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NUCLEAR REGULATORY COMMISSION

Title: Dominion Nuclear North Anna LLC

Docket Number: 52-008-ESP; ASLBP No. 04-822-02-ESP

Location: Louisa, Virginia

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UNITED STATES OF AMERICA
U.S. NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

+ + + + +

IN THE MATTER OF ||
DOMNINION NUCLEAR ||
NORTH ANNA LLC ||
 ||

Docket No. 52-008-ESP
ASLBP 04-822-02-ESP

Louisa County Public Meeting Room
Executive Board Room
1 Woolfolk Avenue
Louisa, Virginia

Tuesday, April 24, 2007
9:00 a.m.

BEFORE:

ALEX S. KARLIN, Administrative Judge
THOMAS ELLEMAN, Administrative Judge
RICHARD F. COLE, Administrative Judge

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

9:01 a.m.

JUDGE KARLIN: Good morning. Mr. Court, please let's go on the record at this point. This is the Atomic Safety Licensing Board Panel of the U.S. Nuclear Regulatory Commission. We are meeting here in the matter of Dominion North Anna Nuclear LLC. For the record, I want to reflect that this is an application for an early site permit at the North Anna site in Virginia. The docket number of this case is 52-008-ESP and it's ASLBP 04-822-02-ESP, ESP standing for Early Site Permit, obviously.

For the record, today's date is April 24, 2007. This proceeding is being held in the Louisa County Council Room, the Board of Supervisors' room in Louisa, Virginia and is being held pursuant to a second revised scheduling order that we issued on January 4, 2007 and also an order on March 20, 2007 that laid out in some greater detail how we would proceed and the agenda for the day.

I thought we would begin by introducing ourselves and then talk a little bit about the proceeding. We're three administrative judges appointed to conduct the judicatory hearings on behalf of the Commissioners of the Nuclear Regulatory

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1 Commission.

2 To my right is Dr. Richard Cole. He is a
3 Ph.D. from UNC Chapel Hill, I was told to say it was
4 Chapel Hill, in Civil Engineering and a diplomat of
5 the American Academy of Environmental Engineers. To
6 my left is Dr. Thomas Elleman, a Ph.D. in Physical
7 Chemistry from Iowa State and formerly the head of the
8 Nuclear Engineering Department of NC State. Dr.
9 Elleman is formerly a certified health physicist. My
10 name as I said before, I think, is Alex Karlin. I'm
11 a lawyer by training. I spent 30 years basically
12 doing environmental law and have been here for three
13 years and I'm the Chair of this particular Board.

14 Other members of our staff I'd like to
15 recognize today here are Dr. Bill Reed, William Reed.
16 He's appointed as a new judge to the ASLBP recently.
17 He has a Ph.D. from MIT and he formerly worked at the
18 Los Alamos Nuclear Lab or National Lab as Deputy
19 Director of Applied Physics Division and the
20 Theoretical Division. Just wave your hand, Dr. Reed.
21 And more recently, he was with DoE serving the
22 accelerated strategic computational initiative.

23 Marcia Carpentier is a lawyer and a law
24 clerk to the Board and she works closely with us on
25 research and helping develop our approaches and today

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1 she will help us a little bit with the time and how we
2 want to manage time.

3 Ashley Prange is an administrative
4 assistant with the NRC in the back there, if you could
5 raise your hand. If you have administrative
6 questions, she may be able to help you. So please
7 keep that in mind.

8 Roger Hannah and Yvonne Core are here in
9 the Public Affairs and if the media or anyone else has
10 a question, I think they can probably be the right
11 people to try to respond to that. And Drew Pretzello
12 is our security officer in charge of security at NRC
13 and he's helped with this.

14 With that, perhaps we could ask the
15 parties to introduce themselves. I guess we would
16 start with Dominion North Anna. Mr. Lewis.

17 MR. LEWIS: Thank you, Judge Karlin. My
18 name is David Lewis. I'm with the law firm of
19 Pillsbury Winthrop Shaw Pittman representing Dominion
20 Nuclear North Anna and with me at the counsel table is
21 Mr. Robert Haemer of the same firm.

22 JUDGE KARLIN: Great. Very good. Thank
23 you. The staff.

24 MS. POOLE: Good morning, Your Honors.
25 I'm Brooke Poole with the NRC staff. With me at

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1 counsel table are Robert Weisman to my left and James
2 Biggins to the right.

3 JUDGE KARLIN: Good morning. Welcome.
4 I'm sure you each have some members of your staff and
5 of your client here as well, but we probably can't go
6 into introductions of them. We'll meet them as they
7 testify and other matters. I would also like to thank
8 the Louisa County Government and Board of Supervisors
9 for allowing us to use this very nice and modern
10 facility. We're a little tight here, but I hope if
11 you all bear with we can make it work. It's not our
12 courtroom back in Rockville, but I think that we felt,
13 in other words, this Board felt it was better to have
14 something in the vicinity of the facility. That is
15 the policy of the NRC whenever possible. So I wanted
16 to do that.

17 Lee Linetecum is the County Administrator
18 and I would like to thank him and particularly Amanda
19 Lloyd who is the administrative assistant who helped
20 us set this up in their modern and high tech sort of
21 space. It's very similar in its technical abilities
22 it seems to our courtroom back in Rockville. And
23 welcome any members of the public and media who may be
24 here.

25 We're here to conduct an evidentiary

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1 hearing on Dominion North Anna's application for an
2 early site permit. This is the cumulation of a number
3 of years of work and litigation in this case and in
4 any application for an early site permit, the law, the
5 Atomic Energy Act and NEPA require that a hearing be
6 held and that is what we're going to do today. It's
7 in the nature of a trial and we'll talk about that in
8 a minute.

9 It's a time for the parties, their lawyers
10 and their witnesses to talk and the judges to ask
11 questions and it's not a time for the public to make
12 statements or participate in that way. We did have a
13 limited appearances statement session in February,
14 February 8th, in Louisa County High School and that
15 was a different opportunity for the public to
16 participate.

17 So before we start, I like to sort of
18 cover five items to introduce the members of the
19 public to what this is about and how we'll proceed.
20 One of the them is housekeeping matters. The second
21 is what is the Atomic Safety and Licensing Board.
22 Third is the history of this proceeding. Fourth is
23 what is an early site permit and fifth is procedures
24 we're going to use today.

25 So with that on housekeeping matters

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1 again, very basic, obviously turn off your cell phones
2 if you would please. If you have any cell phone
3 conversations, please conduct them outside of the
4 room. The media are welcome. If they want to do
5 photography, that's fine if they can stay stationary
6 in the back of the room and use ambient lighting only.
7 That's the approach and the policy we use.

8 A transcript of this proceeding will be
9 made and will be made available to the public. We
10 have our court reporter here. This probably takes
11 about two weeks before the transcript is made
12 available on the website of the NRC>

13 Second, the nature and role of the Atomic
14 Safety and Licensing Board, I always want to take a
15 look at my notes and make sure I cover this right, but
16 there are a number of proceedings that have probably
17 gone on down here in the neighborhood and facility and
18 the communities around here and we thought we'd
19 explain what the Board is and what Board isn't. We
20 have three judges who have been appointed by the
21 Commissioners of the NRC to serve on these boards and
22 to hold these hearings as required by the law.
23 Federal law creates five commissioners of the NRC.
24 They are appointed by the President. They're
25 confirmed by the Senate and they are the governing

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1 body of the Nuclear Regulatory Commission.

2 In addition to the Commissioners
3 themselves, there is a large staff that works for the
4 NRC, over 3,000 professionals who work on reviewing
5 materials licenses, applications and reactor license
6 applications and the staff in this case through a lot
7 of work and is represented by Ms. Poole and her
8 colleagues in the legal area. They did a safety
9 evaluation report. They did an environmental impact
10 statement. The staff would have held public hearings
11 in association with some of those events and they've
12 been down here. So you have the Commissioners, you
13 have the staff and then you have this Board.

14 This Board is a different entity. We're
15 independent of and separate from either the
16 Commissioners or the staff. By nature of the
17 regulations, we are prohibited from talking with the
18 staff or the Commissioners about anything about this
19 proceeding. All we know is what we receive in
20 evidence in writing and oral testimony and prior
21 filings of these matters and we are assigned to call
22 them the way we see and try to take a look at the
23 issues, the legal issues, that circumscribe our role
24 and to resolve and answer them in the best way we see
25 fit.

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1 If somebody doesn't like the ruling that
2 we end up issuing on this, they can appeal it to the
3 Commissioners and if they don't like that, they can
4 appeal it to the Court. So there is a process and
5 this is sort of the initial decision making process.
6 We make the decision whether this early site permit is
7 to be issued, grant or deny. Either way, it can be
8 appealed to the Commissioners and they can affirm us
9 or reverse us.

10 History, a brief history, the third item
11 I'd like to cover here. Virginia Electric Power
12 Company, a subsidiary of Dominion Resources, owns the
13 North Anna Power Station site and the land surrounding
14 Lake Anna. They have two nuclear reactors there now.
15 In September 2003, Dominion Nuclear North Anna LLC,
16 and we'll probably just say Dominion as we proceed to
17 shorten all that, but the Dominion Nuclear North Anna
18 LLC which is a separate subsidiary of Dominion
19 Resources, submitted an application for early site
20 permit for up to 16 new nuclear reactors to be located
21 at this same spot on the same site on the lake and
22 these are referred to as two units, Units 1 and 2.
23 I'm sorry. Three and 4. Units 1 and 2 are already
24 there. Three and 4 are the numbers for them, but each
25 one may have up to at least eight nuclear reactors for

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1 a total of 16 new ones.

2 At the outset of this proceeding, in
3 December of '03, the Commission issued a notice in the
4 *Federal Register* saying that if anyone wanted to
5 request a hearing in this matter, they could submit a
6 notice, submit a request for a hearing and raise
7 contentions. Several parties led by the Blue Ridge
8 Environmental Defense League and Nuclear Information
9 Resources Services and Public Citizen did file a
10 request for a hearing and raised a number of
11 contentions.

12 In June of '04, a predecessor board, a
13 board of different judges in this matter, held a
14 conference in Rockville, Maryland and heard arguments
15 from BREDL and from the Applicant and the staff as to
16 whether or not the contentions presented by the Blue
17 Ridge Defense League warranted admission as proper
18 contentions and indeed that board did rule that two of
19 the contentions by BREDL and I use that acronym, I
20 hope you'll understand, that board did admit two
21 contentions and they ruled that a hearing should
22 indeed be granted.

23 Contention 1, I will call it, dealt with
24 the concern that the environmental report submitted by
25 the Applicant had failed to address or failed to

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1 adequate address the adverse impacts on striped bass,
2 the alleged adverse impacts on striped bass, in Lake
3 Anna and downstream arising from increased water
4 temperature. I'm paraphrasing but that was
5 essentially it. And Contention No. 2 said that the
6 environmental report submitted by the Applicant failed
7 to address the no action alternative and that was a
8 complaint under, both of those, were under, NEPA, the
9 National Environmental Policy Act.

10 So that board granted the hearing request
11 in August of 2004 and so we go through this every
12 time, the national question for the members of the
13 public. If in August of 2004, the request for the
14 hearing was granted, why are we only having this
15 hearing now in April of 2007, two and a half years
16 later? And part of the answer is that under the NRC
17 regulations, we're not allowed to have the evidentiary
18 hearing until the final environmental impact statement
19 is completed and the staff spent a lot of time working
20 on the environmental impact statement and they went to
21 public hearings and they went off and did another
22 iteration of it and that took more than a year's worth
23 of work. So that was an action we had to wait for
24 before we could actually hold this hearing.

25 Another part of the answer is that the

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1 Applicant after listening to public comments
2 associated with the draft environmental impact
3 statement and for whatever reasons, the Applicant
4 decided to substantially adjust its application and
5 change the method of treating the hot water or the
6 water from the facility, Unit 3, was going to use and
7 convert it from once-through cooling water to a
8 combination of dry and wet cooling and also to
9 increase the power load for each unit from 4,300
10 megawatts thermal to 4,500 megawatts thermal. Those
11 two changes resulted in a need for the staff to go
12 back and look at a number of things and that also
13 ended up consuming a goodly amount of time. So we had
14 to wait basically two years for those activities to be
15 completed and a final environmental impact statement
16 was issued in December of '06 and at that point, it
17 triggered a number of activities by us to reach this
18 point here today.

19 Meanwhile, we did a few things at this
20 Board, first off, the two contentions by BREDL. One
21 contention as I said was that they had failed to, the
22 Applicant had failed to, cover the no action
23 alternative in its environmental report that it was
24 required to submit. The Applicant, I think, changed
25 its environmental report, fixed that matter, did cover

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1 the no action alternative and pursuant to an agreement
2 of the parties, BREDL, the Applicant, the staff, all
3 agreed this is dropped. That contention was settled.
4 The complaint had been satisfied.

5 The other contention dealt with rockfish
6 and the thermal impacts on rockfish and after the
7 Applicant had changed its application to convert from
8 once-through cooling water to the cooling towers, they
9 filed a motion for summary disposition saying that
10 contention is no longer admissible or legitimate
11 because they've eliminated 99.9 or whatever on a
12 substantial or normal style of the thermal impacts.
13 We looked at that. We listened to briefings from each
14 of the parties on whether that contention was still
15 viable after that change and we granted a summary
16 disposition on that point saying that contention is no
17 longer fair or legitimate because it's a substantial
18 change that occurred.

19 BREDL did not file any additional
20 contentions and so now we have a proceeding whether --
21 BREDL is not a party at this point. They did submit
22 public comments in the limited appearance sessions,
23 both oral comments and written comments. We received
24 some as recently as April 19th or it was dated April
25 19th. So now the two parties in this case are the

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1 Applicant and the staff.

2 In immediate runup to this proceeding
3 since the filing of the environmental impact statement
4 was issued, we held, as I said, a limited appearance
5 statement session for the members of the public to
6 give us comments as to what they thought we should
7 focus on and that was held here in Louisa County on
8 February 8, 2007. We issued over 100 environmental
9 questions to both the staff and the Applicant after
10 having read the EIS, it's a multi-volume EIS, and
11 multi-volume SER.

12 We read both of those as carefully as we
13 could. We asked over 100 questions on the EIS. We
14 asked over 100 questions on the SER in two separate
15 waves and the parties answered them on their own.
16 Dominion answered the entire set as did the staff and
17 they submitted a lot of documentation to us. We have
18 read that material and the judges all agree to thank
19 again the parties for the substantial amount of work
20 they did in answering those questions. We thought the
21 questions were important. They concerned us and we've
22 gotten answers. We don't necessarily agree with all
23 the answers, but we've gotten the answers and I think
24 we understand most of them.

25 Now we are having this hearing. As an

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1 immediate prior to the hearing, written testimony has
2 been submitted by the parties by the witnesses on the
3 key issues in this case. Documents and exhibits have
4 been submitted and will be submitted in here this
5 morning and then we are going to take testimony on
6 seven topics that we thought were important. Let me
7 see if I have that. I'll get to that a little bit
8 later as to what those topics are.

9 Fourth point, what is an early site
10 permit? In essence what this application is for is as
11 I said Dominion is saying they may want to build
12 additional nuclear reactors on the site on Lake Anna.
13 They are not committing to build new nuclear reactors.
14 They're just saying at this point -- And they haven't
15 even decided what kind of nuclear reactor it could be.
16 Each unit could be one large reactor or eight smaller
17 reactors. So they haven't decided what kind of
18 reactors they want to build, but they have decided
19 that they think this is going to be a good site for it
20 and they would like an early site permit that focuses
21 on whether or not the site is environmentally
22 satisfactory, safe and an environmentally, reasonably
23 good choice and so they're getting a site, they're
24 asking for a site permit. The types of reactors are
25 unknown.

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1 If and when they get the site permit, then
2 it basically puts the site in the bank for 20 years.
3 For 20 years, Dominion has the automatic right as it
4 resolved the site issues. Those do not get to be
5 revisited later, but in 10 years, 20 years, two
6 months, they could come in and say, "Thank you for
7 that early site permits you gave us. Now we want to
8 build some reactors and we know what kind of reactors
9 they are and we know where we're going to put them
10 exactly on that little site." So they have to get a
11 separate permit for that which would actually allow
12 them to construct and operate the particular type of
13 reactors. It's only one step in the process. It
14 doesn't really get them the right to build at this
15 point, just reserve the site for them.

16 Fifth and final procedures, what we're
17 going to follow today, the evidentiary hearing is
18 essentially the trial of the case. Lawyers, as I say,
19 ask the questions. They present witnesses. Witnesses
20 testify. The judges ask questions and actually most
21 of this is going to be the judges asking the questions
22 and the focus of our questions will be on seven areas
23 that we'll talk about in a minute.

24 How we're going to proceed specifically is
25 for opening statements. Each party will get a chance

1 to give an opening statement up to 30 minutes long
2 explaining a bit of an overview of their case to us
3 and to the public as they choose and we'll go with the
4 Applicant first and then the staff. Then there will
5 be the admission of written evidence. These are the
6 written documentary materials, the exhibits. We have
7 a list of several dozen of them we have to formally
8 admit and this will maybe take a half an hour.

9 Then we are going to go through seven
10 topics. The first topic is surface water impacts and
11 possible mitigation measures. The second topic is
12 site hydrology and groundwater issues. The third is
13 tritium. The fourth is radiological releases and
14 doses from normal operations. Fifth is NEPA
15 alternatives and whether the staff has adequately
16 considered all the reasonable alternatives as required
17 by NEPA. Sixth is something we call the zero release
18 commitment which is a proposed permit condition that
19 the staff has proposed which essentially says there
20 shall be no releases into the groundwater. And the
21 seventh item is seismic issues recovered and we have
22 some questions about those.

23 In each topic, the staff will put on some
24 witnesses. They'll sit right up here and then we'll
25 ask, the judges will ask, them some questions. Then

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1 what we'll do is let the staff ask any followup
2 clarification questions it may need to ask if we've
3 gotten off track in some way and it will be limited to
4 that sort of thing, just clarification.

5 Then the Applicant will have any
6 opportunity to put on witnesses on the same topic.
7 Let's just say it's tritium. They'll put on their two
8 or three or whatever witnesses they have and likewise
9 we'll ask some questions and then the Applicant will
10 have a chance to seek clarification.

11 We ask and I think we've mentioned this
12 before that when we start on a particular topic like
13 tritium the witnesses for the staff will go first. It
14 would probably be a good idea for the witnesses for
15 the Applicant to sit in the room and listen.
16 Obviously, you get a heads-up as to what we're
17 inquiring about. But also one of our first questions
18 might be "You heard what the staff said. Do you have
19 any significant changes, alternations, concerns or
20 supplements that you think we need to hear about?"

21 I'm might also add that each set of
22 witnesses at least on most of the topics we're going
23 to hear, if they wish, a presentation, a brief
24 introductory presentation of 15 minutes. We've asked
25 them to keep it to 15 minutes total. And if they have

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1 PowerPoint slides, hopefully they will be visible to
2 everyone on these screens.

3 And that's our process. Let's see if I'm
4 missed anything. At the end of the entire proceeding,
5 we then may have some legal questions. We do have
6 three legal questions we've already talked to the
7 parties about. One of them deals with the
8 Commission's Environmental Justice Policy. Another
9 deals with the fact that the Commission has just
10 issued new regs, new regs. dealing with Part 52.
11 That's the area that deals with early site permits and
12 although those regs. are strictly speaking applicable
13 to this proceeding, there might be information that
14 could inform us on some of the issues we've talked
15 about. So we'll get to that. And the other is the
16 Commission has dealt with what we call the zero
17 release commitment in two other cases already, two
18 other decisions by the Commission, and we'd like to
19 just inquire a little bit from them about how they
20 think those other decisions govern or apply or inform
21 what we should be doing in this case.

22 We hope to complete this by Friday, this
23 Friday, the 27th and I think we will. If we don't,
24 however, we are prepared to proceed as long as it
25 takes. We have reserved both this courtroom and the

1 Rockville courtroom next week. What we plan to do
2 unless something weird comes up is that we would
3 probably reconvene in Rockville on Tuesday, May 1st if
4 it's necessary to continue to the next week. It will
5 probably go 9:00 a.m. to 5:00 p.m. each day this week.

6 With that, I pause if we have anything.
7 Gentlemen?

8 JUDGE ELLEMAN: The only additional
9 comment I would make is the questions we ask, the
10 responses to those questions as well as all of the
11 other documents mentioned by Judge Karlin, all of that
12 is publicly available and can be accessed online
13 through the NRC Document Room.

14 JUDGE KARLIN: Right. Thank you. With
15 that I think we're ready to commence and I think that
16 would involve Dominion Nuclear North Anna giving us
17 their opening statement. Mr. Lewis.

18 MR. LEWIS: Thank you, Judge Karlin. Good
19 morning, Judge Karlin, Judge Elleman and Judge Cole.
20 On behalf of Dominion, I would like to welcome you to
21 Virginia and also to Louisa County which is the North
22 Anna Power Station's hub community.

23 Before you in this proceeding is
24 Dominion's application for an early site permit which
25 in essence is a request for a determination that the

1 North Anna Power Station is suitable for additional
2 nuclear units. Although the North Anna Power Station
3 is an operating nuclear plant with two operating units
4 and indeed was originally approved for four units,
5 Dominion has nevertheless carefully evaluated the site
6 against the NRC's current siting criteria and in
7 addition, has prepared a comprehensive environmental
8 report to demonstrate that the site remains suitable
9 for additional units.

10 That review has been painstaking. By my
11 estimate, Dominion and its contractors will have
12 expended approximately 100,000 hours preparing the
13 application, performing the many analyses,
14 calculations, reviews, that went into it, responding
15 to the NRC's staff's questions, interacting with the
16 state and public on issues raised by the application
17 and supporting the staff's review.

18 Overall, when this process is finished,
19 Dominion will have spent on the order of \$20 million
20 demonstrating that the North Anna site remains
21 suitable for additional units. Not only has
22 Dominion's review been extensive, but Dominion has
23 endeavored to be responsive to the comments and
24 concerns that have been raised through this
25 proceeding. Nowhere is this more apparent in

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1 Dominion's decision than in Dominion's decision to
2 alter its proposal and install closed cycle-cooling
3 inside their cooling system and that is no
4 insignificant change. It essentially eliminated any
5 significant thermal impact. It reduced the water
6 consumption and it is one that will cost Dominion in
7 the end approximately \$200 million, but we did it
8 because we listened to the comments from the public
9 and the agencies and because after considering those
10 comments, we decided it was the right thing to do.

11 The NRC staff's review has also been
12 painstaking. We estimate that the NRC staff has spent
13 approximately 40,000 man-hours reviewing Dominion's
14 application over a three-year period. It has been a
15 very intensive review. That review has included
16 independent analyses of the issues that the NRC staff
17 found were important. With respect to environmental
18 matters, Appendix A of the final environmental impact
19 statement indicates that 28 members of the NRC staff
20 worked on preparing that analysis and they were
21 supplemented by an additional 31 scientists from the
22 Pacific Northwest National Laboratory.

23 In addition, the NRC staff's review
24 included input from numerous federal and state
25 agencies including just to name a few, Fish and

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1 Wildlife Service and NOAA Fisheries, the Army Corps of
2 Engineers, the Virginia Department of Environmental
3 Quality, the Virginia Department of Game and Inland
4 Fisheries, the Virginia Department of Conservation and
5 Recreation, the Virginia Department of Health and the
6 Virginia Department of Historic Resources and there
7 were quite a few others that are fully documented in
8 the final environmental impact statement.

9 Of course, the NRC staff review also
10 included input from the public and they held a number
11 of public meetings and solicited public comments.
12 They held meetings and solicited comments initially on
13 what should be the scope of the environmental review.
14 Then after they prepared their draft environmental
15 statement, again they solicited public comments and
16 held public meetings to get at public input to inform
17 their eventual proposed findings and evaluations.

18 The result is the safety evaluation report
19 and final environmental impact statement by the staff
20 that are comprehensive and thorough and therefore,
21 Dominion asks this Board to find that the staff's
22 review has been sufficient and make the findings that
23 are prerequisite to issuance of ESP. Thank you.

24 JUDGE KARLIN: All right. Thank you.
25 Commendable brevity. Thank you. I might add that you

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1 have submitted obviously a great deal of written
2 material including a written statement of position and
3 we appreciate that you just didn't try to repeat that
4 but gave us a brief review. Thank you.

5 Staff. Ms. Poole.

6 MS. POOLE: Good morning, Your Honors.
7 Thank you. We're pleased to be here today and are
8 prepared to address the seven hearing issues set by
9 the Board in its March 20th order as well as other
10 questions subsequently set by the Board.

11 The primary purpose of the staff's opening
12 statement is to provide the structure of the proposed
13 North Anna early site permit for the Board's
14 information at the outset. This was also done at the
15 conclusion of the Grand Gulf early site permit
16 proceeding and we thought a similar presentation might
17 be useful here.

18 The staff provided a draft of the proposed
19 permit to the Board in its pre-filed materials that
20 was identified as Staff Exhibit 17 in our exhibit list
21 that was provided on April 10, 2007. It should be
22 noted that the staff provided this draft permit to the
23 Licensing Board as part of the staff's response to
24 Factual Question 3 as set forth at pages 11 and 12 of
25 the Board's March 20th order. Due to its status as a

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1 draft, the permit will change as to its factual
2 contents should it be ultimately issued. However, for
3 the purpose of providing the Board with information as
4 to its form and content, the Staff hopes that the
5 draft permit provided will serve as a useful
6 reference.

7 By way of background, as we all know, the
8 primary purpose of 10 CFR Part 52 is to resolve issues
9 associated with construction and operation of new
10 power reactors early in the process. Certainly a
11 combined license or COL applicant can do just that by
12 applying for a COL and resolving all issues prior to
13 beginning construction. There are other licensing
14 processes in Part 52 including design certification
15 and the early site permit that allow for even earlier
16 resolution of issues.

17 An early site permit deals exclusively
18 with siting matters. On the safety side, the
19 Commission stated in its proposed rulemaking for Part
20 52 that siting decisions should be made without
21 detailed design information. That reference is 53
22 *Federal Register*, page 32065, dated August 23, 1988.
23 Additional detail with respect to this background set
24 forth in the staff response to Petitioner's
25 contentions regarding the permit application for the

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1 North Anna site was filed on May 28, 2004. For your
2 reference, see pages 638 and 12-14 of that answer.

3 Having said that, previously in 10 CFR
4 Part 100 siting and design were intermixed. In 1996,
5 the Commission promulgated a revision to Part 100 to
6 partially separate the two. The design requirements
7 were moved into 10 CFR Part 50 and the designing
8 requirements left in Part 100. That reference is 61
9 Federal Register at page 65157 dated December 11,
10 1996. Part 100 became effective in January 1997.

11 Briefly, the regulations in Part 52
12 provide a basic structure for the early site permit.
13 Section 52.17(a)(1) defines the substantive matters
14 that the staff assesses in connection with an ESP
15 application. This includes four matters. First, the
16 rule references Section 50.34(a)(1) as it relates to
17 the acceptability of a site under identified
18 radiological consequence evaluation factors. Second,
19 site characteristics must comply with Part 100.
20 Third, Sections 30.54(a)(2) and throughout, this is
21 reference to Title X of the Code of Federal
22 Regulations. Sections 50.34(a)(12) and (b)(6)
23 reference 10 CFR Part 50 Appendix S which has to do
24 with seismic and geotechnical matters, primarily the
25 safe shutdown earthquake and seismically induced

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1 flood, both of which will be reflected in any permit
2 issued as site characteristics and finally, Section
3 50.34(b)(6)(v) which has to do with emergency
4 planning. Section 52.17(b) goes into detail as to
5 what emergency planning standards are required at the
6 ESP stage, the point being that the safety review that
7 is required at the ESP stage is only for siting. In
8 addition, Section 52.17(a)(2) requires the submission
9 of an environmental report as mentioned by Mr. Lewis
10 which is considered by the staff when it prepares its
11 environmental impact statement or EIS in connection
12 with the application.

13 Unless the Board has any questions on the
14 background, I would like to proceed to briefly go
15 through the provision of the draft permit that was
16 provided as Staff Exhibit 17.

17 JUDGE KARLIN: Please go ahead.

18 MS. POOLE: Section 1 of the permit
19 contains the findings that the Commission is required
20 to make in order to issue an early site permit. Item
21 1A contains a finding that the permit complies with
22 the applicable requirements of the Atomic Energy Act
23 of 1954 as amended, that's the AEA, and the applicable
24 rules and regulations of the Commission and that all
25 required notifications to other agencies or bodies

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1 have been duly made. That requirement is derived in
2 part from AEA Section 185 and is modeled on 10 CFR
3 Section 50.50 entitled "Issuance of Licenses and
4 Construction Permits." That applies to construction
5 permits and it is also required by Section 52.24.
6 That's subpart A of the regulations that pertain to
7 ESPs. The portion of the finding pertaining to
8 required notifications derives largely from the
9 notification requirements set forth in 10 CFR Section
10 2.101.

11 Item 1B contains a finding explicitly
12 required by 10 CFR Section 52.21 that taking into the
13 consideration the site criteria contained in Part 100
14 a reactor or reactors having design characteristics
15 that fall within the site characteristics and
16 controlling parameters of the North Anna ESP site can
17 be constructed and operated without undue risk to the
18 health and safety of the public. This finding is
19 somewhat similar to the finding required for a
20 construction permit under Section 50.35 (a)(4)(ii).

21 Item 1C is a reasonable assurance finding
22 that the Commission makes whenever it approves a
23 licensing action. This is derived from AEA Section
24 182A for a construction permit. The associated
25 regulatory findings are in 10 CFR Section 52.24 for an

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1 ESP and Section 50.4(a) for a construction permit. In
2 essence, this finding is a summary of all required
3 safety findings.

4 Item ID is also a finding that the
5 Commission must make when it approves a licensing
6 action. This finding is taken directly from AEA
7 Section 103(d) and is reflected in 10 CFR Section
8 50.40(c) for a construction permit. Although it's not
9 explicitly identified in Part 52 subpart A, the staff
10 believes that Section 52.24 would also require that
11 finding. The finding also derives from 10 CFR Section
12 100.21(f) which requires that site characteristics be
13 such that adequate security plans and measures can be
14 developed.

15 Item 1E pertains to emergency plans. As
16 you know, there are a couple different options that an
17 applicant may request in an ESP application. Here the
18 Applicant requested considerable of certain major
19 features of emergency plans. They did not seek to
20 have approved complete and integrate emergency plans.
21 The Applicant's request is consistent with 10 CFR
22 Sections 52.17(b)(1) and 52.18. The major features
23 finding is also in partial compliance with 10 CFR Part
24 50 Appendix E.

25 This item, Item 1E, also includes the

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1 finding that there is no significant impediment to the
2 development of emergency plans at the ESP site. These
3 findings are supported by the staff's review in
4 Chapter 13 of the final safety evaluation report.

5 Provision 1F relates to satisfaction of
6 the National Environmental Policy Act and 10 CFR Part
7 51. The staff's review in support of this finding is
8 discussed in its April 10, 2007 written statement at
9 pages 43 and 49.

10 Finally, Item 1G pertains to the
11 Applicant's request to conduct site preparation and
12 preliminary construction activities pursuant to 10 CFR
13 Sections 52.17(c) and 52.10(e)(1). This finding is
14 consistent with 10 CFR Section 52.25(c).

15 Section 2 of the draft permit is really
16 the embodiment of the Commission's decision to issue
17 an early site permit to the Applicant. It's based on
18 the findings I've just discussed in Section 1. I
19 would also note that it is here that the thermal power
20 level is addressed. As would be done for a reactor
21 operating license, the draft permit lists maximum
22 thermal power level for each unit which as you
23 mentioned, Judge Karlin, could be a number of modular
24 units also as well as a total maximum thermal power
25 for the site.

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1 Section 3 simply describes that the ESP
2 shall be deemed to contain and is subject to the
3 conditions specified in the Commission's regulations,
4 the Atomic Energy Act and so forth. This section also
5 specifies certain conditions. Item 3A concerns the
6 site characteristics which are incorporated into the
7 draft permit as Appendix A to the permit. A way that
8 this appendix would be used is if a COL applicant were
9 to reference both the certified design and this ESP if
10 it were ultimately granted.

11 The Commission's rules governing design
12 certification require that a D.C. applicant describe
13 site parameters postulated for the design. Examples
14 of this would be maximum wind speed or the 100-year
15 snow pact. If those values fall within the site
16 characteristics that are incorporated into the permit,
17 then we know that the design can be built at this
18 particular site. To the extent that a COL applicant
19 uses information relating to a site characteristic
20 considered in this ESP proceeding that was not
21 included in the certified design to show that it's
22 practicable to build a facility at its chosen site,
23 then that information would be consider anew at the
24 COL stage as to whether the design itself was adequate
25 to justify that value. In other words, the staff did

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1 not evaluate in the context of this ESP the
2 correctness of a design.

3 Item 3B states that controlling values of
4 parameters as well as the accident source term plant
5 parameters are incorporated in to the permit. These
6 are set forth in Appendix B of the draft permit. What
7 this item is intended to address with respect to
8 controlling values of parameters is that the existence
9 of a plant in most cases is not going to affect site
10 characteristics. However, there are few areas, in
11 this case hydrology, one area, where the existence of
12 the plant can affect a site characteristic. To ensure
13 in a safety context that the site characteristic
14 remains appropriately bounded at the COL stage, the
15 COL applicant will have to show that those design
16 parameters match the design parameters used in the
17 evaluation of the site characteristic at the ESP
18 stage.

19 I should not that the draft permit you
20 received on April 10th did not include this appendix.
21 For your information, the two bounding parameters that
22 would be included are maximum cooling water flow rate
23 for Unit 3 and minimum finish site grade. So, for
24 example, the design of the plant determines cooling
25 water flow rate. In addition, as mentioned, the

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1 accident source term plant parameters are also
2 included in Appendix B. I'll come back to Item 3C
3 because Item 3D is similar to the one I've just
4 discussed.

5 In the environment context, Item 3D states
6 that values of plant parameters considered in the
7 environmental review of the application as set forth
8 in Appendix D, D as in Delta, are incorporated into
9 the permit. This is a complete set of the values
10 making up the plant parameter envelope or PPE used as
11 the basis for the staff's environmental review in this
12 case. The reason this is in the permit is because
13 without some set of bounding parameters, it's
14 impossible for the staff to know what effect the plant
15 will have unless there is in effect a plant to
16 analyze. The PPE allowed the staff to essentially
17 postulate a plant.

18 The Commission's COL regulations require
19 a COL applicant to show that it's actual proposed
20 plant falls within these parameters. If the actual
21 proposed facility does not fall within these bounds,
22 then the staff will consider the significance of that
23 information in the context of the environmental review
24 that will be performed at the COL stage.

25 Item 3C states that COL action items that

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1 are set forth in Appendix C to the permit are
2 incorporated into the permit. COL action items are
3 matters that any applicant referencing this ESP, if
4 granted, would be required to address in some way in
5 the final safety analysis report at the COL stage.
6 After issuance of a COL or a CP if an applicant were
7 to proceed under Part 50, these items would not be
8 requirements for the permit holder or licensee unless
9 they are included in any permit or license issued at
10 that time.

11 Sections E and I, skipping around a little
12 bit, of the draft permit address conditions. Section
13 E sets forth eight safety conditions that are
14 applicable with regard to this permit. They are
15 identified in the final safety evaluation report.
16 Similarly, Section I sets forth three environmental
17 conditions that were identified in the final
18 environmental impact statement.

19 Sections F, G and H of the draft permit
20 pertain to the site redress plan. These sections are
21 accompaniments to the finding made in Section 1G
22 discussed above. It specifically authorizes the
23 permit holder to perform the activities authorized by
24 10 CFR Section 52.25 insofar as those activities are
25 described in the Applicant's site redress plan. The

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1 conduct of any other activities requires prior NRC
2 approval. In addition, the permit holder must obtain
3 the right as stated in the draft permit to implement
4 the site redress plan prior to initiating any
5 authorized activities. Section G, finally, requires
6 the permit holder to notify the NRC and the existing
7 North Anna plant operator at least 120 days before
8 commencement of authorized activities, certifying to
9 the NRC that all required permits have been obtained
10 for any such activities.

11 Section H addresses the situation present
12 here where the Applicant has submitted a site redress
13 plan but has not yet obtained a Clean Letter Act
14 Section 401 certification prior to issuance of the
15 permit. The permit holder pursuant to that condition
16 shall not perform such activities until the permit
17 holder obtains the required certification or in the
18 alternative, a determination from the Commonwealth of
19 Virginia that no certification is required. The
20 permit holder must submit documentation of whatever
21 determination it receives to the NRC prior to
22 commencement of any such activities.

23 Section J of the draft permit simply
24 requires that a COL applicant referencing this ESP
25 must develop an environmental protection plan or EPP

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1 for construction and operation of the proposed reactor
2 and include that EPP in the COL application. This
3 item derives from 10 CFR Section 50.36(b) which
4 requires an EPP for operating licenses. The staff's
5 practice has been to include an EPP in each
6 construction permit in furtherance of NEPA. In this
7 way, the NRC is informed of environmental events that
8 occur during construction and that enables the agency
9 or the permit holder as appropriate to notify other
10 effected agencies.

11 Section 4 imposes the obligation on the
12 permit holder to be in compliance with 10 CFR Part 21.
13 This requires the permit holder to maintain all
14 information that formed the foundation for granting
15 the permit so that if a later defect were identified
16 it would be possible to do that and comply with Part
17 21.

18 Section 5 simply gives the effective date
19 of the permit and its expiration date.

20 The appendices are described in the
21 various conditions that I've previously discussed.

22 I would like to conclude by stating that
23 it's our view the staff's evidence to be submitted
24 here will be adequate for the Board to make the
25 findings required of it by 10 CFR Section 2.104 as set

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1 forth in the notice of hearing. Further, that
2 evidence in the staff's view will allow issuance of
3 the permit subject the conditions identified as a
4 result of the staff's review.

5 This concludes the staff's opening
6 statement. We will pleased to respond to any
7 questions the Board may have.

8 JUDGE KARLIN: Thank you. Any questions?
9 No. All right. Thank you. No, we don't have any
10 questions. That's very helpful.

11 Now what we'd like to do is move to the
12 commission of the documentary evidence. This is prior
13 to the examination and testimony by the witnesses. We
14 need to get the documents into the record for purposes
15 of legal requirements here. This is a bit of a dry
16 presentation by the parties of the exhibits one by
17 one. If you would, I think we start with the staff.
18 Identify each of your exhibits, the name and a little
19 identification of it for purposes of identification
20 and then at then end move for, I guess, its admission
21 and we'll see if there are any objections and we'll
22 rule.

23 MS. POOLE: Okay. If I may take one
24 moment to give something to my colleagues.

25 JUDGE KARLIN: Sure.

1 (Pause.)

2 JUDGE KARLIN: And we'll want to go
3 relatively slowly through this so we make sure we have
4 three copies of each of the key documents.

5 MS. POOLE: As an initial matter, my
6 colleague, Mr. Biggins, has a revised staff exhibit
7 list that we would like to provide to the Board and to
8 the Applicant.

9 At this time, we would like to identify
10 each of the NRC staff's exhibits and if there is no
11 objection from the Licensing Board offer them as a
12 group.

13 JUDGE KARLIN: That would be fine. Could
14 you tell us what are the differences? Let's see. We
15 have 23 documents here and I think you --

16 MS. POOLE: Yes.

17 JUDGE KARLIN: You have the same numbers,
18 additional numbers. What's the difference about this?

19 MS. POOLE: The differences are in our
20 April 10th exhibit list we had identified brief
21 presentations for the zero release criteria and for
22 alternatives. We've removed those.

23 JUDGE KARLIN: Fine. Okay.

24 MS. POOLE: And in addition, we added
25 Staff Exhibit 22 which I'll mention briefly which is

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1 a Statement of Professional Qualifications for Mary
2 Ann Parkhurst. She will be sitting on a panel and we
3 had not previously provided her statement of
4 qualifications in conjunction with either safety or
5 environmental questions.

6 JUDGE KARLIN: Okay. So it's the deletion
7 of 2 and the addition of 1.

8 MS. POOLE: One.

9 JUDGE KARLIN: So instead of 24, there's
10 23. Okay.

11 MS. POOLE: That's correct. I would also
12 note that each staff exhibit has been premarked as
13 directed by the Licensing Board in its March 20, 2007
14 order. I would make one other observation. In a few
15 cases, the Statements of Professional Qualifications
16 that we've previously submitted are going to require
17 minor corrections. This arises from there's been
18 extensive shuffling between the Office of Nuclear
19 Reactor Regulation and the Office of New Reactors. So
20 some of our witnesses have moved and we'll want to
21 identify their current positions.

22 JUDGE KARLIN: Okay.

23 MS. POOLE: If it's acceptable to the
24 Board we would propose that whatever corrections we
25 have would be identified by the relevant witness at

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1 the time he or she is first impaneled.

2 JUDGE KARLIN: Yes, that makes sense.
3 They've change their current title or position.

4 MS. POOLE: So we're all do that at that
5 time.

6 Staff Exhibit No. 1 is the Safety
7 Evaluation Report for an Early Site Permit (ESP) at
8 the North Anna ESP site. That's NUREG 1835.

9 JUDGE KARLIN: Okay.

10 MS. POOLE: Should we provide them to you
11 one at a time?

12 JUDGE KARLIN: Yes.

13 (Off the record discussion.)

14 JUDGE KARLIN: Yes, these are pretty bulky
15 materials. I realize it.

16 MS. POOLE: If you'll bear with us for one
17 moment while we unpack our box.

18 JUDGE KARLIN: Sure. Unfortunately, what
19 we do need to have is all three copies physically
20 handed in in this great electronic age. Actually, we
21 do have and we are moving the Agency and Atomic Safety
22 License Board are moving to total electron submission
23 of these materials and some of the proceedings that
24 are going on now, that is the Modus Operandi of total
25 electronic. Some of us older guys like to have pieces

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1 of paper that we can look at.

2 (Off the record comments.)

3 MS. POOLE: I'll wait a moment while those
4 are provided.

5 JUDGE COLE: The ones you need are
6 probably at the bottom of the box.

7 (Laughter.)

8 JUDGE KARLIN: From one box to another.

9 MS. POOLE: Okay.

10 JUDGE KARLIN: All right. Are we ready to
11 proceed?

12 MS. POOLE: Ready to proceed.

13 JUDGE KARLIN: So that's Staff Exhibit No.
14 1.

15 MS. POOLE: Staff Exhibit No. 1

16 (Whereupon, the document
17 referred to was marked as Staff
18 Exhibit No. 1 for
19 identification.)

20 JUDGE KARLIN: Safety Evaluation Report.

21 MS. POOLE: Yes. Staff Exhibit No. 2 --

22 JUDGE KARLIN: Do we have that, Ms.
23 Carpentier?

24 MS. CARPENTIER: Yes.

25 JUDGE KARLIN: Okay. It's a good thing.

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1 All right. We have that.

2 MS. POOLE: Staff Exhibit No. 2 is the
3 Safety Evaluation Report for an Early Site Permit
4 (ESP) at the North Anna ESP Site NUREG 1835,
5 Supplement 1.

6 (Whereupon, the document
7 referred to was marked as Staff
8 Exhibit No. 2 for
9 identification.)

10 JUDGE KARLIN: Okay.

11 MS. POOLE: Staff Exhibit 3 is
12 Environmental Impact Statement for an Early Site
13 Permit (ESP).

14 JUDGE KARLIN: Let's let Ms. Carpentier
15 make sure we have it and mark it at least.

16 MS. POOLE: Pardon me.

17 JUDGE KARLIN: Yes.

18 (Off the record discussion.)

19 JUDGE KARLIN: Go ahead.

20 MS. POOLE: Let me start again then. Staff
21 Exhibit 3 is the Environmental Impact Statement for an
22 Early Site Permit (ESP) at the North Anna ESP site
23 final report, NUREG 1811, Volumes I and II.

24 (Whereupon, the document
25 referred to was marked as Staff

1 Exhibit No. 3 for
2 identification.)

3 JUDGE KARLIN: Okay. These are
4 essentially for the audience the three major reports
5 that the staff has put together in analyzing this and
6 it sort of cumulates and crystallizes all of their
7 assessment of the material. These are the safety
8 evaluation reports and the environmental impact
9 statement. We'll be talking about those and asking
10 questions about those today. They're all numbered.
11 You have three.

12 JUDGE KARLIN: We're up to 4. What's 4?

13 MS. POOLE: Staff Exhibit 4 is the July
14 18, 2005 Advisory Committee on Reactor Safeguards
15 Letter Report to the Honorable Nils J. Diaz, Chairman.

16 (Whereupon, the above-referred
17 to document was marked as Staff
18 Exhibit 4 for identification.)

19 JUDGE KARLIN: Okay. Next.

20 MS. POOLE: Staff Exhibit 5.

21 JUDGE KARLIN: If that gets any taller
22 we'll have an OSHA violation.

23 (Laughter.)

24 MS. POOLE: Staff Exhibit 5 is the October
25 13, 2006 Advisory Committee on Reactor Safeguards

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1 Memorandum to Luis Elirojas, Executive Director for
2 Operations.

3 (Whereupon, the above-referred
4 to document was marked as Staff
5 Exhibit 5 for identification.)

6 JUDGE KARLIN: Okay.

7 MS. POOLE: Staff Exhibit 6 is entitled
8 Attachment A, North Anna ESP Safety Inquiries Staff
9 Responses to Safety Questions.

10 (Whereupon, the above-referred
11 to document was marked as Staff
12 Exhibit 6 for identification.)

13 Staff Exhibit 7 is entitled Attachment B,
14 Attachment to NRC Staff's Response to Board Safety
15 Question 86.

16 (Whereupon, the above-referred
17 to document was marked as Staff
18 Exhibit 7 for identification.)

19 Staff Exhibit 8 is entitled Attachment C,
20 Attachment to NRC Staff's Response to Board Safety
21 Question 90, Evacuation Time Estimates for the North
22 Anna Power Station and Surrounding Jurisdictions.

23 (Whereupon, the above-referred
24 to document was marked as Staff
25 Exhibit 8 for identification.)

1 Staff Exhibit 9 are the affidavits of the
2 Staff in support of the Staff's responses to safety
3 questions.

4 (Whereupon, the above-referred
5 to document was marked as Staff
6 Exhibit 9 for identification.)

7 JUDGE KARLIN: And this is the one that
8 includes their CVs and there will be some adjustments
9 perhaps?

10 MS. POOLE: That's correct. Staff Exhibit
11 10 is entitled Exhibit B, North Anna ESP Environmental
12 Questions, Staff Responses to Environmental Questions.

13 (Whereupon, the above-referred
14 to document was marked as Staff
15 Exhibit 10 for identification.)

16 JUDGE KARLIN: One of the things as we're
17 going along we add to the public is all of these
18 documents are -- I think they're all on ADAMS. They
19 all have a ADAMS number. That's the system that the
20 NRC keeps for making public documents available to the
21 public. So they are all on the ADAMS system and the
22 public can review them.

23 I might suggest not all of them are on
24 ADAMS yet, but all of them so far at any rate.

25 MS. POOLE: Staff Exhibit 11 are the

1 affidavits of the Staff in support of the Staff's
2 responses to environmental questions. Here again,
3 there may be a minor change or two with respect to the
4 statements of professional qualifications.

5 (Whereupon, the above-referred
6 to document was marked as Staff
7 Exhibit 11 for identification.)

8 Staff Exhibit 12 is entitled Staff Exhibit
9 C, Staff Response to Board Question 2, Staff
10 Supplemental Response to Environmental Questions.

11 (Whereupon, the above-referred
12 to document was marked as Staff
13 Exhibit 12 for identification.)

14 Staff Exhibit 13 are affidavits in support
15 of the Staff's Supplemental Response to Environmental
16 Questions.

17 (Whereupon, the above-referred
18 to document was marked as Staff
19 Exhibit 13 for identification.)

20 Staff Exhibit 14 is entitled Review
21 Standard, RS 002, Processing Applications for Early
22 Site Permits, dated May 3, 2004.

23 (Whereupon, the above-referred
24 to document was marked as Staff
25 Exhibit 14 for identification.)

1 Staff Exhibit 15 is the pre-filed written
2 testimony of George F. Wonder, in support of the final
3 Safety Evaluation Report and the final Safety
4 Evaluation Report Supplement.

5 (Whereupon, the above-referred
6 to document was marked as Staff
7 Exhibit 15 for identification.)

8 JUDGE KARLIN: That was 15?

9 MS. POOLE: Staff Exhibit 15, yes, Your
10 Honor.

11 JUDGE KARLIN: Okay.

12 MS. POOLE: Staff Exhibit 16 is the pre-
13 filed written testimony of John S. Cushing in support
14 of the final Environmental Impact Statement.

15 (Whereupon, the above-referred
16 to document was marked as Staff
17 Exhibit 16 for identification.)

18 Staff Exhibit 17 is the draft Dominion
19 Nuclear North Anna LLC Early Site Permit.

20 (Whereupon, the above-referred
21 to document was marked as Staff
22 Exhibit 17 for identification.)

23 What is now Staff Exhibit 18 was
24 previously identified as Staff Exhibit 22. Staff
25 Exhibit 18 is slide presentation on Hearing Topic 1,

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1 Surface Water Impacts and Possible Mitigation
2 Measures.

3 (Whereupon, the above-referred
4 to document was marked as Staff
5 Exhibit 18 for identification.)

6 JUDGE KARLIN: This is where we get three
7 copies for the record and four additional copies for
8 the Judges to see, but do we have all of those now?

9 MS. POOLE: I have a separate set.

10 JUDGE KARLIN: We can get those when the
11 actual witnesses come up, I guess will be okay.

12 MS. POOLE: I will at this time also state
13 that as a matter of convenience the Staff has prepared
14 a CD which contains all the exhibits on its revised
15 list as well as the revised exhibit list which we'll
16 provide to you for your use.

17 JUDGE KARLIN: That would be very helpful,
18 yes.

19 MS. POOLE: Staff Exhibit 19 which is the
20 Staff's slide presentation on Hearing Topic 2, Site
21 Hydrology, was previously identified as Staff Exhibit
22 18.

23 (Whereupon, the above-referred
24 to document was marked as Staff
25 Exhibit 19 for identification.)

1 Staff Exhibit 20 is Staff's slide
2 presentation on Hearing Topic 3, Tritium, was
3 previously identified as Staff Exhibit 19.

4 (Whereupon, the above-referred
5 to document was marked as Staff
6 Exhibit 20 for identification.)

7 Staff Exhibit 21 is slide presentation on
8 Hearing Topic 4, Radiological Releases and Doses from
9 Normal Operations is unchanged. It was previously
10 listed as Staff Hearing Exhibit 21.

11 (Whereupon, the above-referred
12 to document was marked as Staff
13 Exhibit 21 for identification.)

14 Staff Exhibit 22, the Statement of
15 Professional Qualifications for Mary Ann Parkhurst was
16 not previously identified by the Staff.

17 (Whereupon, the above-referred
18 to document was marked as Staff
19 Exhibit 22 for identification.)

20 And finally, Staff Exhibit 23 which is the
21 Staff's slide presentation on Hearing Topic 7, Seismic
22 Safety, was also previously identified as Staff
23 Exhibit 23. That number has not changed.

24 (Whereupon, the above-referred
25 to document was marked as Staff

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1 Exhibit 23 for identification.)

2 JUDGE KARLIN: Okay.

3 (Pause.)

4 MS. POOLE: I now move to have these
5 exhibits admitted into evidence.

6 JUDGE KARLIN: Are there any objections?

7 MR. LEWIS: No objection.

8 JUDGE KARLIN: No objections being heard,
9 we'll admit all those documents as identified now into
10 evidence with those exhibit numbers.

11 (The documents, having been
12 marked previously for
13 identification as Staff Exhibit
14 1 through 23, were received in
15 evidence.)

16 Thank you. May I ask we have this chart
17 here, what we're doing is keeping track to make sure
18 we've got each one of them. And on the chart, I see
19 that up to 14 they do have ML numbers showing they're
20 on ADAMS, the ADAMS public document system, and 15
21 through 23 do not have ADAMS numbers. I assume they
22 will be put on ADAMS, it's just a matter of time.

23 MS. POOLE: Yes.

24 JUDGE KARLIN: They're more recent
25 documents.

1 MS. POOLE: That's correct.

2 JUDGE KARLIN: The last week or two.

3 MS. POOLE: However, all Staff Exhibits
4 will be included in the ADAMS publicly-available
5 system.

6 JUDGE KARLIN: Okay. I thought that was
7 the case. I just wanted to confirm. Great. Thank
8 you. It's important that we go through that and keep
9 documents and make sure the record is established
10 because that's a legal basis upon what we make our
11 decision.

12 Let's now turn to the Staff. Happily --
13 I'm sorry, to the Applicant. You have a fewer number,
14 but we still need to go through that.

15 MR. BIGGINS: If I may interrupt, we do
16 have the disks also and I can provide those if I may
17 approach?

18 JUDGE KARLIN: Yes, please. Let's give
19 them to Ms. Carpentier. That would be great. I think
20 that's helpful. You might want to put a number of
21 those too. I'm not sure whether --

22 MS. POOLE: We intended to provide them as
23 a convenience, but we are happy to --

24 JUDGE KARLIN: Let's just make them as a
25 convenience. We'll leave it at that. We can't

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1 physically get them in.

2 All right, now let's turn to Mr. Lewis and
3 the Applicant.

4 MR. LEWIS: Mr. Haemer will do the
5 exhibits.

6 MR. HAEMER: Robert Haemer for Dominion.
7 Your Honor, we have 16 exhibits to enter into.
8 Assisting me with this Maria Webb from our office.

9 JUDGE KARLIN: Okay, great. Hold on a
10 second. Ms. Carpentier, are you okay? You've got --
11 do you want to move it into boxes? All right, please
12 go ahead, Mr. Haemer.

13 MR. HAEMER: Following the Staff's lead,
14 I'd like to enter all of these exhibits and then move
15 to have them entered.

16 JUDGE KARLIN: Right, for identification
17 first, right.

18 MR. HAEMER: At the pre-hearing conference
19 on April 18th, the Board granted the scheduling
20 request that the Seismic Hazard Panel presented on
21 Thursday. Reflecting that, Exhibit 16 which is the
22 presentation on seismology, geology and seismic
23 hazards. I'd like to defer that and enter that on
24 Thursday morning after Dr. Lettis has had a chance to
25 return from his overseas trip and provide a final

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1 review of the material he provided earlier.

2 JUDGE KARLIN: Yes, that seems fine.
3 That's a good idea. So we'll defer number 16 for the
4 moment and wait until the panel is actually being
5 presented.

6 MR. HAEMER: Thank you.

7 JUDGE KARLIN: Unless Staff has any
8 objection.

9 MS. POOLE: We have no objection.

10 JUDGE KARLIN: Great.

11 MR. HAEMER: Dominion Exhibit 1,
12 Dominion's responses to the safety questions,
13 including Attachments 1 through 6 and Figure 1 to
14 Question 48. Attachment 6 is from the April 17th
15 correction that Dominion filed.

16 (Whereupon, the above-referred
17 to document was marked as
18 Dominion Exhibit 1 for
19 identification.)

20 JUDGE KARLIN: Okay.

21 MR. HAEMER: Dominion Exhibit 2,
22 Declarations in Support of Dominion's Responses to
23 Safety Questions including the Supplemental
24 Declaration from Mr. Banks submitted on April 17th.

25 (Whereupon, the above-referred

1 to document was marked as
2 Dominion Exhibit 2 for
3 identification.)

4 JUDGE KARLIN: Now let me just ask on
5 that, the supplemental, please tell me what the
6 supplemental submission is.

7 MR. HAEMER: On April 17th, Dominion
8 submitted a supplemental radiological and chemical
9 data in response to Board Safety Question 48
10 associated with the answer to those, that supplemental
11 answer, the correction. Mr. Banks supplied a
12 declaration as to the completeness of that supplement
13 and correction.

14 JUDGE KARLIN: Okay, just let me --
15 (Pause.)

16 JUDGE KARLIN: Okay, that was your
17 correction to your answer on 48?

18 MR. HAEMER: Yes, Your Honor.

19 JUDGE KARLIN: We hadn't called for a
20 supplemental answer, but you were just correcting
21 something.

22 MR. HAEMER: Right. It's more in the
23 nature of a correction. It was additional information
24 we had available at the time and some additional --

25 JUDGE KARLIN: Great, okay, that's fine.

1 Do you have number 2 done?

2 MS. CARPENTIER: Yes.

3 JUDGE KARLIN: All right.

4 MR. HAEMER: Dominion Exhibit 3,
5 Dominion's responses to the environmental questions,
6 including Attachment 1.

7 (Whereupon, the above-referred
8 to document was marked as
9 Dominion Exhibit for
10 identification.)

11 Dominion Exhibit 4, 50-mile radius map of
12 Figure 2-2 in a 3 by 3 size.

13 (Whereupon, the above-referred
14 to document was marked as
15 Dominion Exhibit 4 for
16 identification.)

17 Dominion Exhibit 5, a 10-mile radius map,
18 Figure 2-3 in a 3 foot by 3 foot size.

19 (Whereupon, the above-referred
20 to document was marked as
21 Dominion Exhibit 5 for
22 identification.)

23 JUDGE KARLIN: Okay.

24 MR. HAEMER: Dominion Exhibit 6, a letter
25 from Mr. Davis to the U.S. NRC enclosing the North

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1 Anna Power Station 2005 Annual Radiological
2 Environmental Operating Report.

3 (Whereupon, the above-referred
4 to document was marked as
5 Dominion Exhibit 6 for
6 identification.)

7 Dominion Exhibit 7, Station Administrative
8 Procedures, VPAP-2103N, Rev. 10, the Off-Site Dose
9 Calculation Manual for North Anna.

10 (Whereupon, the above-referred
11 to document was marked as
12 Dominion Exhibit 7 for
13 identification.)

14 Dominion Exhibit 8, the Declarations in
15 Support of Dominion's Responses to the Environmental
16 Questions.

17 (Whereupon, the above-referred
18 to document was marked as
19 Dominion Exhibit 8 for
20 identification.)

21 Dominion Exhibit 9, Dominion's pre-filed
22 testimony of Marvin L. Smith, Stephen D. Routh, Dr.
23 William R. Rice, Jr., Dr. Robert K. McGuire, and Dr.
24 John R. Davie, on safety matters including attached
25 statements of qualifications and declarations of each

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1 witness.

2 (Whereupon, the above-referred
3 to document was marked as
4 Dominion Exhibit 9 for
5 identification.)

6 Dominion Exhibit 10, Dominion's pre-filed
7 testimony of Marvin L. Smith, Karen L. Patterson, and
8 John A. Cudworth on environmental matters including
9 statements of qualifications and declarations of each
10 witness.

11 (Whereupon, the above-referred
12 to document was marked as
13 Dominion Exhibit 10 for
14 identification.)

15 Dominion Exhibit 11, the North Anna Early
16 Site Permit Application, Revision 9, September 2006.

17 (Whereupon, the above-referred
18 to document was marked as
19 Dominion Exhibit 11 for
20 identification.)

21 JUDGE KARLIN: And that's just one of
22 them.

23 (Laughter.)

24 JUDGE KARLIN: They haven't been stamped?
25 We can just do the first page.

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1 MS. CARPENTIER: We can do it on the
2 break.

3 JUDGE KARLIN: We can do that on the
4 break. We'll just take those.

5 MR. HAEMER: Dominion Exhibit 12,
6 Dominion's presentation on site characterization,
7 hydrology, beta-zone, groundwater and aquifers,
8 including the statements and qualifications of the
9 witnesses.

10 (Whereupon, the above-referred
11 to document was marked as
12 Dominion Exhibit 12 for
13 identification.)

14 JUDGE KARLIN: The chart you gave us shows
15 that as Topic 1. What is the title you have for that?

16 MR. HAEMER: That's Board Topic 1, Staff
17 Topic 2. It's hydrology site characterization.

18 MR. LEWIS: Judge Karlin, because of the
19 reorganization of the sequence, we changed the title
20 to delete the reference to the topic number and just
21 put the subject matter. We consider it a revised
22 exhibit with the current title, but it was confusing
23 calling it Topic 1 when it was the --

24 JUDGE KARLIN: Yes, the number of the
25 topics changed.

1 MR. LEWIS: We kept the same sequence,
2 but instead of calling it presentation on Topic 1, we
3 called it presentation on hydrology.

4 JUDGE KARLIN: Okay. If you can submit a
5 revised list, that would be helpful.

6 MR. HAEMER: Dominion Exhibit 13, labeled
7 Dominion Slides for Presentation on Topic 2. This is
8 Dominion's presentation on tritium and associated
9 statements of qualification of the witnesses.

10 (Whereupon, the above-referred
11 to document was marked as
12 Dominion Exhibit 13 for
13 identification.)

14 Dominion Exhibit 14 labeled Slides for
15 Dominion's Presentation on Topic 4. It is Dominion's
16 presentation on radiological releases and doses from
17 normal operations and associated statements of
18 qualifications of the witness.

19 (Whereupon, the above-referred
20 to document was marked as
21 Dominion Exhibit 14 for
22 identification.)

23 JUDGE KARLIN: And you're submitting three
24 copies of this now and will give us copies when the
25 actual slides are presented?

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1 MR. HAEMER: Yes, Your Honor.

2 JUDGE KARLIN: Great.

3 MR. HAEMER: Dominion Exhibit 15 labeled
4 Slides for Dominion's Presentation on Topic 5. It's
5 Dominion's presentation on surface water impacts and
6 possible mitigation measures and associated statements
7 and qualifications of the witnesses.

8 (Whereupon, the above-referred
9 to document was marked as
10 Dominion Exhibit 15 for
11 identification.)

12 JUDGE KARLIN: Okay.

13 MR. HAEMER: At this time, Dominion moves
14 to have Exhibits 1 through 15 entered not the record
15 as evidence.

16 JUDGE KARLIN: Any objections?

17 MS. POOLE: The Staff has no objections.

18 JUDGE KARLIN: Great. Hearing none, the
19 exhibits 1 through 15 are admitted in the record as
20 evidence.

21 (The documents, having been
22 marked previously for
23 identification as Dominion
24 Exhibits 1 through 15, were
25 received in evidence.)

1 in. Hopefully, this will help somewhat. We generate a
2 lot of hot air in this proceeding and they needed
3 extra, extra air conditioning for our work.

4 Also, Ms. Carpentier was able to get some
5 organization on the large number of exhibits that were
6 submitted.

7 So sorry for the bit of delay. We like to
8 be pretty crisp in terms of reconvening when we say we
9 will.

10 All right. At this point we are now onto
11 topic number one, which deals with surface water
12 issues. And I guess before us is the Staff. So I'm
13 going to turn it over to the Staff to introduce its
14 witnesses and just move with their presentation.

15 MS. POOLE: Here on the panel for hearing
16 topic one, surface water impacts and possible
17 mitigation measures are seated, I'm going to go left
18 to right as they're facing you, Your Honors.

19 Lance W. Vail, Pacific Northwest National
20 Laboratory. He is a hydrologist.

21 Dr. Michael T. Masnik, a member of the NRC
22 Staff who performed review in the area of aquatic
23 biology.

24 Jeffrey A. Ward of the Pacific Northwest
25 National Laboratory. Also performed work in the area

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1 of aquatic ecology.

2 And following Dr. Michael J. Scott and the
3 PACific Northwest National Laboratory who will provide
4 some information in the area of the socioeconomic.

5 As previously mentioned also with the
6 Board's permission, Dr. Masnik has one correction to
7 his statement of professional qualifications to be
8 noted in the record.

9 JUDGE KARLIN: All right. Fine.

10 Dr. Masnik?

11 DR. MASNIK: Yes, Your Honors.

12 I am currently a senior aquatic biologist
13 and my professional qualifications state that I'm a
14 senior aquatic ecologist. So please biologist.

15 JUDGE KARLIN: Ecologist to biologist.

16 Thank you.

17 MS. POOLE: Dr. Masnik's affidavit is in
18 Staff Exhibit 13.

19 JUDGE COLE: You really could be both,
20 but--

21 DR. MASNIK: Yes, Your Honor.

22 JUDGE KARLIN: All right. Great.

23 With that, why don't you just proceed.
24 What we have planned we've allocated some time, 15
25 minutes for a presentation and then we'll have some

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1 questions for you. So, please, proceed.

2 Welcome.

3 MS. POOLE: Sorry. Your Honors, one thing.

4 JUDGE KARLIN: Yes.

5 MS. POOLE: At the pre-hearing conference
6 last week this was the one issue in which we requested
7 a 20 minute presentation.

8 JUDGE KARLIN: Oh, 20 minutes. I'm sorry.
9 Yes. Yes.

10 MS. POOLE: So this will be just a little
11 bit longer.

12 JUDGE KARLIN: No problem. No problem. 20
13 minutes. Yes.

14 MS. POOLE: Okay. Thank you, Your Honors.

15 JUDGE KARLIN: All right. Thank you.

16 MR. VAIL: Good morning. My name's Lance
17 Vail. I'm a senior research engineer with the
18 Hydrology Group --

19 JUDGE KARLIN: Before we start, I guess
20 what I have to do is ask to swear you in for the
21 testimony here. So I do need to do that. Sorry.

22 If you would you all please rise. Stand
23 up and raise your right hand. I need to ask you do
24 you swear or affirm that the testimony you're about to
25 give will be the truth, the whole truth and nothing

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1 but the truth.

2 ALL: I do.

3 JUDGE KARLIN: Yes. Thank you.

4 Now be seated. I'm sorry for the
5 interruption.

6 MR. VAIL: No problem.

7 JUDGE KARLIN: Is it Dr. Vail?

8 MR. VAIL: No. Mr. Vail.

9 JUDGE KARLIN: Mr. Vail. Okay. Please be
10 seated.

11 MR. VAIL: I'm a senior research engineer
12 in the Hydrology Group at Pacific Northwest National
13 Laboratory. And I was involved in hydrologic analysis
14 for the environmental and safety reviews of the North
15 Anna early site permit.

16 When we received the original application
17 with a once through cooling system proposed for Unit
18 3 and a wet tower proposed for Unit 4 we knew that it
19 would be important to establish a water energy budget
20 for Lake Anna.

21 Subsequently, Dominion revised their
22 application to state that Unit 4 would employ dry
23 cooling, thereby eliminating detectable water impacts.

24 At Revision 6 Dominion further revised
25 their application to state that Unit 3 would employ a

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1 closed cycle combined wet/dry cooling design. This
2 effectively eliminated direct thermal impacts to Lake
3 Anna from the ESP cooling system for either Units 3 or
4 4. However, there remained the issue of the impact of
5 consumptive water use with Unit 3.

6 North Anna is typical of many reservoirs
7 in the southeast. It's a warm reservoir, thermally
8 stratifies in the summer. This figure shows the
9 tributaries that feed that into the lake, the location
10 of the existing proposed and proposed sites. The three
11 ponds that compose the waste 2 treatment facility and
12 the dam where all the release is downstream into the
13 North Anna River occur.

14 JUDGE KARLIN: I'm looking at slide 2 of
15 your presentation. Number 2. Okay.

16 If you could identify it for the record as
17 we go from slide 1 to 2 to 3, the transcript will pick
18 that up more readily.

19 MR. VAIL: Okay.

20 JUDGE KARLIN: Thank you.

21 MR. VAIL: So slide 3 the Staff did review
22 the consumptive water use of the force of operation
23 from Unit 3 cooling that had been provided by Dominion
24 and determined that those estimates that they used in
25 their PPE values, their PPE table were not

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1 unreasonable.

2 The Staff reviewed the Applicant's water
3 use water use impact assessment. However, due to the
4 complexity and uncertainty of the water budget and the
5 importance of this issue the Staff also performed an
6 independent calculation using a different approach.

7 The Staff's analysis was more conservative
8 than the applicant's since we relied narrowly on the
9 long term bounding values explicitly stated in the
10 PPE. And the applicant employed short term
11 characteristics of a specific cooling system design.
12 This allowed the applicant's analysis to take credit
13 for the reduced water use that occurs in periods of
14 low lake level during favorable atmospheric
15 conditions.

16 The Staff observed meteorological records
17 to estimate the direct precipitation to the lake.
18 Wind speed humidity, air temperature were used to
19 estimate the natural evaporation. Induced evaporation
20 estimates for Units 1 and 2 were based on results of
21 model predictions of water surface temperatures that
22 had been revalidated by the applicant in their earlier
23 review of the proposed once through design in Unit 3.

24 The releases from the dam were based upon
25 the current operating rules consistent with the

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1 release policy established by the Commonwealth for
2 this reservoir.

3 Slide 4.

4 The Staff's assessment considered the
5 baseline condition to be continued operation of Units
6 1 and 2 --

7 JUDGE KARLIN: Mr. Vail, can I just ask,
8 when you say the "Staff," you're with PNNL, right? So
9 are you speaking that you did this or that the Staff
10 did this? When you say the "Staff," does that mean
11 you?

12 MR. VAIL: I'm speaking as myself, yes.

13 JUDGE KARLIN: All right. You are the
14 staff?

15 MR. VAIL: I am --

16 JUDGE KARLIN: Representing you're working
17 for the Staff?

18 MR. VAIL: I'm representing working for
19 the staff.

20 JUDGE KARLIN: Right. Okay.

21 MS. POOLE: Your Honors, PNNL assisted the
22 NRC Staff with the safety and environmental reviews
23 under a technical assistance contract.

24 JUDGE KARLIN: Right. So when you refer to
25 Staff, you are referring to yourself as well as a

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1 consultant to the Staff?

2 MR. VAIL: Correct.

3 JUDGE KARLIN: Right. Okay. I'd just like
4 to know who did what, when and where.

5 MR. VAIL: Okay.

6 Our assessment focused on the incremental
7 changes that would result from operation of Unit 3
8 within the bounds provided by the applicant's PPE.

9 Since Unit 4 had no impact on the water
10 budget, it was not considered further in this
11 assessment.

12 This figure shows the assessment results.
13 It shows the changes in the lake elevation as a
14 function of time through the period that we analyzed.
15 And you can see that the changes in the pool elevation
16 between the two scenarios. The scenario 1 shown there
17 is our baseline, which is the operation of the Unit 1
18 and 2 continuously for our assessment. And then the
19 red line is the addition of Unit 3 operation.

20 So clearly there's an increase in the
21 depth it goes down and the periods that the water is
22 at those lower water levels.

23 Of interest in that figure is to note the
24 frequency that you occur at 248, because that is the
25 level which it shifts from 40 cfs to 20 cfs.

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1 Particularly of interest is the period around 1981
2 where there was an extended period where our
3 predictions suggested that it would shift down in our
4 more conservative analysis. The majority of the
5 increase that we saw in the frequency of those low
6 water conditions which the Board had mentioned are
7 associated with that period.

8 JUDGE KARLIN: Yes.

9 MR. VAIL: Now I'll turn over the
10 microphone to Dr. Masnik.

11 DR. MASNIK: Good morning, Your Honors.
12 I'm Michael Masnik, senior aquatic biologist with the
13 U.S. Nuclear Regulatory Commission.

14 JUDGE KARLIN: Good morning.

15 DR. MASNIK: I was responsible for the
16 technical oversight of the aquatic and hydrology
17 sections for the North Anna impact statement.

18 I will first briefly address potential
19 impacts at slide 6. I will first briefly address
20 potential impacts to biota of Lake Anna. Then Mr. Ward
21 from Pacific Northwest National Laboratory will
22 address the impacts to biota inhabiting the water
23 courses below the North Anna Dam.

24 Following his presentation I'll provide a
25 few remarks on past and future studies conducted on

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1 the reservoir and in the North Anna River downstream
2 of the dam. And finish with a short discussion of
3 mitigation considered by the Staff to minimize or
4 eliminate additional impacts related to the new
5 facilities on aquatic resources.

6 Next slide.

7 The Staff conducted an extensive review of
8 the biota inhabiting Lake Anna. On a relative scale
9 reservoir biology is generally well understood and the
10 water bodies are usually successfully managed to
11 provide both a health ecosystem and a recreationally
12 valuable fishery.

13 New cooling reservoirs go through a
14 natural succession over a number of years to arrive at
15 a fairly stable ecosystem, often maintained by
16 stocking and other management techniques.

17 Lake Anna is a typical southeastern mature
18 and managed reservoir with an excellent sport fishery.
19 With that understanding, the Staff assessed the impact
20 to the reservoir biota should additional units be
21 constructed and operated at the North Anna site.

22 Although the Staff assessed the impacts of
23 construction and operation on all trophic levels
24 within the reservoir, the Staff focused on the
25 reservoir fishery. Past experience in assessing

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1 impacts on aquatic biota inhabiting reservoirs has
2 shown that the lower trophic levels such as plankton
3 and zooplankton are largely unaffected by the
4 operation of nuclear power plants.

5 And furthermore, the health and
6 productivity of a reservoir fishery is a good
7 indicator of the condition of the lower trophic
8 levels.

9 The Staff examined the potential impact of
10 the reservoir biota for a variety of impact categories
11 related to the construction of Units 3 and 4 and the
12 operation of Unit 3. We looked at the potential
13 effects related to site runoff during construction,
14 construction and operation of the intake structure
15 including the impingement and entrainment of fishes,
16 effects related to the station discharge or water
17 quality related impacts including thermal effects such
18 as heat shock and cold shock. And the impacts related
19 to the loss of reservoir habitat in the vicinity of
20 the site.

21 Next slide.

22 Based on analysis of impact presented in
23 the EIS for North Anna ESP application the Staff has
24 concluded that there will be no detectible impacts to
25 fish populations in Lake Anna due to the construction

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1 and operation of Units 3 and 4.

2 This conclusion is based on the known
3 impacts associated with closed cycle cooling on a
4 large reservoir.

5 I will now ask Mr. Ward to address impacts
6 to biota downstream.

7 MR. WARD: Good morning.

8 JUDGE KARLIN: Good morning.

9 MR. WARD: My name is Jeff Ward. I'm a
10 senior research scientist at the PNNL Marine Sciences
11 Laboratory. And I work closely with Dr. Masnik to
12 assess the aquatic impacts.

13 We're speaking to slide 9 now.

14 The Staff assessed the impacts of Unit 3
15 to aquatic biota in the North Anna Dam in the Pamunkey
16 Rivers, downstream of the North Anna Dam. We
17 evaluated fish, invertebrates and aquatic and riparian
18 plants. Our assessment determined the potential
19 stressor was flow, primarily from the dam releases.

20 This is slide 10.

21 This slide shows the general location of
22 the lake and also the major rivers with respect
23 Chesapeake Bay. The letter A identifies the location
24 of the North Anna Dam, B denotes the confluence of the
25 North and South Anna Rivers in the beginning of the

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1 Pamunkey River. C is the approximate location of tidal
2 influence on the Pamunkey River.

3 The fall line is located approximately
4 between A and B. Just to give you a sense of the
5 relative distances, the approximate distance from A to
6 B is 34 river miles; from A to C is approximately 70
7 river miles. And from A to the mouth of the York River
8 is approximately 126 river miles.

9 This is slide 11.

10 The Staff determined that river flow was
11 the predominate stressor of concern. It could effect
12 downstream resources by reducing the flow volume into
13 the North Anna River creating constant downstream
14 flows during droughts or potential impacts associated
15 with alternative flow regimes if they're considered or
16 adopted for the North Anna River.

17 Next. Slide 12.

18 In evaluating the impacts of downstream
19 flow to fish the Staff assumed that the existing lake
20 level contingency plan would continue. That the
21 representative or important species include those that
22 are described in this slide. And that the fish
23 populations are most sensitive to flow during spawning
24 and early life history stages.

25 Next slide. This is slide 13.

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1 This shows the water budget model results
2 for the non-drought scenario conditions for Unit 2 and
3 Unit 3 operation. Essentially adding Unit 3 reduces
4 the fraction of time that greater than 30 or 40 cfs
5 flows occur by approximately 2 to 3 percent. It also
6 increases the fraction of time that 20 cfs flows occur
7 by approximately five percent.

8 JUDGE KARLIN: It goes from 6 percent to
9 11?

10 MR. WARD: Correct.

11 JUDGE KARLIN: Essentially doubling it?

12 MR. WARD: Correct.

13 JUDGE KARLIN: Okay.

14 MR. WARD: Okay. This is slide 14.

15 The left side of this slide shows the
16 monthly average releases during non-drought conditions
17 for 2 and 3 Unit operation, with the black line
18 represent two unit operation and the red line
19 representing the addition of Unit 3.

20 The right side of the graph shows the
21 spawning times for representative important species.
22 Because the low flow events do not coincide with
23 spawning periods for most of these species, the
24 impacts are expected to be small.

25 JUDGE KARLIN: May I ask does the chart,

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1 slide 14, shows the flows -- this is releases from the
2 Dam, is that right?

3 MR. WARD: That's correct.

4 JUDGE KARLIN: Okay.

5 MR. WARD: This is during a non-drought
6 event.

7 JUDGE KARLIN: All right. Does that equate
8 to flows in the river, I guess? I mean --

9 MR. WARD: Yes. Yes, it does.

10 JUDGE KARLIN: I mean isn't the entire
11 water flow into North Anna River south of the dam
12 consist of water from the dam or is there other
13 sources or other tributaries to it?

14 MR. WARD: I'll direct that to Lane Vail.

15 MR. VAIL: This is Lance Vail.

16 As the river flows downstream it picks up
17 water from Little River, a tributary that comes in,
18 and then at South Anna comes in. At that point it
19 forms the Pamunkey River.

20 So there isn't a significant amount of
21 contribution in that lower part other than those
22 specific tributaries, which during certain times of
23 year can represent a significant contribution.

24 JUDGE COLE: And the major spawning areas
25 are located principally in the Pamunkey River?

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1 MR. WARD: That's correct.

2 JUDGE COLE: Which is how far downstream
3 of Lake Anna? Would that be 80 miles?

4 MR. WARD: The confluence of the North and
5 South Anna is about 34 river miles below the dam. And
6 that's the beginning of the Pamunkey River.

7 JUDGE COLE: Okay. But the spawning takes
8 place at what concentration of saline water for most
9 of the fish, 1,000 milligrams per liter. So it's got
10 to be the tidal section.

11 DR. MASNIK: It depends on the species of
12 fish, Your Honor. Some species spawn, obviously, in
13 the estuary, some in the river.

14 IF we're talking stripped bass, which was
15 of interest, the most upstream record for eggs and
16 larvae in 2000, it was collected in 2002, and that was
17 about 74 river miles below the plant.

18 JUDGE COLE: Okay.

19 MR. WARD: Seventy river miles is
20 approximately where the Pamunkey River becomes tidally
21 influenced. So that's the location.

22 JUDGE COLE: Thank you.

23 MR. WARD: Okay. Any other questions?

24 JUDGE COLE: No. Not right now.

25 MR. WARD: Okay. We'll go to slide 15.

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1 The Staff evaluated potential impacts to
2 benthic communities, aquatic plants and riparian
3 vegetation common to downstream locations.

4 The Staff concluded that the impact of
5 reduced flow to the addition of Unit 3 is expected to
6 be undetectable.

7 We acknowledge the addition of Unit 3
8 would extend the low flow conditions, especially
9 during drought events, but believe the existing biota
10 and plant assemblages have adapted to the existing
11 flow regimes and are tolerate to occasional low flow
12 conditions.

13 I'll now pass the microphone back to Ms.
14 Masnik.

15 JUDGE ELLEMAN: Before you do, this is
16 Judge Elleman.

17 You have said you evaluated certain facts.
18 And earlier you said you studied the impact of the
19 changes. Tell us a little bit how you did this. How
20 do you make an evaluation that gives you the
21 information you seek?

22 MR. WARD: Are you speaking about the flow
23 and the spawning?

24 JUDGE ELLEMAN: Well, what triggered the
25 question was your slide that says that evaluations

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1 were carried out on the impacts on the species
2 downstream. And the word "evaluation" to me is a very
3 general word. Tell me in a little more detail what
4 you did to come to the conclusions you're coming to.

5 MR. WARD: My background is in
6 environmental risk assessment. And what I do is I
7 look to see if the stressors of concern can exist with
8 the receptor at a time when you can cause significant
9 harm.

10 Now in the case of the fish species and
11 the flow, we evaluated whether the fish would be in
12 the river spawning during a time when the low flow
13 conditions could occur. And we determined that that
14 wasn't likely to happen, therefore there was minimal
15 risk to the species.

16 JUDGE ELLEMAN: Okay. And so this speaks
17 only to the spawning part of it? It does not address
18 any other impacts that might be non-spawning?

19 MR. WARD: Correct. Correct.

20 JUDGE ELLEMAN: All right. Thank you.

21 MR. WARD: You're welcome.

22 Okay. I'll turn the mike back over to Dr.
23 Masnik who is going to discuss the past and future
24 studies and also mitigation.

25 DR. MASNIK: Thank you, Mr. Ward.

1 Slide 17.

2 I'd like to take a couple of minutes to
3 address studies performed or imminent on aquatic
4 resources of Lake Anna and the North Anna River.

5 The decision to impound the river and
6 build the North Anna facility stimulated the first
7 comprehensive assessment of biota in the North Anna
8 River. Baseline studies of biota were conducted in the
9 '70s by the Biology Department at Virginia Tech under
10 contract with then VEPCO.

11 Much of this data is summarized in VEPCO's
12 316A and 316B demonstrations for Units 1 and 2
13 submitted to the Commonwealth of Virginia in 1986 and
14 1985 respectively.

15 A number of studies have been conducted on
16 the reservoir by the Virginia Department of Game and
17 Inland Fisheries, often in cooperation with the
18 utility.

19 The Staff summarized the current aquatic
20 monitoring programs in the EIS for the early site
21 permit. The studies are being conducted in support of
22 North Anna Units 1 and 2 operation. The studies are
23 conditions of the Commonwealth of Virginia's issued
24 NPDES permit for Units 1 and 2. Presumably these
25 studies will continue and data collected and analyses

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1 performed could be used in support of the stress for
2 Units 3 and 4.

3 Again, though, these studies on the
4 aquatic biota are conducted in support of the
5 continued operation of Units 1 and 2.

6 The Staff is only aware of one study that
7 is imminent and directly related to the proposed Unit
8 3. Dominion received from the Commonwealth of
9 Virginia a federal consistency certification
10 concurrence under the Coastal Zone Management Act. In
11 connection with this concurrence Dominion requested a
12 permit condition from the NRC. The permit condition
13 was submitted in a response to a request from Virginia
14 Department of Game and Inland Fisheries to conduct an
15 in stream flow incremental methodology or IFIM study
16 on Lake Anna and downstream waters.

17 This study is to be designed and monitored
18 in cooperation and consultation with the Virginia
19 Department of Game and Inland Fisheries and the
20 Virginia Department of Environmental Quality.

21 The study is to begin this calendar year
22 and be completed prior to the issuance of a combined
23 construction and operating license by the NRC.

24 There will likely be additional aquatic
25 studies required by the Commonwealth of Virginia and

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1 other regulatory agencies in response to the
2 construction and operation of Units 3 and 4. However,
3 the Staff would only be speculating on the focus,
4 duration and specifics of such studies at this time.

5 Next slide, please.

6 I'd like to conclude by listing the major
7 mitigation measures designed to mitigate impacts to
8 aquatic biota that were considered by the Staff during
9 the course of its review. The most significant
10 mitigation measure to protect aquatic resources that
11 was considered by the Staff was in fact implement by
12 Dominion. The conversion from a once through cooling
13 system to a closed cycle combined wet/dry cooling
14 power heat dissipation system for Unit 3.

15 Although the applicant revised its
16 proposed cooling system, the staff did consider in the
17 EIS the imposition of additional mitigative measures
18 to protect aquatic resources.

19 The Staff determined that impingement
20 losses could be further reduced if the intake average
21 through screen flow velocity was a half a foot per
22 second or less. This issue will be visited by the
23 Commonwealth of Virginia Department of Environmental
24 Quality during the MPDS permitting process as part of
25 the station's 316B comprehensive demonstration plan

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1 for Unit 3.

2 JUDGE COLE: So a decision hasn't been
3 made on that yet?

4 DR. MASNIK: No, it has not, Your Honor.

5 The Staff also examined the potential
6 benefits of installing fine mesh traveling screen
7 panels with a mesh size of 1 millimeter. Although the
8 applicant has not indicated the planned screen mesh
9 size for Unit 3 intake structure at this time, the
10 applicant has stated that the traveling screens would
11 be similar in design to those currently employed by
12 Units 1 and 2.

13 The Unit 1 and 2 intake traveling screens
14 have a mesh size of about 1 centimeter or 3/8th of an
15 inch.

16 The use of the 1 millimeter fine mesh
17 screens would prevent many organisms from becoming
18 entrained in the cooling water flow. However, instead
19 of being entrained, they would be impinged on the
20 surface of the screen.

21 Based on design and operational
22 constraints of the fine mesh screen systems and the
23 anticipated minor losses from entrainment at the
24 closed cycle plant, the Staff concluded that the use
25 of fine mesh screening would not be practicable, and

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1 furthermore would not significantly reduce the already
2 small entrainment impact predicted for Unit 3
3 operation.

4 The Staff evaluated increasing the storage
5 capacity of Lake Anna by increasing the normal
6 operating pool level to provide water for downstream
7 releases. The Staff's independent assessment estimated
8 that the frequency of 20 cfs flows would be unchanged
9 if the normal reservoir was raised 10 inches. Raising
10 the reservoir normal pool elevation would result in
11 some shifting of wetlands, particularly the upper
12 reaches of the reservoir, and additional water for
13 downstream biota, particularly during low water or
14 drought conditions.

15 Staff considered the possibility of
16 varying North Anna Dan releases during late summer and
17 fall to more closely emulate the natural --

18 JUDGE KARLIN: May I just ask a question,
19 Doctor?

20 DR. MASNIK: Sorry. Sure.

21 JUDGE KARLIN: Dr. Masnik, are you saying
22 that the Staff looked at the possibility of increasing
23 the lake level by 10 inches and you're saying that
24 would have zero effect in terms of the number of days
25 or hours that the 20 cfs would go out of the dam?

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1 MR. VAIL: It would have no incremental
2 change between the baseline and Unit 3. So it would
3 basically shift the frequency that you were below 248
4 to be the same as it is in the baseline currently.

5 JUDGE KARLIN: So it would cancel out the
6 effect of Unit 3?

7 MR. VAIL: It would basically cancel out--
8 yes. Correct.

9 JUDGE KARLIN: Oh, okay. That's quite
10 different from what I thought I heard, which was it
11 would have no effect. That adding the lake level by 10
12 inches would have no effect. But what you're saying
13 it would cancel out the effect? It would bring it
14 back to normal as opposed to doubling the amount of
15 time that 20 cfs, cubic feet per second going off the
16 dam?

17 MR. VAIL: Correct. You have no
18 incremental effect.

19 JUDGE KARLIN: So that would solve the
20 problem, if there is a problem?

21 DR. MASNIK: Okay. As I was stating, the
22 Staff considered the possibility of varying the North
23 Anna Dam release rates during later summer and fall to
24 more closely emulate the natural variation and stream
25 flow typically experienced in water courses draining

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1 the southeastern U.S. Mr. Ward discussed this concern
2 in his presentation. As a result of this concern the
3 Commonwealth of Virginia is requiring an in stream
4 flow incremental methodology study to be conducted by
5 Dominion. The study may result in changes to the dam
6 release protocol to reflect more normative flows in
7 the North Anna River below the dam in late summer and
8 fall.

9 And Dr. Scott will now discuss the
10 socioeconomic impact of Lake Anna water levels.

11 JUDGE ELLEMAN: Excuse me.

12 DR. MASNIK: Sure.

13 JUDGE ELLEMAN: Before you switch, this is
14 Judge Elleman.

15 A problem with us imposing a very tight
16 time limit on you is that things go by very quickly
17 when we listen to presentations.

18 I think I heard you say that you were
19 aware of only one study that gave unfavorable or
20 damaging consequences in your survey of flow effects
21 on downstream species. Did I understand correctly or
22 did I miss the point of your statement?

23 What was your reference to one unfavorable
24 study?

25 DR. MASNIK: I don't recall saying that,

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1 Your Honor.

2 JUDGE ELLEMAN: You don't? Okay. Well,
3 since I can't elaborate any further, I guess I have to
4 -- I thought I heard you say that in your survey of
5 results that had been carried out, you felt there will
6 be one unfavorable.

7 MS. POOLE: Pardon me, Judge Elleman. May
8 I pose a question to Dr. Masnik?

9 JUDGE ELLEMAN: Sure. Please.

10 MS. POOLE: All right. Judge Elleman, are
11 you referring --

12 JUDGE KARLIN: Are you trying to help
13 clarify this?

14 MS. POOLE: Yes.

15 Are you referring to the in stream flow
16 incremental methodology, the single imminent study?

17 JUDGE ELLEMAN: No. I think not. I
18 thought I heard reference to an investigation of
19 existing studies and that there was one of these
20 existing studies that did not show favorable or
21 positive results. Since neither of you are
22 referencing to this, clearly I must have misheard
23 something. But I thought that's what was said.

24 DR. MASNIK: Your Honor, I don't believe
25 I said anything --

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1 JUDGE ELLEMAN: You obviously can't answer
2 a question that I can't raise in a way that you
3 understand. So let me withdraw it.

4 JUDGE KARLIN: All right. Please continue.
5 Dr. Scott.

6 DR. SCOTT: If I could have slide 19
7 I'm Michael Scott. I'm with Pacific
8 Northwest National Laboratory, a staff scientist.
9 They classify economist, which is what I am, as
10 scientists.

11 And I worked on the socioeconomic impacts
12 of Lake Anna at water levels.

13 In normal years water levels in Lake Anna
14 are maintained at 250 feet, so we would expect to see
15 no mud flats exposed, recreational activities at
16 normal levels and small impact in normal water years
17 from Unit 3 being in the system. However, during
18 severe drought, as we saw in Mr. Vail's presentation,
19 low water levels would be slightly more frequent and
20 lake levels would be somewhat lower with Unit 3
21 operating. I'm referring now back to the figure that
22 we saw with the black and red lines.

23 There would be a moderate and temporary
24 impact on private lake front property views with water
25 levels below 248 feet approximately, as observed

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1 during the 2001/2002 drought. There were substantial
2 mud flats. However, property values, which has been
3 a concern, here, were not observed to be adversely
4 effected during the 2001/2002 drought.

5 Also as observed during the 2001/2002
6 drought we would expect moderate temporary impacts on
7 boating and useability of private docks, boat houses
8 and boat ramps many of which are fixed facilities as
9 water levels fall below 248.

10 Fishing was still possible and successful
11 in the 2001/2002 drought. And Lake Anna State Park,
12 which is the major public facility, was able to use
13 its launch ramps.

14 Several of the marinas modified their
15 launch ramps and their wet slips to operate at lower
16 water.

17 Some fishing guides had to move their
18 launch points, but were still able to find fish.

19 So the businesses that were involved were
20 able to continue operating.

21 If the Commonwealth choose to require a
22 lake level above 250 feet supplying more water for
23 downstream, modification might be required to these
24 same private fixed structures. Some of them don't have
25 a lot of freeboard. So if we were to keep the lake

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1 level much higher, some of them might have to be
2 modified, in which case the impact --

3 JUDGE KARLIN: May I ask --

4 DR. SCOTT: Yes, sir.

5 JUDGE KARLIN: -- would a 10 inch increase
6 eliminate the freeboard on any of them?

7 DR. SCOTT: We don't know the freeboard of
8 all of them, obviously. We couldn't take a census.
9 But there are docks that have freeboard between six
10 and 12 inches as far as we know. So ten inches might
11 possibly do that.

12 JUDGE KARLIN: Okay.

13 DR. SCOTT: And as I was about to say,
14 this might occur at a six to 12 inch decrease in the
15 water level.

16 JUDGE KARLIN: Does this chart the
17 socioeconomic impacts or cover in the river downstream
18 in the North Anna River downstream of the dam such as,
19 for example, recreational uses, kayaking, canoeing in
20 that river?

21 DR. SCOTT: This chart does not in
22 response to the question. Some questions that we
23 thought the Board might ask, we did look at that
24 situation as best we could document it. There is some
25 information -- did somebody have something? Oh.

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1 There was some information about the North
2 Anna River below the dam indicating that it was used
3 for kayaking and some recreational fishing. And it was
4 a reasonably scenic area. We did not find anything in
5 a very brief search concerning the number of
6 recreation days or anything that would allow us to
7 make a judgment about how the river related to either
8 the participation rates or the success of any of those
9 endeavors.

10 JUDGE KARLIN: All right. Thank you.

11 Does that conclude your presentation?

12 Great. Thank you.

13 We will now proceed with questions and Dr.

14 Cole--

15 JUDGE COLE: Just a few questions,
16 gentlemen.

17 I think you actively or correctly
18 perceived the areas that we were interested in. You
19 probably got that from the large number of questions
20 we asked about that area. We were concerned about the
21 lake level, downstream flows during drought conditions
22 and otherwise, the consumptive losses is very
23 important to us, the operational aspects of the Unit
24 3 wet/dry system, the status of the IFIM study. And
25 I'll be asking some questions about those things.

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1 First, if you could turn to slide 5, which
2 is the lake level. In response to one of our
3 questions the applicant identified the 100 year flood
4 level as elevation 255. Do you recall that, sir? Are
5 you aware of that?

6 MR. VAIL: That was a conclusion that was
7 provided by the applicant or to the Staff.

8 JUDGE COLE: You might have provided it,
9 too.

10 MR. VAIL: I -- I --

11 JUDGE COLE: Anyway, I'm looking at this
12 chart. And 255 is considerably higher than any
13 elevation that was measured in Lake Anna between 1979
14 and January 2003. And we're talking about then with
15 a flood level of 255 do you know if they ever had a
16 flood at Lake Anna? Did they ever reach elevation 255
17 or is that a question we should ask to the other
18 panel?

19 MR. VAIL: I'm not aware of that
20 information

21 JUDGE COLE: Did you have anything to do
22 with the probable maximum precipitation data
23 information?

24 MR. VAIL: Yes. I was also involved in the
25 safety analysis.

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1 JUDGE COLE: All right, sir.

2 JUDGE KARLIN: I want to make sure the
3 record reflects we're talking to Mr. Vail at the
4 moment. Mr. Vail is testifying.

5 Are you able to get this, Mr. Court
6 Reporter? Okay.

7 JUDGE COLE: Mr. Vail, they had several
8 references to the probable maximum precipitation and
9 the probable maximum flood. And could you tell me
10 about the calculations for the probable maximum
11 precipitation? I believe that was described in
12 testimony that we received.

13 MR. VAIL: The probable maximum
14 precipitation is derived from hydro-meteorological
15 reports, the HMRs that are actually developed by NOAA.
16 And they represent what's call the probable maximum
17 precipitation that is higher than anything that has
18 been observed. And it doesn't have a strict
19 probability associated with it. We basically take the
20 guidance that's specifically laid out in the hydro-
21 meteorological reports and derive those values for the
22 probable maximum precipitation.

23 JUDGE COLE: So the situation is such that
24 the maximum amount of the rain water is available over
25 a certain predicted area and it then falls? So it's

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1 something that's theoretically possible, but with no
2 probability associated with it at all, but highly
3 improbable?

4 MR. VAIL: It's what the climatologists
5 have said would be the maximum that they could
6 perceive.

7 JUDGE COLE: Now we then applied this to
8 a 343 square mile area in the North Anna water shed
9 and it predicted 18.2 inches of rain over six hours?

10 MR. VAIL: That's correct.

11 JUDGE COLE: Do you recall that answer?

12 MR. VAIL: Yes.

13 JUDGE COLE: What is the probability of
14 that ever happening?

15 MR. VAIL: Again, while it's called the
16 probable maximum precipitation, it does not have a
17 specific probability associated with it.

18 JUDGE COLE: Okay. What do we use it for?

19 MR. VAIL: To drive the estimated probable
20 maximum flood. It's an engineering standard that is
21 used by Corps of Engineers and other federal agencies
22 in making dam safety determinations and spillway
23 designs.

24 JUDGE COLE: For very important
25 structures?

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1 MR. VAIL: For very important structures.

2 JUDGE COLE: Okay. Now do you know what
3 the -- you do not know what the maximum water level
4 has ever been in Lake Anna?

5 MR. VAIL: I know that it is well below
6 anything predicted with the PMF, the probable maximum
7 flood.

8 JUDGE COLE: All right. So it is
9 conservative? That's the point. I couldn't reconcile
10 the data with a 100 year flood elevation of 255 and
11 all the data that I see it's never gotten above 252.
12 And then we come up with a maximum flood elevation of
13 almost 270 feet, which is 15 feet above the 100 year
14 flood.

15 All right. So we know it's conservative.
16 We're happy about that.

17 Now looking at this chart again, Chart 5.
18 Particularly in the last section there between January
19 '01 and January '03 --

20 JUDGE KARLIN: Could we put that up on the
21 viewer for everyone, perhaps?

22 JUDGE COLE: Yes. That's it. That was
23 slide 5.

24 JUDGE KARLIN: Thank you.

25 JUDGE COLE: That's a very rapid drop from

1 250 down to almost 246. Was this in the middle of the
2 famous drought era?

3 MR. VAIL: Exactly. I was also involved in
4 evaluations for the license renewal. And we actually
5 experienced -- this occurred during the time that the
6 license renewal was going on. So we had particular
7 sensitivity to that drought that was experienced in
8 the entire southeast at that time.

9 JUDGE COLE: Right.

10 MR. VAIL: And it basically represents two
11 of the lowest precipitation years in the extended
12 period of record. So it's a -- it's certainly an
13 anomaly and it is not from, you know, our assessment
14 of looking at a long term meteorological record that
15 would bias our results conservatively; that in the
16 period, the duration that we have from '70 to '03 we
17 wouldn't expect to see that occur usually.

18 JUDGE COLE: Dr. Masnik, you had addressed
19 some of the effects of low flow on the biota
20 downstream. And I got a certain impression that
21 sometimes reduced flow in an area might even be
22 beneficial to the biota downstream. Did I correctly
23 get that impression from --

24 DR. MASNIK: Judge, I don't believe I
25 stated that. But I think we both agree that that is

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1 the case sometimes, particularly for something like
2 submerged aquatic education. You know, it would be
3 beneficial from the standpoint of other species for
4 some of these plants to die out on the banks or the
5 sides of the stream. But in general for aquatic
6 systems low water is generally a period of stress.
7 However, I might add that particularly east coast
8 rivers that biota have evolved in such a way to
9 essentially flourish during these periods of time when
10 there's wide changes in flow. So they're essentially
11 pre-adapted to weather periods of low water. . So that
12 the biota is able to persist in these rivers.

13 JUDGE COLE: Now prior to the construction
14 of Lake Anna -- this is probably not Mr. Vail. Prior
15 to the construction of Lake Anna what were the kinds
16 of flows we were experiencing in the North Anna River?
17 Do you have any idea.

18 MR. VAIL: Certainly there were recorded
19 flows well below 20 cfs down into the zone of about 5
20 cfs. Those numbers start to get suspect because the
21 gauges aren't designed for those sort of flows. But it
22 wouldn't surprise that in the past if 5 cfs flows were
23 not common.

24 We certainly did observe from the USGS
25 station gauges flows down to 5 cfs.

1 JUDGE COLE: All right, sir. Thank you.

2 In response to a question we asked about
3 raising the water level between six and 12 inches on
4 the lake, one of the responses indicated that it might
5 increase flooding. And based upon the elevation data
6 in Figure 5 do you think that's a reasonable
7 expectation?

8 MR. VAIL: Well, if I'm a property owner
9 and if I'm worried -- if I'm calling it when the water
10 comes over my boat dock flooding, then yes that would
11 occur more frequently, as Dr. Scott mentioned. When we
12 compare that relatively to the probable maximum flood
13 it's not going to have any impact on that sort of
14 event. It's just that's definitely in the --

15 JUDGE COLE: All right, sir.

16 Do you think it's possible to develop an
17 operating scheme with a slightly elevated lake level
18 and minimize the impact of below 20 cfs flow
19 downstream?

20 MR. VAIL: The rules that are specified
21 were specified by the Commonwealth of Virginia. If
22 there were other attributes that they had in
23 estimating those or other concerns that we didn't look
24 at, I wouldn't want to speculate about what might be
25 some alternative operating --

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1 JUDGE COLE: So right now their operating
2 rule is if it's between 250 and 248 the down flow
3 stream is 40 cfs and it gets below 248, it drops to 20
4 cfs, is that your understanding of the way the
5 operating rule?

6 MR. VAIL: Correct. That's specified in
7 the lake level contingency plan.

8 JUDGE KARLIN: But let me focus you back
9 on the question. Do you think it's possible to
10 develop a system and not that would allow for
11 increased levels in the lake and thus fewer times when
12 it's 20 cfs discharge from the lake; is it possible to
13 do that? You answered well that's not my problem, go
14 the states. But I want to know as an expert is it
15 possible to develop a plan that would increase the
16 amount of water into the lake and then reduce the amount
17 of time that the downstream flows were restricted to
18 20 cfs? Is it possible to do that?

19 MR. VAIL: By dropping, for instance, the
20 248 constraint that you switch from 40 to 20 cfs you
21 would basically eliminate all 20 cfs periods.

22 JUDGE KARLIN: So the answer is yes?

23 MR. VAIL: Yes.

24 JUDGE KARLIN: Okay.

25 JUDGE ELLEMAN: This is Judge Elleman.

1 As long as we're asking you to speculate
2 on future and potential events, you stated that the
3 drought was a very unusual circumstances and that
4 historically it was very anomalies from what had
5 happened prior to that. But we all know we can't turn
6 on our TV sets today without seeing that the climate
7 is changing, the weather is changing. What is your
8 personal expectation that future rainfalls are going
9 to be predicted by past history, and in this area?

10 MR. VAIL: Your Honor, if I can mention
11 what we did do in looking at the climate question. We
12 did evaluate and review the national assessment that
13 was done as part of the U.S. Global Climate Change
14 Research Program. And we looked at this region to
15 estimate what that would mean in terms of temperature
16 and precipitation.

17 The results were based on two different
18 models. One model said that precipitation would stay
19 about to the stated, the level it is now. The other
20 one said that the precipitation would actually
21 increase. Both models said that the temperature would
22 increase.

23 So even if there was potentially an
24 increase in precipitation which would offset some of
25 those, the increased temperature result in increased

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1 evaporation. I couldn't evaluate that.

2 I can also mention that if you're looking
3 in the news now there's a lot of discussion about the
4 Intergovernmental Panel on Climate Change, their
5 report that's actually due out in a few month. Their
6 executive summary has been out in the news recently.

7 I also looked at that recently and
8 reviewed that and looked at that in the context of
9 this area. And its conclusions are basically the same
10 as what had been in the earlier national assessment.

11 So at this point, you know, we have looked
12 at it. We're aware of that information. But it would
13 be, you know, speculating on my part. And I'm not a
14 climate scientist, but I do a lot of research on the
15 impacts of climate change on the hydrologic cycle.
16 But I can't tell you what the likelihood of that
17 actually happening is.

18 JUDGE ELLEMAN: Well, thank you. That's
19 helpful.

20 JUDGE COLE: Yes. Mr. Vail, considering
21 the size of the watershed and the evaporation rate on
22 Lake Anna it appears that the evaporation rate exceeds
23 the rainfall during a couple months of the year, at
24 least. So that what we can expect is what? The water
25 level goes down every year, is that correct, sir?

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1 MR. VAIL: The water level would go down
2 during those summer months in the typical year.

3 JUDGE COLE: The evaporation is greater
4 than inflow?

5 MR. VAIL: Are you speaking specifically
6 the climate change scenarios?

7 JUDGE COLE: No. No. I'm just talking
8 about the record, the historical record we have.
9 Almost every year here it looks like it drops down
10 during a couple months of the year, and some are more
11 severe than others. And the record indicates that the
12 rainfall and the inflow into the lake is not enough to
13 make up for the induced evaporation from the lake
14 surface. So the water level is going to go down
15 almost every year?

16 MR. VAIL: The natural evaporation and the
17 induced evaporation and the downstream releases will
18 exceed the inflows that are occurring during typical
19 late summer and fall periods.

20 JUDGE COLE: All right.

21 Did you get involved in the water supply
22 for the ultimate heat sink system?

23 MR. VAIL: I'm afraid so.

24 JUDGE COLE: Well, we asked a question,
25 because I was concerned about the size of the heat

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1 sink and the amount of water needed and the mention of
2 it has to provide for normal operation. And normal
3 operation with an ultimate heat sink does not involve
4 an operating reactor, does it?

5 MR. VAIL: Could you repeat the question?

6 JUDGE COLE: The ultimate heat sink and
7 the amount of water needed to provide a 30 day supply
8 is one of the requirements. And the size of that tank
9 is of such a size that it does not appear to be a
10 requirement for an operating power reactor. It's a
11 reactor that is shutdown that you're taking care of.

12 MR. VAIL: Right. Those 30 days aren't 30
13 days when it's generating power.

14 JUDGE COLE: Right. Well, I
15 misinterpreted that where they said had to provide for
16 normal cooling for 30 days. And normal cooling for 30
17 days is not operating a reactor if the reactor is in
18 a shutdown condition.

19 MR. VAIL: That's correct, yes.

20 JUDGE COLE: I just want to straighten the
21 record out on that, because I had misinterpreted it.

22 JUDGE ELLEMAN: Please help me with a
23 point of persona confusion, and I really don't know to
24 whom to direct this question. So I'm just going to
25 throw it open and let whoever responds -- whoever

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1 thinks they have an appropriate response to do so.

2 You have conducted a variety of studies
3 that show that the decrease downstream flow should
4 have minimal impact. You appear to have approached it
5 a very scientific way. You've made a lot of
6 calculations. But Dominion is getting ready to conduct
7 an in stream flow incremental methodology study, and
8 I presume this is being done if not at the instance of
9 the state, at least with the state's urging and
10 support. So somebody must believe that there are some
11 reasons for focusing more heavily downstream than what
12 has been done to this point.

13 Now I'm speaking without knowing the
14 specific objectives of that study because we haven't
15 heard what those are. And I guess maybe they're still
16 being formulated. But it does seem to me that there is
17 a contradiction here of the Staff saying everything
18 looks very good, it looks like there isn't a problem,
19 but yet there is an additional new study coming in
20 which is going to address questions related to this
21 issue.

22 Can any of you comment on that point?

23 MR. WARD: This is Jeff Ward.

24 We can't comment on the scope or the study
25 because we haven't seen the work plan.

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1 The Staff believe that the assessment that
2 we've done to evaluate downstream impacts was
3 thorough, reasonable and we're competent in our
4 conclusions.

5 We acknowledge that the Commonwealth
6 believes additional studies need to be done, and we
7 respect that decision.

8 JUDGE ELLEMAN: And your acknowledgement
9 of this comes just from knowing that there will be a
10 downstream flow study or does it come from additional
11 inputs and conversations that you've had?

12 MR. WARD: From the knowledge of the
13 study. Personally I don't know the scope of the study
14 and so I can't comment on how it will be conducted or
15 what it could possibly show.

16 JUDGE KARLIN: Well, may I? I mean, you
17 just said the Staff is confident of its assessment of
18 its impacts on downstream flow. I thought I heard you
19 say something --

20 MR. WARD: Yes. Yes, Your Honor.

21 JUDGE KARLIN: But didn't you also just
22 tell me that you have very little information on the
23 socioeconomic impacts or maybe it was Dr. Scott in the
24 downstream area and that chart only addressed impacts
25 in the lake? I mean I thought I heard him say it was

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1 his viewgraph did not address that and he had very
2 little information about that. How can you be
3 confident if you have very little information?

4 DR. SCOTT: I think we're up against a
5 division of effort here, Your Honor.

6 When I said that we had very little
7 information on, for example, kayaking and
8 participation in that activity or levels of fishing
9 activity in the--

10 JUDGE KARLIN: The socioeconomic aspects?

11 DR. SCOTT: The socioeconomic aspects of
12 it, I had very little information on that.

13 I also said that I wasn't able to -- I
14 didn't see anything in a brief search that indicated
15 that levels of flow in the river had anything to do
16 with the level of activity that does take place. So
17 we don't have any information on either of those two
18 things.

19 JUDGE KARLIN: Have you ever kayaked?

20 DR. SCOTT: No, I have not.

21 JUDGE KARLIN: The level does have an
22 impact on --

23 DR. SCOTT: I believe that would be true.
24 I think Dr. Masnik is actually a kayaker, so maybe you
25 should ask him about that.

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1 JUDGE KARLIN: All right. Go ahead. I'm
2 sorry, Dr. Elleman.

3 JUDGE ELLEMAN: No, it's quite all right.

4 Does anyone else want to comment on the
5 question I posed? Why does there appear to be an
6 apparent contraction of view here; the contraction
7 beings that you don't foresee a problem, but yet
8 additional studies are going to be carried out and are
9 going to proceed?

10 DR. MASNIK: This is Mike Masnik.

11 You know, we've had a number of meetings
12 with the Commonwealth of Virginia on the issue of
13 downstream flow. And Department of Game and Inland
14 Fisheries is concerned about the reduced flow in the
15 river.

16 All I can say is that, you know, we've met
17 with them. We've discussed our position on it. We've
18 looked at what we believe will occur in the river and
19 we've found that these changes are within the normal
20 variation that you would expect in a small river
21 system like North Anna is and in the southeastern part
22 of the United States. And certainly, you know, in
23 late summer when the flows are diminished, there will
24 be some impact. We don't deny that. But as Lance had
25 mentioned prior to the impoundment, flows typically

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1 got below the 20 cfs limit often in a natural
2 environment. And all I can tell you is that biota
3 inhabiting those streams are tolerant of large changes
4 in flow and have flourished for quite some time under
5 those circumstances.

6 So I believe the Staff welcomes the fact
7 that additional studies will be done on the stream and
8 that, you know, one of the principle reasons why the
9 IFIM study is being proposed is to determine whether
10 or not it would be beneficial to go back to more
11 normative flows, instead of keeping for example at 20
12 cfs or 40 cfs continually day and night for two or
13 three months, there may be some benefit to the biota
14 to vary that flow, let's say, down to 10 and then up
15 maybe to 60. And, hopefully that study will shed some
16 light on that question.

17 JUDGE ELLEMAN: You said that in the
18 periods of low flow during the summer there will be
19 some impact. Can you describe what you believe that
20 impact to be on the biota and on the aquatic species
21 that would be below the dam and downstream?

22 DR. MASNIK: Well, the most obvious is
23 that there's less habitat for the biota to inhabit
24 because there's less water. But, you know, most --
25 and I'm speaking primarily of fish. Most fish are

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1 able to move up and down or concentrate in pools. You
2 know, there may be some behavior changes on the part
3 of some of the fish. But, you know, it defines -- I'm
4 defining the term "impact" very loosely. I mean, it's
5 having an effect on the biota.

6 JUDGE ELLEMAN: Would you expect an effect
7 on the number of fish?

8 DR. MASNIK: In extreme cases, certainly,
9 if there is the lack of conductivity between the
10 stream where you have isolation of pools. But we're
11 not talking about flows at that level here.

12 JUDGE KARLIN: I have a couple of
13 questions. I guess it would probably be best to
14 address them to Dr. Masnik as a starting point,
15 anyway. And if you tell me there's someone else that
16 is perhaps appropriate.

17 If you could pull out the final
18 environmental impact statement and refer to page 3-9,
19 I'd like to ask a couple of questions about that.

20 You with me?

21 DR. MASNIK: Yes, I am.

22 JUDGE KARLIN: Great. Okay.

23 I'm going to inquire about the Units 3 and
24 4 and their cooling systems and their varying impacts.

25 At that page 3-9 of the final

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1 environmental impact statement it indicates at the top
2 the two proposed units employ, and that's Units 3 and
3 4, considerably different cooling systems with
4 different water needs. Proposed Unit 3 would use a
5 closed cycle combined wet and dry cooling tower.
6 Okay. So they're quite different cooling systems.
7 Unit 3 is a closed cycle combined wet and dry.

8 At the bottom of that page just before
9 section 3.2.2.1 it says Unit 2 would use a dry cooling
10 system.

11 So as I understand it --

12 DR. MASNIK: I believe it's Unit 3.

13 JUDGE KARLIN: I'm sorry. Unit 4. Yes.
14 Thank you. Will use a dry cooling system. So Unit 4
15 is dry cooling, Unit 3 is a combined wet and dry
16 cooling. All right. You're with me.

17 Now if you could go to question 30 that we
18 asked in the environmental questions, we asked about
19 this particular page. And we noted -- and you don't
20 have to actually pull that out. But that a number of
21 interested parties have proposed using the Unit 3 dry
22 towers all of the time instead of using along with the
23 wet towers or in lieu of using the wet towers. So I'd
24 like to focus a little bit on that.

25 Why not just use dry cooling for Unit 3

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1 also?

2 The question was asked, question 30 of our
3 environmental questions: Have any estimates been made
4 of the savings in consumptive water loss if Unit 3
5 used dry cooling? And I don't think we got an answer
6 in the answer. So I'd like to see have any estimates
7 been made of the savings in water consumption if Unit
8 3 used dry cooling at the time?

9 DR. MASNIK: I think this applicant gave
10 us something on that.

11 JUDGE KARLIN: Then maybe I'm missing it.
12 But I just didn't see if it was there.

13 MR. VAIL: If Unit 3 --

14 JUDGE KARLIN: Mr. Vail, you're going to
15 respond?

16 MR. VAIL: Yes.

17 JUDGE KARLIN: Okay.

18 MR. VAIL: This is Lance Vail.

19 If Unit 3 were to be operated with a dry
20 tower the same as Unit 4, there would be -- we would
21 basically be at the baseline condition. There would be
22 no consumptive water loss.

23 JUDGE KARLIN: Okay. So your answer is
24 have you estimates been made of savings in consumptive
25 water loss? The answer is no, but you're telling me

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1 now that it would be zero, there would be no
2 consumptive water loss?

3 MR. VAIL: There would be no consumptive
4 water loss if it was to be switched to a full dry
5 tower.

6 JUDGE KARLIN: Like number four?

7 MR. VAIL: Like number four.

8 JUDGE KARLIN: Okay. And does that mean
9 that the doubling in the 20 cubic feet per second from
10 downstream would be eliminated and it would be back to
11 the existing baseline?

12 MR. VAIL: That's correct.

13 JUDGE KARLIN: And let me ask this: Your
14 slide 3 here that you displayed to us at the bottom
15 bullet says "Unit 4 has no impact on lake level of
16 downstream flows." Is that because it's dry cooling?

17 MR. VAIL: That's correct.

18 JUDGE KARLIN: And so the discussion which
19 we have in the remaining slides is dealing with the
20 impact of Unit 3 being wet and dry cooling?

21 MR. VAIL: That's correct.

22 JUDGE KARLIN: And if Unit 3 were dry
23 cooling all the time, you could also say Unit 3 would
24 have no impact on lake level or downstream flows?

25 MR. VAIL: That's correct.

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1 JUDGE KARLIN: All right. Bear with me
2 here.

3 Now, Units 1 and 2, what kind of cooling
4 system do they use?

5 MR. VAIL: They use once through cooling.

6 JUDGE KARLIN: Once through cooling. And
7 does that have an impact on consumptive water? Does
8 that consume water?

9 MR. VAIL: Yes. It doesn't result in
10 direct force evaporative losses in a cooling tower.
11 But the elevated temperatures that it results into the
12 lake will stimulate induced evaporation from the lake
13 surface. So by heating the lake you do get an
14 indirect consumptive water loss.

15 JUDGE KARLIN: Okay. So a cooling tower
16 like a dry cooling tower would have a consumptive
17 water loss by virtue of -- well, a wet cooling tower
18 would have a consumptive water loss because the water
19 would evaporate into the air from the tower, is that
20 correct?

21 MR. VAIL: Directly at the tower.

22 JUDGE KARLIN: Directly at the tower.
23 Whereas, a once through cooling system is used at
24 Units 1 and 2 would have such evaporation because it
25 wouldn't have a tower, right?

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1 MR. VAIL: That's correct.

2 JUDGE KARLIN: But it would increase the
3 temperature of the water being returned to the lake
4 and the surface water impoundment. And that increased
5 temperature would increase temperature would increase
6 evaporation, is that correct?

7 MR. VAIL: That's correct.

8 JUDGE KARLIN: And thus increase water
9 consumption or loss? There would be less water in the
10 lake?

11 MR. VAIL: Correct.

12 JUDGE KARLIN: And that would lower the
13 water levels in the lake, as it were?

14 MR. VAIL: Correct.

15 JUDGE KARLIN: Okay. So that the use of
16 once through cooling by Units 1 and 2 results in a
17 consumption of water or loss of water in the lake by
18 virtue of the heating of the water?

19 MR. VAIL: That's correct.

20 JUDGE KARLIN: Do we have any idea how
21 much that is?

22 MR. VAIL: Well, in the documentation
23 originally provided by Dominion they had a study that
24 -- a model assessment that they had done and that we
25 had reviewed that basically provided some estimates

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1 for what those water losses were. And in our
2 calculation we had used the temperatures that had been
3 estimated in that analysis for us to independently
4 estimate what we thought those induced evaporation
5 rates would be.

6 JUDGE KARLIN: Okay.

7 MR. VAIL: And they were very similar.

8 JUDGE KARLIN: So when you use the term
9 "reduced evaporation," that's induced by virtue of the
10 increased water temperature from the Units 1 and 2,
11 reduced evaluation?

12 MR. VAIL: Correct. They make the
13 distinction between --

14 JUDGE KARLIN: Free evaporation --

15 MR. VAIL: Free evaporation. There's the
16 natural evaporation, and there's a forced evaporation
17 which is what would come off a wet cooling tower.

18 JUDGE KARLIN: Okay.

19 MR. VAIL: And an induced evaporation,
20 which would be result of a higher temperature on a
21 lake.

22 JUDGE KARLIN: Okay. And in your slide 4
23 you have thee scenario number two, the addition of
24 Unit 3, that is as I understand the proposed dry and
25 wet cooling towers, would have an added constant

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1 forced evaporated loss of 8,707 gallons per minute
2 from the lake. That means that the cooling towers
3 would evaporate 8,707 gallons per minute from the
4 lake, is that right?

5 MR. VAIL: On the average.

6 JUDGE KARLIN: On the average?

7 MR. VAIL: And the bounding PPE value we
8 used was the 8707.

9 JUDGE KARLIN: And that's recognizing that
10 sometimes it will be using dry cooling and sometimes
11 it will be using wet cooling, is that what you mean on
12 average?

13 MR. VAIL: That's correct. There's two
14 modes that it operates in.

15 JUDGE KARLIN: Right.

16 MR. VAIL: And depending on where you are
17 in those modes and the what the weather conditions
18 are.

19 JUDGE KARLIN: Right.

20 MR. VAIL: But we used the 8707 as the
21 bounding basis for our assessment.

22 JUDGE KARLIN: So when we deal with the
23 8,700 -- let's just call it 8700 gallons per minute
24 from the additional evaporative loss from Unit 3, how
25 much evaporative loss is experienced by Units 1 and 2?

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1 MR. VAIL: I would have to go back. Again,
2 in our assessment we consider that to be the baseline
3 for our assessment. So we were not revisiting the
4 consumptive associated with Units 1 or 2 directly in
5 our review.

6 JUDGE KARLIN: So you didn't look at
7 whether or not the 8700 gallons per minute from Unit
8 3 could be offset by doing something with regard to
9 Units 1 and or; you did not look at that?

10 MR. VAIL: Correct. We did not look at
11 Unit 1 and 2 as mitigation for Unit 3.

12 JUDGE KARLIN: Okay. Now am I asking
13 these questions to the right person, Dr. Masnik?

14 DR. MASNIK: Yes.

15 JUDGE KARLIN: Okay. Mr. Vail, somehow
16 you got on the hot spot here today. Okay. This is
17 helpful.

18 Well, let me ask this with regard to your
19 viewgraph, Unit 4 has no impact on lake level
20 downstream and that's because it's dry cooling, right?
21 Does the proposed permit impose and require dry
22 cooling for Unit 4?

23 Well, you need to have a witness address
24 that or one of the counsel.

25 Do you know, Mr. Vail? I mean, I'm not

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1 trying to trick anybody. If it does, it does. That
2 would be fine, you know.

3 MS. POOLE: If you'll give us one moment,
4 please.

5 JUDGE KARLIN: Okay. Well let me ask
6 while we're waiting for that, I understand for Unit 3
7 there will be dry cooling and wet cooling tower
8 combined, or you know both of them will be available.
9 Is the way it's set up or proposed possible that Unit
10 4 would also use wet and dry cooling as well, that it
11 could pipe its thermal discharges over to make use of
12 the wet cooling system in the energy conservation
13 mode?

14 MR. VAIL: Unit 4 is proposed as dry
15 cooling.

16 JUDGE KARLIN: What I'm wondering, though,
17 is there anything in the permit that would prevent
18 Unit 4 from using some of the wet cooling capacity
19 over there that's being proposed for Unit 3?

20 Why don't we keep on going. If you all
21 would look at that issue for me, counsel for the
22 Staff.

23 MS. POOLE: Judge Karlin, we've got it.

24 JUDGE KARLIN: Yes.

25 MS. POOLE: Section 3.e.2 reads as follows:

1 JUDGE KARLIN: Section 3.e.2 of?

2 MS. POOLE: Of the draft permit that was
3 provided to you as Staff Exhibit 17.

4 JUDGE KARLIN: Okay.

5 MS. POOLE: "An applicant for a CP or a COL
6 referencing this ESP for a fourth unit shall use a dry
7 cooling tower system to remove waste heat from the
8 working fluid passed through the turbine generator set
9 during normal operation."

10 JUDGE KARLIN: Did that say Unit 4?

11 MS. POOLE: For a fourth unit.

12 JUDGE KARLIN: Oh, a fourth unit. Okay.

13 And is that a proposed permit condition?

14 MS. POOLE: It is, indeed.

15 JUDGE KARLIN: A COL action item or
16 whatever?

17 MS. POOLE: It is a proposed permit
18 condition.

19 JUDGE KARLIN: That's part of the draft
20 permit, I understand?

21 MS. POOLE: That is correct.

22 JUDGE KARLIN: Okay. Good. Good.

23 So you're saying that the draft permit
24 would, as proposed, currently would not allow -- or
25 stated another one, would prohibit the applicant from

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1 sending any of its heated water from Unit 4 into the
2 wet cooling systems that's proposed for Unit 3?

3 MS. POOLE: That is correct, Your Honor.

4 JUDGE KARLIN: All right. Thank you.

5 I'd like to then turn to question 45 that
6 we asked in the environmental question. And although
7 it was a legal question, you all addressed it. The
8 Staff addressed it as a factual question.

9 And in the answer we asked -- if the FEIS
10 states that the incremental effect of operation of
11 Unit 3 would approximately double the duration of
12 periods during drought conditions when the aux feed
13 would be applied, that is 50 would be applied. It
14 would increase the amount from 5.7 percent of the time
15 to 11 percent of the time when the flow downstream
16 would be 20 cubic feet a second. I mean, a normal
17 flow, the proper flow in that river is supposed to be
18 40 cubic feet a second. Under drought conditions or
19 certain conditions the state has said we'll let you
20 get by with a minimum flow of 20 cubic feet a second.
21 s I understand what the FEIS is saying at page 5.9 is
22 that operating Unit 3 would double the period during
23 which there would be drought flow conditions.

24 In that context we asked whether or not
25 you had considered using more stringent water saving

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1 measures on Units 1 and 2 in mitigation or return for
2 the fact that you're going to consume more water out
3 of Units 3 and 4. The Staff said "imposing more
4 stringent water saving measures on Units 1 and 2 would
5 likely result in derating the plants, thereby reducing
6 generating capacity." Please talk about that.
7 Derating the plants, meaning you're going to use some
8 of the electricity the plant would generate? Instead
9 of selling it to customers, they'd have to use it on
10 their own treatment system, is that right?

11 MR. VAIL: What the derating was just
12 talking about cutting back the power load, the power
13 generation from those units. So by derating, the
14 plants would reduce the thermal discharge from those
15 Units 1 and 2.

16 JUDGE KARLIN: Derating the plants meaning
17 you would have a lower electric output available for
18 sale--

19 MR. VAIL: A lower electric -- for
20 instance, turning off one of the units entirely would
21 reduce the thermal load and thereby reduce the induced
22 evaporation.

23 JUDGE KARLIN: Please explain that again.
24 Derating the plants? As I understand it if you were
25 to put dry cooling systems, let's just say, on Units

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1 1 and 2. How would that derate Units 1 and 2? Is
2 that what we're talking about?

3 MR. VAIL: No. We were talking about
4 reducing the power level to reduce the induced
5 evaporation from Units 1 and 2 to mitigate the
6 downstream flow impacts.

7 JUDGE KARLIN: Oh. So the statement
8 "imposing more stringent water saving measures on
9 existing Units 1 and 2 would likely result in derating
10 the plants," you're saying one way to reduce the water
11 consumption of Units 1 and 2 would be to reduce the
12 amount of power they could generate, derate them?

13 MR. VAIL: Correct.

14 JUDGE KARLIN: But that's not the only way
15 they could do it, is it?

16 MR. VAIL: Well --

17 JUDGE KARLIN: Could they build a dry
18 cooling system for that and keep it the same level?

19 MR. VAIL: They could-- they could-- the
20 alternatives that we looked at it was unclear that any
21 of those were actually reduce the evaporative losses;
22 for instance putting in a wet helper tower, spray
23 ponds would actually result in some consumptive water
24 loss.

25 JUDGE KARLIN: Okay. But further in that

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1 answer to question 45 the Staff indicated that the
2 Staff did not consider it a reasonable alternative to
3 derate the plant, is that correct?

4 MR. VAIL: That's correct.

5 JUDGE KARLIN: Okay. And that was because
6 you thought it would require the derating of the plant
7 to do that? The required derating of the plant in
8 order to reduce the water consumption of Units 1 and
9 2?

10 MR. VAIL: Again, Units 1 and 2 were --
11 continued operation of Units 1 and 2 were considered
12 the baseline for our assessment. So we did not do a
13 detailed assessment about altering the operations of
14 Units 1 and 2.

15 JUDGE KARLIN: Now, are Units 1 and 2
16 owned by the same company as proposed Units 3 and 4?
17 If you don't have an answer to that, that's fine.

18 MR. VAIL: Yes.

19 JUDGE KARLIN: Okay. Let me turn your
20 attention to the final environmental impact statement
21 page 8.2, 8.3 and 4 and 5. Starting at 8.2. We're
22 get at this with the alternative section as well, but
23 I thought since you guys were focusing on this, it
24 might be helpful to us.

25 8.2, Dr. Masnik, perhaps. Page 8.2 and

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1 it's section 8.2 the system design alternatives. You
2 indicate there in the fourth line down "A dry cooling
3 tower has been proposed for Unit 4 at the North Anna
4 ESP site." Then it says at the end of that paragraph
5 "Therefore, none of these alternatives is considered
6 for the Unit 4 at the ESP site."

7 Were any other alternatives considered --
8 Unit 4 is proposed to have dry cooling. Did you in
9 your environmental evaluation consider any other
10 alternatives for Unit 4, such as wet cooling or once
11 through cooling water?

12 It appears that the answer from the text
13 is no.

14 DR. MASNIK: You're correct, Your Honor.

15 JUDGE KARLIN: So for Unit 4 you just
16 accepted dry cooling?

17 DR. MASNIK: That's correct.

18 JUDGE KARLIN: No alternatives were looked
19 at?

20 DR. MASNIK: That's correct.

21 JUDGE KARLIN: Okay. Moving to page 8.5
22 And page 8.4, the cooling systems for Unit 3, which
23 would be a combined wet and dry cooling systems. And
24 at the bottom of 8.4 the paragraph at the end, "A dry
25 cooling tower designed to dissipate heat may reduce

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1 water related impacts of operating Unit 3, but it also
2 has some disadvantage in particular dry cooling
3 systems are more expensive to build and are not as
4 efficient as wet cooling systems."

5 So help me there. On Unit 4 you said dry
6 cooling is great. On Unit 3 you said oh no, dry
7 cooling is a problem. Why?

8 DR. MASNIK: On Unit 4 dry cooling was
9 what was proposed by the licensee. We evaluated it
10 based on the merits of the cooling system. And we
11 found it to be an acceptable design and have the
12 minimal amount of impact on the lake and downstream
13 biota. Whereas --

14 JUDGE KARLIN: Let me stop you. You had
15 4 as the minimal impact, the least impact --

16 DR. MASNIK: That's correct.

17 JUDGE KARLIN: -- of any of them and
18 that's because it's using dry cooling? Okay.

19 Now we're at Unit 3 and dry cooling is no
20 good for Unit 3, though. Why?

21 DR. MASNIK: Well, we didn't say that it
22 was no good. We said that there were some
23 disadvantages. The two disadvantages that we gave were
24 they were expensive to build and they're more
25 expensive to operative. Those were the two --

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1 JUDGE KARLIN: So is expense an
2 appropriate mechanism for the Staff to consider in a
3 NEPO analysis as expense to the applicant?

4 MR. VAIL: Without the cost analysis there
5 is also fuel cycle impacts to generate the same amount
6 of power. You would have to -- you would have more
7 fuel cycle impacts because of the reduced efficiency
8 of the system.

9 JUDGE KARLIN: All right. So in this page
10 8.4 there's a reference. I wanted to ask you about
11 that. I think this is what you must be getting at,
12 Mr. Vail. It says "Dry cooling systems are more
13 expensive to build," which is what Dr. Masnik just
14 indicated. He said more expensive to operate. What
15 the EIS says is they're not as efficient as meaning
16 that they require power or some -- well, what does
17 "they're not as efficient" mean when you say dry
18 cooling systems are not as efficient as wet cooling
19 systems, not as energy efficient?

20 MR. VAIL: They're not generally as energy
21 efficient because the ultimate temperature that you
22 can get on the cooling side on a dry system is likely
23 to be higher than you would see on an equivalent
24 system that would have some evaporative cooling. And
25 so there's a loss inefficiency there. Plus there's

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1 parasitic costs associated with fans to keep the air
2 circulating around the dry cooling system.

3 JUDGE KARLIN: And so further in that
4 paragraph, if you'll look on with it, it says
5 "Dominion estimates that the power needed to operate
6 dry cooling towers would be 8.5 to 11 percent of the
7 plant power output, about 150 megawatts electric."
8 That's what you're referring to as not as efficient,
9 the Staff was referring to do you think?

10 MR. VAIL: That's correct. There were two
11 parts to the efficiency. One is the higher temperature
12 that the system would be operating at and the other
13 aspect of that would be the energy associated with the
14 fans.

15 JUDGE KARLIN: Okay. And so it's a trade
16 off as between reducing the water flow in the
17 downstream from doubling the amount of 20 cfs in the
18 downstream versus putting dry cooling on Unit 3?
19 Would that be one way to look at it?

20 MR. VAIL: That's correct that there's
21 trade offs.

22 JUDGE KARLIN: And with regard to Units 1
23 and 2, let's say that the Staff has said that it
24 requires 150 megawatts electric. Could that 450
25 megawatts electric come from Units 3 and 4 to serve

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1 dry cooling for Units 1 and 2? Come from anywhere,
2 right?

3 MR. VAIL: Yes. Come from anywhere.

4 JUDGE KARLIN: And in fact Units 3 and 4
5 could be built instead to 4500 megawatts to 4650
6 megawatts and that would compensate, that would
7 provide the power right there?

8 MR. VAIL: We didn't evaluate that.

9 JUDGE KARLIN: Okay. Didn't evaluate that.
10 Okay.

11 Let me see if I have any other questions.

12 JUDGE ELLEMAN: This is Judge Elleman.

13 Dry cooling towers put the rejected heat
14 directly into the atmosphere and so you shouldn't have
15 any evaporative losses. Are there second order
16 effects that could effect water consumption associated
17 with dry towers? For example, the air is hotter
18 somewhere, either atmospheric conditions that could
19 trap that air such that evaporative loss would go up
20 at the lake. The humidity goes down because the air
21 is hotter. Could this effect local precipitation in
22 some way that would alter the available amount of
23 water. Are these order effects of any consequence?

24 DR. MASNIK: Judge, you're talking a
25 hydrologist and sociologist and two aquatic --

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1 JUDGE ELLEMAN: Yes, we've gone astray
2 here.

3 DR. MASNIK: So we're not qualified to
4 answer that question.

5 JUDGE ELLEMAN: Yes. Maybe I asked the
6 wrong group to address that issue.

7 DR. MASNIK: Right.

8 JUDGE KARLIN: Any other questions?

9 All right. Well, thank you very much.

10 What I think we'll do is adjourn now. I
11 think we've finished our questions for this panel.

12 Well, let me ask that. Do we want to give
13 the Staff an opportunity to ask any clarifying
14 questions in the nature of clarifications? And we
15 might as well do that now if we can just go if you
16 have any. Ms. Poole?

17 MS. POOLE: May we confer for just three or
18 four minutes?

19 JUDGE KARLIN: Sure.

20 MS. POOLE: Amongst ourselves?

21 JUDGE KARLIN: Sure. I'd hoped you'd been
22 thinking of these as we went. Okay.

23 MS. POOLE: We have thought. Now we must
24 confer.

25 JUDGE KARLIN: All right. We'll I'll give

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1 you a minute.

2 We'll go off the record.

3 (Whereupon, at 12:27 p.m. off the record
4 until 12:29 p.m.)

5 JUDGE KARLIN: All right. We're back on
6 the record.

7 Mr. Weisman, Ms. Poole, anything you can
8 think of you want to ask?

9 MS. POOLE: Your Honors, our only
10 additional comment would be a request. And that would
11 be if we could reserve the opportunity to address the
12 system design alternatives also when the alternatives
13 panel has been impaneled later on in the proceeding.

14 JUDGE KARLIN: I think that will be
15 addressed when the alternatives panel is convened.

16 MS. POOLE: Okay.

17 JUDGE KARLIN: I mean, we will ask some
18 questions about that. And the witnesses, presumably,
19 will have the opportunity to address that either in
20 their present -- well they don't have a presentation.
21 But we'll make sure to ask a question or two about
22 that in the alternative session.

23 MS. POOLE: Okay. Thank you. That's all
24 we have.

25 JUDGE KARLIN: Okay. Thank you.

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1 Well, with that I think what we will do is
2 thank this panel for their patience, cooperation and
3 all the work you obviously put into the written
4 testimony as well. And we'll need to adjourn.

5 I have it at 12:29 right now. I'm not
6 sure what the lunch opportunities are in town. I
7 think we'll try to grab some sandwiches. But let's say
8 we'll reconvene in an hour and 15 minutes. We will
9 reconvene at 1:45.

10 Thank you.

11 We're now adjourned.

12 (Whereupon, at 12:30 p.m. the hearing was
13 adjourned, to reconvene this same day at 1:45 p.m.)

14 JUDGE KARLIN: Okay. Mr. Court Reporter,
15 we're back on the record.

16 This is the Atomic Safety and Licensing
17 Board convening -- reconvening in the matter of
18 Dominion North Anna's application for an early site
19 permit. And we're back on the record again.

20 As Judge Cole mentioned, we appreciate the
21 panel of witnesses sort of being a little bit crammed
22 in on the facility. We only have so much space in
23 this facility. It's nice and it's modern, but it's a
24 bit small. Hopefully, if you all bear with us, we'll
25 make it work.

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1 We have finished with the staff's panel on
2 surface water impacts and mitigation, and now we are
3 presented with I assume Dominion North Anna's panel in
4 that regard. Mr. Lewis.

5 MR. LEWIS: Judge Karlin, seated is Dr.
6 Jud White, Mr. Bill Bolin, Mr. John Waddill, Dr.
7 Stewart Taylor, Dr. Patrick Ryan, and Dr. Charles
8 Coutant, to provide Dominion's presentation the
9 surface water impacts and possible mitigation
10 measures. And I'd like to approach the bench to hand
11 out the presentation materials.

12 JUDGE KARLIN: Great. Okay. Thank you.
13 And we have six name tents and seven people. Do we
14 have everything? No, we have six and six. Okay. Six
15 and six.

16 (Laughter.)

17 We're doublechecking.

18 MR. LEWIS: If we got that wrong --

19 (Laughter.)

20 JUDGE KARLIN: There just was a gap there
21 at the middle. Okay. Great.

22 All right. Proceed. You have 15 minutes
23 to give us an initial presentation.

24 DR. WHITE: Good afternoon. My name is
25 Jud White, and I'm Environmental Policy Manager at

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1 Dominion, and I have been for the last several years
2 helping support the nuclear team on this ESP project.

3 We're pleased to be before you today to
4 discuss the topic surface water impacts and possible
5 mitigation measures, and our goal today is simple --
6 to be responsive and thorough in answering the
7 questions and helping ensure that you have the
8 information that you need.

9 We have six panel members today, as noted
10 on this slide basically six subtitles to discuss very
11 briefly. We hope to hold to the time limit. And my
12 next slide that I was going to show has been said
13 about three times, and I don't really need to dwell on
14 this any more other than that it was a major decision
15 that we went from closed cycle -- from open cycle to
16 closed cycle.

17 JUDGE KARLIN: Dr. White?

18 DR. WHITE: Yes.

19 JUDGE KARLIN: Hold on a second.

20 We've got to do this. I've got to get
21 you --

22 DR. WHITE: Oh, we've got to swear in.

23 JUDGE KARLIN: I need to swear you all in.

24 DR. WHITE: Okay. I take everything I
25 said back.

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1 (Laughter.)

2 JUDGE KARLIN: We won't take that off your
3 time, though.

4 DR. WHITE: Okay.

5 (Laughter.)

6 JUDGE KARLIN: So if you all could stand,
7 please, and raise your right hand.

8 (Whereupon, the panel was sworn.)

9 Thank you. Please sit down.

10 Sorry, Dr. White.

11 DR. WHITE: That's okay. No problem.

12 JUDGE KARLIN: Please proceed again.

13 DR. WHITE: No problem. This slide, as I
14 indicated -- as has been indicated earlier, and
15 basically just there was a major decision to go from
16 open cycle to closed cycle.

17 JUDGE KARLIN: So we're on Slide 3.

18 DR. WHITE: We're on Slide 3, that's
19 correct.

20 JUDGE KARLIN: I'm just trying to keep
21 track for the record, so --

22 DR. WHITE: Right. Slide 3.

23 The next slide -- well, first, Dr. Taylor
24 is going to talk about the impacts on lake levels and
25 downstream flows.

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1 DR. TAYLOR: Thank you, Jud, and good
2 afternoon, Your Honors. My name is Stewart Taylor.
3 I'm a hydrologist with Bechtel Corporation. We've
4 been supporting Dominion in putting together their ESP
5 application.

6 I'll be talking in the next few minutes
7 about the hydrologic impacts on lake levels as well as
8 downstream flows. We performed this assessment using
9 a water balance model, which is depicted in the
10 schematic that appears on the slides and the monitors.
11 And this water budget model predicts weekly lake
12 levels and outflows, the releases from the North Anna
13 dam, on a weekly basis for a 24-year period of record.

14 Slide 5, please.

15 Our results are summarized on this plot,
16 which is a hydrograph, which plots the lake level as
17 a function of time for the 24 years from 1978 through
18 2003. And what's shown on this hydrograph in the red
19 is the existing condition with Units 1 and 2, and then
20 shown in green is the condition with Unit 3 added to
21 the lake using the combination wet and dry cooling
22 system that you heard described earlier.

23 What you see in this slide is that in a --
24 in a normal year, so-called normal year, that there's
25 not a whole lot of difference in the lake level

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1 between the current condition and adding Unit 3. But
2 what you see during drought years, particularly in the
3 1981 period and the 2002 period, you're seeing bigger
4 deviations between existing condition and Unit 3. In
5 particular, in 1981, eight-tenths of a foot difference
6 in minimum lake level and about nine-tenths of a foot
7 difference in 2002.

8 Slide 6, please.

9 One can summarize this hydrograph
10 statistically, and what we've presented on this slide
11 is the percent of time that the lake level is below a
12 certain elevation.

13 So what you see is that for elevation 248
14 currently the lake is below -- less than or equal to
15 248 feet about 5 percent of the time. And then, if
16 you'd add a Unit 3, using the cooling system, a wet
17 and dry cooling system, that increases from about
18 5 percent of the time to about 7 percent of the time.
19 At elevations 246 and below there is very little
20 difference between existing condition and a Unit 3.

21 Slide 7?

22 JUDGE KARLIN: Could I ask you to go back
23 to that slide for a minute? The 5.2 -- 248 elevation,
24 as I understand it, that correlates into 20 cubic feet
25 per second going out of the dam. Is that right?

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1 DR. TAYLOR: That's correct. That
2 implements the lake level --

3 JUDGE KARLIN: All right. So at 248,
4 there would be 20 cubic feet per second going out of
5 the dam, presumably. And you have the figure of
6 currently 5.2 percent; with Unit 3, 7 percent. But
7 doesn't the FEIS talk about going from 6 percent to 11
8 percent?

9 DR. TAYLOR: Yes.

10 JUDGE KARLIN: We saw that I think in some
11 of the FEIS, and we were trying to understand the --
12 how they were consistent.

13 DR. TAYLOR: Sure, Your Honor. I'll try
14 to clarify. The NRC conducted their own independent
15 analysis, and you heard Mr. Vail describe those
16 results. Going from 6 percent to 11 percent was based
17 on the water budget model that they developed
18 independent from Dominion.

19 These results represent the work that
20 Dominion did in support of the ESP application, and
21 one of the key differences in the work that Dominion
22 did was that -- I mean, you've heard this wet and dry
23 cooling system described, and one of the features of
24 the system or the proposed operating mode is that when
25 you get below a certain elevation, below 250 feet mean

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1 sea level, you start using this air-cooled -- you
2 start engaging the air-cooled component of the cooling
3 system.

4 Well, this is a water-saving feature, so
5 when our elevation -- the modeled elevation drops
6 below 250, then we explicitly account for that air
7 cooling and reap the benefits or, you know, gain some
8 credit for not consuming as much water.

9 In the water budget model the NRC used,
10 they used a fixed evaporation rate over the whole --
11 over their whole 24-year simulation period. So we've
12 attempted to represent physically what goes on in the
13 lake and the cooling system.

14 JUDGE KARLIN: So is the difference in
15 assumptions being made in approaches between the 11
16 percent versus 7 percent?

17 DR. TAYLOR: It's a difference in
18 assumptions. I would characterize the word that
19 Dominion -- as Dominion did as more realistically
20 representing --

21 JUDGE KARLIN: And the staff was more
22 conservative perhaps, is that what --

23 DR. TAYLOR: That's correct, Your Honor,
24 yes.

25 JUDGE KARLIN: Okay.

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1 JUDGE COLE: So you used what you
2 considered to be the actual predicted operating
3 experience, the way you would operate it.

4 DR. TAYLOR: The anticipated mode of
5 operation, as well as the characteristics of wet and
6 dry cooling tower, and as well as meteorological
7 effects as well.

8 JUDGE COLE: Without artificially using
9 more dry cooling than is predicted by the contingency
10 plan.

11 DR. TAYLOR: I'm sorry. I'm not --

12 JUDGE COLE: If you're above 250, you're
13 using the wet cooling tower. If you're between 250
14 and 248, you use the dry cooling tower.

15 DR. TAYLOR: That's correct, Your Honor.

16 JUDGE COLE: And below 248 -- yes, you use
17 the dry cooling tower.

18 DR. TAYLOR: Yes.

19 JUDGE COLE: And the wet tower if that
20 can't handle it.

21 DR. TAYLOR: Yes, that's correct.

22 JUDGE COLE: And that's the assumption
23 that you made in getting these numbers.

24 DR. TAYLOR: Correct.

25 JUDGE COLE: Thank you.

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1 DR. TAYLOR: Moving on to Slide I believe
2 it is 7, the same water budget model predicts the
3 outflows and what outflows from the North Anna dam.
4 And what's plotted on this figure are our results from
5 the water budget model that plotted lake outflow
6 versus time for the 24 years.

7 And the current condition is plotted in
8 blue, the condition with Unit 3 is plotted in red.
9 For the most part, you see that, you know, there is
10 not a whole lot of difference between the two plots.
11 In the drought years, such as the early '80s and 2001,
12 2002, you can see more impact on outflow with Unit 3
13 added to the lake.

14 Slide 8, we can again summarize these
15 results in a statistical format. What our analysis
16 shows is that outflow is 40 cubic feet per second or
17 less about 45 percent of the time under current
18 conditions. With an added Unit 3, that increases to
19 about 50 percent. The other flow rate of interest is
20 the 20 cubic feet per second. Currently, that's
21 around -- the flow would be 20 cfs about 5 percent of
22 the time. With Unit 3, that increases to about
23 7 percent of the time.

24 And that concludes what I had to say with
25 regard to hydrologic impacts, and I will pass it on to

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1 Dr. Ryan who will help --

2 JUDGE COLE: Before we leave --

3 DR. TAYLOR: Sure.

4 JUDGE COLE: -- back on Slide 7, the lake
5 outflow hydrographs. I'm looking at the blue and the
6 red. At first glance, it looks like the reds exceeded
7 the blue, but is that a little blue dot on top of the
8 red line? It looks like a lot more water going out
9 with the existing plant number 3.

10 Now, every once in a while I see a blue
11 dot on top of the --

12 DR. TAYLOR: Yes. I think what that
13 represents is just -- is an artifact of these
14 basically plotting on top of each other.

15 JUDGE COLE: Okay. So it probably is true
16 that dam releases weren't higher with existing Unit 3
17 -- would not be higher --

18 DR. TAYLOR: That's correct.

19 JUDGE COLE: -- in general.

20 DR. TAYLOR: Yes.

21 JUDGE COLE: Okay. Thank you.

22 JUDGE ELLEMAN: Before we leave this plot
23 -- this is Judge Elleman -- I'm surprised at the
24 oscillations that appeared. Is this because of the
25 very compressed time scale that it looks like there

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1 are such wide short-term variations on a plot like
2 this?

3 DR. TAYLOR: Part of it is the time scale,
4 Your Honor. Part of it as well is, I mean, this is
5 plotted on a logarithmic plot, and you see these
6 flows, they go up quite significantly, over 1,000
7 cubic feet per second. And that really reflects the
8 way that the reservoir is operated.

9 There is -- you know, Dominion tries to
10 maintain a pool of about 250 feet mean sea level.
11 And, of course, with -- you know, if you have rainfall
12 events, thunderstorms, you know, remnants of
13 hurricanes, that's a significant inflow to the
14 reservoir. So they -- it's a controlled reservoir.
15 They have gates, they open the gates to release the
16 water, and that's why you see those large excursions
17 -- to maintain that pool level at 250.

18 JUDGE COLE: What is the average dam
19 release rate, water release rate from the dam? Do you
20 know?

21 DR. TAYLOR: On an average basis it's --
22 I think it's around 270 cubic feet per second.

23 JUDGE COLE: All right.

24 DR. TAYLOR: I was to the point where I
25 was going to turn this over to Dr. Ryan to talk how

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1 these hydrologic impacts translate to biological
2 events.

3 DR. RYAN: Good afternoon. I'm Patrick
4 Ryan. In a hydrologic consultant, and previously I
5 worked for Bechtel and in my work there did a lot of
6 the work on the modeling, both in the lake itself and
7 in the downstream rivers.

8 What Stewart talked about was the changed
9 inflow at the North Anna dam, and what we did was we
10 looked at those changes in the flow and then we
11 essentially moved them downstream to the Pamunkey
12 River. And we gave particular attention in the
13 spawning periods in April and May.

14 Next slide, Slide 10.

15 This slide is just to orient you, so you
16 see the dam up on the top left corner. And then, as
17 you move downstream, you can see a red triangle.
18 That's the Hart Corner Gauge, and just above that is
19 a stretch of the river where it's typically referred
20 to as a fall line.

21 And further downstream we come to the
22 Pamunkey River, and then there's a red triangle there
23 where there's got a mark as the Hanover Gauge. And
24 it's at the Hanover Gauge that I'm really going to be
25 referring to when we talk about the flows.

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1 As you move further down, you can see
2 where Highway 360 crosses, and that's typically the
3 upstream part of the tidal zone. That's about another
4 20 miles or so downstream of the Hanover Gauge, and
5 then even further downstream you can see where the
6 spawning areas are being marked and dumped, and Dr.
7 Coutant will refer to those.

8 This slide also shows the Mattaponi River,
9 and he will make a reference to that as well. He has
10 some information there.

11 Next slide, please.

12 This is Slide 11. So these are the
13 results for the Pamunkey River flows, impacts of
14 Unit 3 on the Pamunkey River flows, and the focus is
15 on the April and May spawning period. And what we're
16 seeing is that the flow reduction down at the Hanover
17 Gauge is typically quite small, in the 1 to 5 percent
18 range. It's actually about 85 percent of the time the
19 flow reduction is less than 5 percent in the -- at the
20 Hanover Gauge.

21 JUDGE COLE: When you say "flow
22 reduction," flow reduction from what, the average
23 annual or what?

24 DR. RYAN: No. Flow reduction on a week-
25 by-week basis, looking at the consumption of water by

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1 Unit 3. We actually looked at, what was the impact on
2 a short-term basis, week by week, for the water
3 consumption at Unit 3, over the 24-year period?

4 JUDGE COLE: Okay. So whatever the flow
5 would have been, it would be 1 to 5 percent -- in the
6 1 to 5 percent range as a reduction because of Unit 3.

7 DR. RYAN: Correct. That's correct.

8 JUDGE KARLIN: And may I ask on that, why
9 did you pick April/May as -- I mean, that seems to be
10 the wettest time of year, so you'd have the least
11 impact. Is that because of the spawning time?

12 DR. RYAN: Because it was a spawning time,
13 we actually did look as well at the overall annual
14 basis, and we also looked at the summer and fall
15 basis. So we did look at a number of different
16 periods. I'm just presenting the ones for the
17 spawning period.

18 JUDGE KARLIN: So this -- and April/May
19 would be the least impact timeframe for the flow
20 reduction.

21 DR. RYAN: It was actually quite
22 interesting, Your Honor. No matter which period we
23 looked at, whether we looked at the April/May, the
24 annual, the summer, or the fall, that 5 percent
25 reduction about 85 percent of the time applied. So it

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1 was consistent.

2 The numbers are varying, obviously, with
3 -- because the flow varies over the year. And I can
4 give you -- for example, if you look at that 5
5 percent, seven-day low flow, in April and May, it
6 reduced a very small amount from 207 to 206 cfs. Now,
7 if we take the annual values for that, the 5 percent
8 low flow, it would have been 80 cfs being reduced to
9 79 cfs. Very small impacts down at the low flows.

10 JUDGE KARLIN: Now, I'm not sure why we're
11 looking at vast sections of river -- of the Pamunkey.
12 Is that because that's where the spawning occurs, or
13 -- for example, if we look at Slide 10, go back to
14 Slide 10, it would seem that the Pamunkey River is
15 downstream of the North Anna River, downstream of the
16 Little River, downstream of the South Anna River.

17 So you've got two other rivers coming in
18 at that point, all three of them to form the Pamunkey,
19 right?

20 DR. RYAN: That is correct.

21 JUDGE KARLIN: So the impact on the North
22 Anna would be dramatically higher, and the impact on
23 the Pamunkey would be dramatically lower because the
24 Pamunkey has two other significant tributaries to it.

25 DR. RYAN: Yes, that is correct. And we

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1 looked at the Pamunkey because it was more
2 representative of where the spawning areas were.

3 JUDGE KARLIN: The spawning, that's where
4 the spawning occurs. Okay.

5 JUDGE ELLEMAN: Now, had you used the Hart
6 Corner Gauge for your measurement, you would have
7 sensed a much larger variation in flow, would you not?
8 Because the tributaries would not have contributed.

9 DR. RYAN: We would have sensed a larger
10 effect on the flow. Yes, Your Honor.

11 JUDGE ELLEMAN: And does spawning occur up
12 that far, or is it all down in the more coastal
13 region?

14 DR. RYAN: I'd much rather Dr. Coutant
15 address that, because I'm not a biologist.

16 JUDGE ELLEMAN: Okay. All right.

17 JUDGE KARLIN: Well, can we ask him right
18 now? Dr. Coutant?

19 DR. COUTANT: Good afternoon, Your Honors.
20 Yes, the spawning for both striped bass and the
21 American shad, which are species of concern, occur
22 pretty much below -- downstream of the 360 bridge
23 that's shown there. This slide was actually made for
24 the striped bass, and so it shows in the red arrows
25 the spawning area for striped bass.

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1 The spawning area for American shad is a
2 little bit further upstream. There's some overlap,
3 but primarily, again, below the 360 bridge -- and
4 these are well documented in studies by the Virginia
5 Institute of Marine Science.

6 Now, the American shad has some spawning
7 historically that has gone further up river, but it's
8 pretty insignificant.

9 JUDGE ELLEMAN: Okay. Thanks.

10 DR. COUTANT: Now, the other thing is that
11 in the North Anna river, of course, we have the
12 overall biological community, and I'll talk about that
13 briefly.

14 JUDGE KARLIN: All right. We'll get to
15 that later. Sorry to interrupt.

16 Dr. Ryan, please.

17 Thanks, Dr. Coutant.

18 So we're on Slide -- where were we?

19 DR. RYAN: Slide 11.

20 JUDGE KARLIN: Thank you. All right.

21 DR. RYAN: And what it's showing there is
22 that the median flow in April and May was reduced from
23 851 to 824. If we looked at that on an annual basis,
24 that number would have been about 535 to 510, still
25 significant flows on a median basis, even in the --

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1 for the annual period.

2 The mandated minimum flows -- and this
3 refers to that 20 cfs and 40 cfs actually at the dam
4 itself -- generally, they don't occur in April or May
5 except in the extreme drought periods.

6 And the other comment I wanted to make was
7 that once you get down below the 360 bridge you're
8 getting into the tidal area, and it's the tidal flows
9 which will tend to dominate rather than the freshwater
10 flows.

11 That's all I had to say. At this point,
12 I'd like to hand over to Dr. Coutant.

13 DR. COUTANT: Well, again, I'm Chuck
14 Coutant. I'm a biologist, and I've been a consultant
15 for Dominion on this project. I retired from Oak
16 Ridge National Laboratory.

17 What I'd like to do is hit the highlights
18 of our biological analysis, giving you what we
19 analyzed, some of the major points, and then our
20 conclusions. And I'll do this in three topics -- the
21 river communities as a whole, and then striped bass,
22 and then the American shad -- the two species of
23 particular concern.

24 For the river communities, what we did was
25 analyzed the 1979 to 2003 flow record, the historical

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1 flow record, which are the flows that are experienced
2 by the biological communities, all of the species in
3 the North Anna River and the Pamunkey below the dam.
4 And it's quite obvious, as you can see from the spikes
5 on the graph you just saw, that they experience wide
6 fluctuations in flow, both within a year and between
7 years.

8 Most of the biological productivity in a
9 system like this occurs in the spring when flows tend
10 to be high. Most of the spawning activity occurs at
11 those times, whether you're talking small mouth bass
12 in the upper parts of the river or stripers and shad
13 in the lower rivers.

14 The biology of the community is pretty
15 well protected by the minimum flows that are mandated
16 from the North Anna dam, the 20 or 40 cfs, which, as
17 we've heard this morning, is actually higher than the
18 historical low flows.

19 So, therefore, our conclusion is that the
20 biological effects on the overall communities -- river
21 communities would be small.

22 Now, turning to striped bass, what we did
23 was we evaluated research work that's been done by the
24 Virginia Institute of Marine Science over a number of
25 years, particularly since the 1980s, on the York River

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1 system, both the Mattaponi and the Pamunkey. And it's
2 clear that the spawning and early life stages of
3 striped bass are in the tidal freshwater of the lower
4 Pamunkey in April and May, as Dr. Ryan mentioned.

5 There the flows are dominated by tidal
6 flows. They're in the freshwater portion of the
7 estuary, but tidal flow dominates over the flows from
8 the freshwater inflow. And it was interesting to me
9 that freshwater inflow really wasn't even considered
10 by the VIMS scientists as a particularly important
11 variable in their studies. They identified other
12 things.

13 Again, striped bass experience wide year-
14 to-year variations in April --

15 JUDGE KARLIN: You're on Slide 14 now?

16 DR. COUTANT: Sorry. I have moved on to
17 14, yes. Yes, sorry about that.

18 JUDGE KARLIN: No problem.

19 DR. COUTANT: They accommodate wide year-
20 to-year variations in April to May flow. As Dr. Ryan
21 mentioned, the freshwater inflow change of 1 to 5
22 percent in this April to May time really would be
23 insignificant for striped bass, if you look at the
24 kinds of flows they historically and currently do well
25 in.

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1 It was also interesting that the
2 Mattaponi, which has 50 percent of the average flow of
3 the Pamunkey -- it's kind of a sister river -- has a
4 better striped bass production than the Pamunkey does.

5 JUDGE KARLIN: Do you have any explanation
6 or reason that -- did they have any reason for that or
7 explanation?

8 DR. COUTANT: It's largely the amount of
9 habitat over what area, and the distribution of flows.
10 The striped bass have a pelagic early life stage, and
11 that is that the eggs and larvae are essentially
12 floating in the water column. And high flows actually
13 wash them out, and they wash out the food source for
14 the eggs and larvae.

15 So one of the speculations, not terribly
16 well proven, is that the higher flows actually flush
17 out too many of the eggs and larvae, and that's true
18 with the shad, too.

19 JUDGE KARLIN: In the Pamunkey.

20 DR. COUTANT: Well, it happens in both
21 rivers, I'm sure, but the Mattaponi has less flow so
22 it tends to flush them out less.

23 So, again, our bottom line there is that
24 the reproduction and early life stages would
25 experience a small impact.

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1 On the American shad, again, we evaluated
2 -- Slide 15 -- we evaluated the studies by the
3 Virginia Institute of Marine Science for both spawning
4 and juvenile shad abundance in the York River system
5 that they've conducted since 1979. In that record,
6 their juvenile indices were generally higher when they
7 had lower flows rather than the higher flows. Again,
8 as I mentioned, the lower flows make the retention of
9 the eggs and larvae in the river.

10 That same trend has been found in the
11 Connecticut River and the Hudson River, where shad
12 have been studied extensively, too. So it's not
13 peculiar to the York system.

14 So, therefore, our bottom line for
15 American shad is that the reduction in this 1 to 5
16 percent that Pat mentioned in April and May would have
17 a small and maybe even a positive effect on the
18 juvenile shad production and survival.

19 JUDGE KARLIN: May I pursue that a little
20 bit? I mean, your bullet, juvenile abundance indices
21 were generally higher during low flow drought years.
22 So if we extrapolate that out, if the river were to go
23 away, in time there would be much more fish, right?

24 (Laughter.)

25 Is there some limit that occurs that -- at

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1 the end where it starts to drop off?

2 DR. COUTANT: Certainly. That -- if you
3 don't have water, you don't have fish. So -- and that
4 actual limit hasn't --

5 JUDGE KARLIN: But is there a break point
6 that you're aware of, and what's going on here?
7 Again, is it just a lower -- slower water allowing the
8 eggs to hatch better, or something like that?

9 DR. COUTANT: It's a good question. And
10 as I said, the best speculation people have is the
11 flushing out of the younger stages. There hasn't been
12 a real break point shown.

13 Both the Commonwealth biologists and VIMS
14 people have been studying this. And I'm sure they'd
15 like to come up with a break point, but --

16 JUDGE KARLIN: Okay.

17 DR. COUTANT: -- we don't see it yet.

18 JUDGE KARLIN: All right. Thank you.

19 JUDGE ELLEMAN: The focus here has been on
20 fish directly. Are there other species that might be
21 a part of the food chain for fish that should be a
22 part of this discussion?

23 DR. COUTANT: Yes, definitely. And in the
24 case of the striped bass and American shad, a fair
25 amount of work has been done by VIMS on looking at

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1 copapods and alga production, along with the eggs and
2 larvae and early life stages of the fish.

3 Generally speaking, if you have lower
4 flows, you have higher abundance of the food
5 organisms, and then higher abundance of the juveniles.
6 So sort of -- that's one part of the picture.

7 The other part of the picture is in the
8 upper part of the river, the free-flowing non-tidal
9 reach. And I think, as Bill Bolin will tell you in a
10 minute, the studies there show that the lower flows
11 really haven't disrupted the benthic organism, the
12 insect larvae, and other food organisms for, say,
13 small mouth bass.

14 In fact, Bill will pick up that theme and
15 tell you about the actual studies of the river during
16 the drought flows.

17 MR. BOLIN: Thank you, Chuck.

18 Good afternoon, Your Honors. My name is
19 Bill Bolin. I'm the Manager for Environmental Biology
20 for Dominion, and also have been a member of the ESP
21 project team.

22 I have the great distinction and honor of
23 sharing with you all an actual infield study that my
24 colleagues and I did during a period of low flow that
25 was initiated in October of 2001 when we reduced

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1 outflow from the dam from 40 cfs to 20 cfs. The
2 20 cfs flow -- minimum flow lasted for 14 months, and
3 during that time we executed a study that we had
4 designed and worked with the Game Commission and DEQ
5 to design the components of the study.

6 And, basically, we studied the abiotic as
7 well as the biotic features of the river from the dam
8 down to U.S. Route 1. And when I say the abiotic and
9 the biotic, every month we would -- we had -- we
10 selected transects, and every month we would go out
11 and measure along those transects the width of the
12 river and the depth of the river and the velocity at
13 certain points along that transect.

14 We also put in continuous monitoring
15 instruments called hydrolabs, which measure the DO and
16 the water temperature hourly for the entire 14 months.
17 We also collected aquatic insects at a station that we
18 had historically sampled in the '70s and '80s. And
19 then, when we returned back to 40 cfs minimum flow, we
20 went back six months later and collected at the same
21 station the aquatic insects.

22 And we also have a -- yes, sir.

23 JUDGE KARLIN: Can I ask you, Mr. Bolin --
24 I'm sorry, just sort of a basic question. Route 1,
25 you say that the study area was down to Route 1?

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1 MR. BOLIN: Thirty miles.

2 JUDGE KARLIN: Okay. I was trying to
3 place it on this map. We have Highway 360, but
4 that --

5 MR. BOLIN: It's upstream of 360.

6 JUDGE KARLIN: -- it must be near --

7 MR. BOLIN: I don't have that map in front
8 of me.

9 JUDGE KARLIN: Is it on the North Anna
10 River or is it --

11 MR. BOLIN: Yes, sir. It's entirely on
12 the North Anna River.

13 JUDGE KARLIN: So this is on the North
14 Anna.

15 MR. BOLIN: If you see NAR-5 there --

16 JUDGE KARLIN: Yes, sir.

17 MR. BOLIN: -- it's just a little
18 downstream of NAR-5.

19 JUDGE KARLIN: Okay. I gotcha. Now I
20 understand.

21 MR. BOLIN: We also continued our
22 collections of fisheries that we have been doing there
23 since 1974. And Slide 17 gives you some of the
24 results. And, basically, in a nutshell we really
25 couldn't tell any changes in the width of the river

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1 when we went from 40 to 20. We couldn't tell any
2 change in -- noticeable change in the depth.

3 And the velocities -- we had trouble
4 getting velocities, and that was because of -- we
5 think that there was a lot of eddies and back currents
6 and that messed our instruments up.

7 JUDGE KARLIN: How many spots did you do
8 this test at? I mean, are we talking about three or
9 a dozen or one? I'm not suer.

10 MR. BOLIN: We had four transects.

11 JUDGE KARLIN: Four transects.

12 MR. BOLIN: Four transects.

13 JUDGE KARLIN: Okay.

14 MR. BOLIN: We also -- every month we
15 would retrieve those hydrolabs, and they measured, as
16 I mentioned, temperature and DO. And the end result
17 of those measurements was they pretty much followed
18 seasonal patterns. In other words, when the weather
19 got hot, the water temperature got warmer. When it
20 got cooler, the water temperature got cooler.

21 What we did notice when we did the aquatic
22 insects was that the numbers of insects, as well as
23 the types of insects, remained virtually the same when
24 compared to the 1970/'80 studies, as well as the post-
25 low flow study. So there was really no change in the

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1 insect community. It stayed pretty much the same.

2 JUDGE KARLIN: So we're talking about
3 macroinvertebrates and --

4 MR. BOLIN: We're talking about
5 macroinvertebrates.

6 JUDGE KARLIN: -- May flies and that sort
7 of thing?

8 MR. BOLIN: May flies, yes. We had a lot
9 of May flies.

10 (Laughter.)

11 JUDGE KARLIN: I've been reading this
12 stuff.

13 MR. BOLIN: There you go.

14 (Laughter.)

15 And as you know, May flies are indicators
16 of good water quality, too. And most of the community
17 was May flies.

18 We also --

19 JUDGE KARLIN: How about crayfish? You
20 got crayfish?

21 MR. BOLIN: We have crayfish in there, but
22 we typically don't collect them the way we were
23 collecting --

24 JUDGE KARLIN: Those are charismatic
25 macroinvertebrates, is that --

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1 MR. BOLIN: There you go. Thank you.

2 (Laughter.)

3 Do you need a job?

4 (Laughter.)

5 We also collected fish three times a year,
6 and we've been doing that since 1974 at four stations
7 on the North Anna River. We simply continued that --
8 those collections during the low flow period, the 14-
9 month period. And we saw basically no measurable
10 changes in the types of fish that we collected or the
11 numbers of fish.

12 So, you know, the take-home message that
13 I get from all of this is -- in my professional
14 opinion is 20 cfs is not detrimental to the river
15 system.

16 JUDGE KARLIN: All right.

17 MR. BOLIN: I'll turn it over to Jud, who
18 is going to talk about IFIM.

19 DR. WHITE: Thank you, Bill. On Slide --
20 I believe that's -- is that 16? My eyes are -- 18,
21 I'm sorry. My eyes are failing me here.

22 I wanted to talk just a little bit about
23 the instream flow incremental methodology study that
24 we have agreed to do. And we agreed to do this as
25 part of the coastal zone certification process that we

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1 had with the Commonwealth of Virginia. And it's being
2 done in cooperation with several of the resource
3 agencies in the Commonwealth.

4 And the study generally -- it's not really
5 being done to quantify any of the impacts for the EIS.
6 It's really a study to optimize state permit
7 decisionmaking related to how we manage the lake and
8 how the releases from the dams are handled.

9 So the study is in draft final form now,
10 being reviewed by the state, hopefully to be approved
11 very soon and get the data collection underway,
12 possibly next month, with collection of data all this
13 summer and with the final report to the agencies
14 anticipated at this point in early 2008. That's the
15 schedule that we're planning.

16 And I would like to defer now to John
17 Waddill to talk about mitigation.

18 MR. WADDILL: Good afternoon. I'm John
19 Waddill. I'm a Mechanical Engineer with Dominion, and
20 I've been on the ESP project and associated with the
21 development of the cooling system.

22 I'm on Slide 19. Mitigation -- the change
23 going from open cycle to a closed cycle system really
24 represents the major mitigation in Dominion's
25 decision. The closed cycle system virtually

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1 eliminates the thermal discharge.

2 And by incorporating both wet and dry
3 elements into the cooling system, and operating it
4 according to the proposed operating strategy that
5 we've evaluated in the ER, we are able to save water
6 when water is relatively scarce and save energy when
7 water is relatively plentiful.

8 Next slide, please.

9 In Slide 20, just speaking again briefly
10 about mitigation, additional mitigation focuses
11 primarily on lake level management, and looking again
12 to reduce the percentage of time that these 20 cfs
13 flows would be experienced.

14 You can do that by increasing the
15 effective storage volume. Currently, we use from 250
16 down to 248. And as the staff noted this morning, we
17 can increase that by either raising the normal lake
18 level or lowering the assigned drought level, what we
19 call the lake level contingency plan.

20 So with our analysis, we can raise the
21 level, the normal level, by about seven inches. And,
22 again, or we could lower the contingency plan level by
23 about seven inches, or a combination of those sorts of
24 things to increase the storage volume.

25 JUDGE KARLIN: And if I may ask, you say

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1 raise it by seven inches as opposed to eight or nine.
2 Does seven essentially eliminate the impact, is that
3 what you're saying?

4 MR. WADDILL: Seven would eliminate --
5 would return the percentage of time at 20 cfs to what
6 is currently experienced with Units 1 and 2.

7 JUDGE KARLIN: Okay. That's your estimate
8 based upon your model and approach.

9 MR. WADDILL: Right. Or you could raise
10 it by three and a half inches and lower the
11 contingency plan by three and a half inches and
12 essentially get the same result.

13 JUDGE KARLIN: I think I heard the staff
14 testifying this morning that 10 inches would be
15 equivalent, and you're suggesting seven. Is that
16 because of the differential in the way you two have
17 calculated this thing, and they're a little more
18 conservative in that?

19 MR. WADDILL: That's correct, Your Honor.

20 JUDGE KARLIN: Okay. Thank you.

21 JUDGE ELLEMAN: What consequences would
22 cause you to take this action?

23 MR. WADDILL: Would cause us to raise or
24 lower --

25 JUDGE ELLEMAN: To raise the lake.

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1 MR. WADDILL: Yes. Dominion actually
2 wasn't looking to do that. Probably as we evaluate
3 any further mitigation, that's how we would evaluate
4 what we would do and how we would do it. So the
5 potential impacts of raising the level, as compared
6 with the impacts of lowering the contingency plan
7 level.

8 JUDGE ELLEMAN: So it is an option but not
9 a plan at this point, in your view.

10 MR. WADDILL: I think that would
11 characterize it properly.

12 JUDGE ELLEMAN: Yes.

13 JUDGE KARLIN: Well, another question,
14 could you unilaterally raise the lake level by seven
15 inches, or would you need some state or federal
16 approval before you could do that? You can't
17 implement that unilaterally, can you?

18 MR. WADDILL: That's true. Dr. White may
19 be able to speak to that more, but we would need
20 approval.

21 JUDGE KARLIN: But it is an option,
22 theoretically.

23 MR. WADDILL: Correct.

24 JUDGE COLE: But would it be part of the
25 permit you get from the State of Virginia --

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1 MR. WADDILL: Yes.

2 JUDGE COLE: -- some operation plans?

3 MR. WADDILL: That's a good segue.

4 DR. WHITE: Yes, it could be a part of a
5 permit, to answer your question directly, Your Honor.
6 The IFIM results that I spoke about earlier, once we
7 get all the data in, will be assessed in cooperation
8 with the Commonwealth state resource agencies. The
9 agencies -- primarily Department of Environmental
10 Quality -- regulates water withdrawals and flows and
11 discharges.

12 And they have indicated to us that any
13 flow requirements or any -- and I assume any changes
14 in lake levels or -- would be addressed through there.
15 They call it the VPDES permit. It's the NPDES
16 discharge permit for Clean Water Act program. And
17 that's where it would fall into -- that program.

18 And I believe that concludes our
19 presentation, and we would be happy to answer further
20 questions.

21 JUDGE KARLIN: All right. Thank you. I
22 think we'll lead off with Dr. Cole again.

23 JUDGE COLE: Let me see. With respect to
24 the IFIM study, I understand that hasn't been started
25 yet, and it might get started next month. And then,

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1 you're going to have it completed for -- by early '08.
2 Is that my understanding? Is that true?

3 DR. WHITE: That's absolutely correct,
4 contingent on Mother Nature, and, you know, and the
5 weather conditions. There's a lot of field work
6 that's going to be involved this summer, and our
7 planning is to try to get it all done this summer.

8 JUDGE COLE: Would you be missing the
9 impact of some of the spawning times? Is that
10 important?

11 DR. WHITE: We have identified -- this
12 study will go down to 360. It's about 70 miles
13 downstream. We have a number of transects down
14 through there, and we will be carrying it through
15 starting in May. And agencies may come in and may
16 want us to continue to do something next March or
17 April possibly, if they want to do that.

18 But right now, striped bass is not part of
19 the study. They didn't think that that was warranted,
20 because a lot of the results -- and like Dr. Coutant
21 mentioned, they didn't see an impact down there, that
22 far downstream. So it stops right at the start of the
23 tidal area, so it's really the riverain flow.

24 This study is a river -- freeflowing
25 river-type study, not a tidal river study.

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1 JUDGE COLE: All right.

2 MR. BOLIN: Could I elaborate on that,
3 please?

4 JUDGE COLE: Yes, sir.

5 JUDGE KARLIN: Mr. Bolin?

6 MR. BOLIN: In the IFIM study, the data
7 that you collect is plugged into a model, and the
8 model allows you to simulate flows during spawning
9 conditions or the rest of the year. You really don't
10 have to do it during spawning times. The data that
11 you collect is a crucial part, and it goes into the
12 model, and it allows you to evaluate the river at
13 certain times of the year. Do you understand?

14 JUDGE COLE: Yes, sir. thank you.

15 MR. BOLIN: Okay.

16 DR. WHITE: That's right, because it's all
17 about habitat. And it's just a matter that you can
18 extrapolate year-round. Exactly right. Thanks for
19 that clarification.

20 JUDGE COLE: With respect to the use of
21 dry cooling and wet cooling towers, I read in --
22 someplace in the documents before me that when the
23 temperature is at 67 -- when the water temperature --
24 no, air temperature is at 67 degrees Fahrenheit, the
25 cooling tower for Unit Number 3 can handle 100 percent

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1 of the heat load from plant number 3.

2 It seems that during the colder
3 temperatures the dry cooling tower is most efficient,
4 is that true?

5 MR. WADDILL: Yes, that is true.

6 JUDGE COLE: Is there any -- most of the
7 time when the temperature is 67 degrees you don't need
8 the dry cooling tower, because there is adequate flow.
9 Is that correct also?

10 MR. WADDILL: I'm not sure I understand
11 that part of the question.

12 JUDGE COLE: When the air temperature is
13 below 67 degrees, it's usually a time when we have
14 more water flow.

15 MR. WADDILL: Oh, that's true. Yes.

16 JUDGE COLE: So that the most efficient
17 time for the dry cooling towers is when you don't need
18 it. Is that true?

19 MR. WADDILL: That is true. However, in
20 long droughts, when we're in a situation like we were
21 in the 2001/2002 timeframe, you're in a period of time
22 when the air temperatures are low enough that, again,
23 once you get into the low sixties, as far as outside
24 temperature, you're virtually using no water at all.
25 So where it helps you is in these long drought

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1 periods, which is the way that we wanted the system to
2 be developed.

3 JUDGE COLE: All right, sir. Now, is
4 there any planned operating scheme where you might use
5 the dry cooling towers just at night when it's cooler,
6 or is it too difficult to switch -- make switches on
7 that short a time basis?

8 MR. WADDILL: We currently don't have any
9 plans to do that, mainly because we would use the dry
10 towers when we need to and when we need to save water.
11 So that would be when the lake level falls below 250.
12 Then, we know that we're in a time of relative
13 scarcity, and we need to save water. That's when we'd
14 use the dry towers.

15 JUDGE COLE: All right, sir. So as you
16 see it now, you don't have any concrete plans to
17 change the operating cycle that they're currently
18 planning, which is use the dry cooling towers when the
19 water level gets below 250.

20 MR. WADDILL: No plans as of now.
21 Certainly, as we go forward and we have the final
22 designs, as well as the outcomes of the IFIM study and
23 our negotiations and permitting, there may be some
24 variations on the operating strategy that we put in
25 the report.

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1 JUDGE COLE: You're maintaining
2 flexibility.

3 MR. WADDILL: That's true. That's true.
4 There may be times, for example, during the summer
5 when you're in a serious energy supply situation,
6 you're approaching a peak, and so for that time during
7 the day you may want to turn off the dry towers, even
8 though you're at a time when the lake level is below
9 250.

10 But then, as you say, turn them back on at
11 night as the load drops and you're able, then, to save
12 the water.

13 JUDGE COLE: Are you participating in the
14 panel for alternates -- alternatives?

15 MR. WADDILL: No, Your Honor.

16 JUDGE COLE: Well, maybe I'll ask you this
17 question while you're here.

18 (Laughter.)

19 In the consideration of Surry as an
20 alternative, they indicated that once-through cooling
21 was -- did not appear to be an option for Surry. But
22 then, they used dry cooling towers as the comparison
23 basis at Surry. Why didn't they consider wet cooling
24 towers as an option also?

25 MR. WADDILL: That I can't speak to. I'm

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1 sorry.

2 JUDGE COLE: That's all right.

3 MR. WADDILL: Anyone else on the panel
4 that can address that? I wasn't involved.

5 JUDGE COLE: Anybody want to address that
6 issue?

7 (No response.)

8 Okay. You gentlemen are not involved in
9 well sampling, right?

10 MR. WADDILL: No, Your Honor.

11 JUDGE COLE: Okay. Thank you.

12 JUDGE KARLIN: All right.

13 JUDGE ELLEMAN: Returning to Slide 18, on
14 the IFIM study, the third bullet says the study is not
15 being performed to quantify impacts for the ESP EIS.
16 Results of the study will be used to optimize state
17 permit decisionmaking related to surface water
18 management.

19 I'm having a little trouble processing the
20 words "optimize state permit decisionmaking." What
21 does this mean? What are they after, and what are you
22 going to be looking at in this study?

23 DR. WHITE: Our current NPDES permit, or
24 VPDES permit in Virginia, the discharge permit for
25 Units 1 and 2, currently have a requirement for the

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1 release of the dam, a minimum release of 40 cfs. It
2 also has this -- what we are calling the contingency
3 plan during droughts of having 20 cfs, and we go down
4 -- when there's a drop period.

5 Well, after the study, they will look at
6 the results to potentially -- and I say potentially --
7 maybe change that -- those requirements in that permit
8 to where maybe 40 all the time minimally is not the
9 right. Maybe they want to tweak it a little bit, you
10 know, maybe to say at some points they may want 50 or
11 something.

12 So I don't want to sort of predict exactly
13 what's going to happen, but I do think that they will
14 look at -- when I say "optimize," using this
15 scientific information that will be collected to look
16 at our permit and see whether -- do they need to make
17 any changes. Theoretically, they could keep it as is,
18 just as it is right now. But they may want to change
19 the minimum release number up or down.

20 JUDGE ELLEMAN: Are you going to be
21 varying the flow and then they're going to be looking
22 at consequences at those different --

23 DR. WHITE: During this study?

24 JUDGE ELLEMAN: Yes.

25 DR. WHITE: Yes, sir. We're going to be

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1 at 40, 140, and 250 cfs are the flow regimes that we
2 will be collecting data. And from that, as Mr. Bolin
3 had indicated, we will be able to extrapolate -- we'll
4 be able to extrapolate from 20 to 500 cfs using the
5 model that's used in the study.

6 So we actually will be releasing set flows
7 that have been agreed upon by the agencies, and then
8 going out in the field and collecting data.

9 JUDGE ELLEMAN: And I presume that these
10 changes in flows have to persist over some --

11 DR. WHITE: Yes, sir.

12 JUDGE ELLEMAN: -- reasonably extended
13 timeframe.

14 DR. WHITE: While you're in the field at
15 least.

16 JUDGE ELLEMAN: Yes.

17 DR. WHITE: Absolutely.

18 JUDGE ELLEMAN: And how long a time period
19 are you going to have to --

20 DR. WHITE: Well, that's in the details of
21 the study design, and that will be worked out -- those
22 detailed protocols will be worked out over the next
23 few weeks. But there is some time of stabilization,
24 you're exactly right. You've got to allow the time --
25 you know, by the time it gets from the -- goes from

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1 the dam down to the various transects, you want to
2 make sure that you're representing it accurately. But
3 we will be collecting velocity data and depth data,
4 etcetera, during those periods.

5 But there will be some acclimation
6 periods, no question. I don't know from the top of my
7 head exactly what they are, but I know that will be a
8 part of the study protocols.

9 JUDGE ELLEMAN: Now, if you were not
10 seeking to build Units 3 and 4, would you still be
11 participating in this study?

12 DR. WHITE: That's a good question. You
13 know, we agree with the NRC staff and EIS that the
14 impacts are small. The state wanted us to do this to
15 see if they could optimize and, as I said, in the
16 decisionmaking, how we manage the lake and the river
17 releases. So a simple answer is probably not.

18 JUDGE ELLEMAN: So if -- well, is it your
19 view that the State of Virginia's motivation in
20 seeking to have your participation is related to the
21 lowered flow that may be produced by Units 3 and 4?

22 DR. WHITE: That's what I -- they're
23 focusing on, you know, the frequency of going down to
24 20, and whether -- what impacts they are. And
25 currently they are using some best professional

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1 judgment, what that means. And the data that will be
2 collected will give them additional information to see
3 if their judgments are correct or not.

4 JUDGE ELLEMAN: Okay. And so implies that
5 they have some concerns, that they --

6 DR. WHITE: You know --

7 JUDGE ELLEMAN: -- things that they are
8 worrying about that they would like to investigate.

9 DR. WHITE: They want to see if we can
10 potentially further mitigate the situation. You know,
11 I think they were -- in our discussions with the state
12 agencies, and we had many, and we went, as you know,
13 from the open cycle system to the closed cycle system
14 after some concerns were raised about temperature and
15 water consumption, etcetera.

16 But at our meeting when we sat down with
17 them and talked about this closed cycle system and
18 conveyed the results of Mr. Waddill and the
19 consumption of water losses that were estimated, they
20 were relatively, you know, happy that we were in the
21 bounds of this could be an acceptable project.

22 But what they're saying now is, well, can
23 we tweak it a little more to get a little more
24 mitigation, a little more, maybe to help the fish down
25 there a little further is what they are trying to say

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1 here. It's a matter -- you know, you talk to 10
2 biologists and maybe eight would say no or two would
3 say yes, man, let's tweak it a little bit more,
4 optimize more. I think that's what they're thinking.

5 But I think it's within the bounds of the
6 EIS that impacts are small, but we're trying to see
7 can we mitigate -- further mitigate this small impact.

8 JUDGE ELLEMAN: The panel that preceded
9 yours just before lunch presented, along with you, a
10 very convincing picture of why the effect should be
11 minimal. But somehow apparently people in Virginia
12 who are concerned as a job-related requirement aren't
13 completely convinced. Can you put your finger on why
14 they aren't convinced?

15 DR. WHITE: That's a good question. I
16 mean, again, you know, some resource agency staff
17 people are a little more conservative I think than
18 others. And I think they do recognize that we have a
19 healthy, balanced community downstream. I don't think
20 that looking at it there's going to be any adverse
21 impacts, etcetera. I really do think they're thinking
22 about, how can we optimize or get the -- make some
23 adjustments to get more out of a little bit. You
24 know, and that's what I think they're thinking.
25 That's my view.

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1 Bill, anybody else, have any comment about
2 that?

3 MR. BOLIN: No, I think Jud is write. I
4 think they want to -- they want to -- if they possibly
5 can, they want to tweak the system. And it may be
6 that the low flows are not an issue. It may be at
7 certain times of the year they want a little more
8 water to help the fisheries and the benthic
9 communities.

10 JUDGE ELLEMAN: Now, if they reach that
11 conclusion, that could imply potential derating of
12 Unit 3 for some part of some period of time of
13 operation. Is that not a possible consequence?

14 MR. BOLIN: Well, I'm not an engineer, and
15 I'm not a plant operator. But it would seem to me
16 what John said earlier about what it would mean was we
17 would have to manage the lake flows at the dam --

18 JUDGE ELLEMAN: Okay.

19 MR. BOLIN: -- differently from what we're
20 doing today.

21 JUDGE ELLEMAN: You may look harder at
22 some of these mitigation offsets --

23 MR. BOLIN: Absolutely. Absolutely. That
24 is absolutely correct.

25 JUDGE ELLEMAN: -- as possible ways of

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1 dealing with the issue.

2 DR. WHITE: Exactly. The mitigation
3 measures that we're looking at and investigating would
4 fall right into the issues that the state may want to
5 look at. and, again --

6 JUDGE ELLEMAN: You are then in the
7 position of deciding whether you want to outrage the
8 homeowners along the shore of the lake or go toe to
9 toe with the people in the State of Virginia.

10 DR. WHITE: Absolutely. Absolutely.
11 Competing values and interests is classic in a lake
12 environment downstream with a lake. And, you know,
13 just the whole 20 cfs issue -- you know, the lake
14 people wanted it, downstream, you know, a little
15 concerned. So it's classic competing interests. We'd
16 have to balance that, and we'd have to work with the
17 state on that -- absolutely -- to balance those
18 interests.

19 JUDGE ELLEMAN: Thank you. This has
20 helped me to better understand the IFIM study.

21 DR. WHITE: You're welcome.

22 JUDGE ELLEMAN: Thank you.

23 JUDGE COLE: Could the state's judgment be
24 tempered some by possible increase in downstream
25 users? There are some users downstream who might want

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1 to expand.

2 DR. WHITE: Yes. What's going to happen
3 that -- when we go for a permit modification -- well,
4 a permit, a VPDES permit I spoke about earlier, that
5 if we want to treat the way we manage the releases or
6 the lake levels it would be reflected in the permit.
7 When they do that, the Commonwealth of Virginia has
8 the responsibility to balance competing interests
9 offstream versus instream.

10 So they would have to take that in
11 consideration. Absolutely. It's another classic case
12 of competing interests, and they would -- that would
13 be part of their analysis.

14 JUDGE COLE: All right. Thank you.

15 DR. WHITE: You're welcome, sir.

16 JUDGE KARLIN: A couple of questions.

17 DR. WHITE: Yes, sir.

18 JUDGE KARLIN: Dr. White, maybe I'll start
19 with you.

20 DR. WHITE: Yes, sir.

21 JUDGE KARLIN: That would be helpful. You
22 were talking about the VPDES permit. That's the
23 Virginia Pollutant Discharge Elimination System --

24 DR. WHITE: That is correct.

25 JUDGE KARLIN: -- permit. That's the

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1 state's delegated version of the NPDES permit.

2 DR. WHITE: That's correct.

3 JUDGE KARLIN: And does that permit -- as
4 I understand it, the discharges from the dam --

5 DR. WHITE: Correct.

6 JUDGE KARLIN: -- is like 40 cfs and 20
7 cfs and drought conditions and, you know, whatever.
8 Is that a -- the volume of discharge from the dam, is
9 that a VPDES permit condition?

10 DR. WHITE: Absolutely.

11 JUDGE KARLIN: So your permit has -- it
12 has --

13 DR. WHITE: It has 40 cfs in there to --
14 that we must maintain 40 at a minimum year-round.

15 JUDGE KARLIN: Is that your discharge
16 point? What are the outfalls?

17 DR. WHITE: We have -- the outfall is from
18 the lower lake -- we have -- the slide that was shown
19 earlier by the NRC, the waste treatment facility which
20 is the private facility that's used to reduce the
21 cooling water's temperature. And at dike 3 at the
22 lower end of the lake, that's where the water goes to
23 Lake Anna, which I call -- which is the main
24 reservoir.

25 JUDGE KARLIN: Right.

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1 DR. WHITE: And that's where they regulate
2 all of the pollutants, and including thermal or
3 anything else. That's the point.

4 JUDGE KARLIN: Right.

5 DR. WHITE: But the point we're talking
6 about in the 40 cfs is at the dam itself, at the
7 spillway --

8 JUDGE KARLIN: Right.

9 DR. WHITE: -- going downstream. And that
10 is a separate special condition in the VPDES permit.

11 JUDGE KARLIN: Okay. Fine. I mean, we
12 went on a site visit. This Board went on a site visit
13 to the facility several years ago, and we did look at
14 -- with participants from the Blue Ridge Environmental
15 Defense League and Dominion lawyers and staff, of
16 course -- and we saw that outfall 3 or dam 3.

17 DR. WHITE: Dike 3, that's correct.

18 JUDGE KARLIN: I guess it's dike 3. And
19 that's the NPDES --

20 DR. WHITE: Point.

21 JUDGE KARLIN: -- point where monitoring
22 is done for the pollutants that are being
23 discharged --

24 DR. WHITE: That's correct.

25 JUDGE KARLIN: -- into the lake from the

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1 surface water facility. But you also have a condition
2 for the amount of water over the dam as part of --

3 DR. WHITE: Correct. As well as this
4 contingency plan for drought, 20 cfs. The state
5 legislature required us to put that in there. The
6 homeowners wanted that.

7 JUDGE KARLIN: I understand that would be
8 a condition. I'm surprised it's in that permit, but
9 c'est la vie.

10 DR. WHITE: You're absolutely correct.
11 The state does have other permit programs, such as 401
12 certification programs, which I'm sure you're very
13 familiar with.

14 JUDGE KARLIN: Right.

15 DR. WHITE: But they have elected to deal
16 with this in the VPDES program.

17 JUDGE KARLIN: Okay. Question -- Mr.
18 Lewis was saying this morning when he introduced this
19 matter that I think -- I think as I understood what he
20 said, and perhaps you can help me -- is that when
21 Dominion decided to move from the once-through cooling
22 water for Unit 3 to the wet and dry cooling towers for
23 Unit 3, if I'm -- he said it involved an additional
24 \$200 million expense --

25 DR. WHITE: That's correct.

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1 JUDGE KARLIN: -- investment. Could you
2 break that out for me or confirm or explain that to me
3 a little bit?

4 DR. WHITE: I'll have to defer to -- John,
5 do you have information on that?

6 MR. WADDILL: That obviously is a round
7 number.

8 (Laughter.)

9 DR. WHITE: .000.

10 (Laughter.)

11 MR. WADDILL: It really represents the
12 cost of the components of the system themselves and
13 some aspects of their construction. The whole cost of
14 the system would be more than that.

15 JUDGE KARLIN: The system being the --
16 what system?

17 MR. WADDILL: The dry towers and the
18 hybrid wet and dry tower.

19 JUDGE KARLIN: Okay. That does not
20 include the dry towers for Unit 4.

21 MR. WADDILL: Correct. That's just for
22 Unit 3.

23 JUDGE KARLIN: We're just talking Unit 3,
24 okay. And so there's some capital cost associated
25 with it and some operating cost.

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1 MR. WADDILL: That's right. That's just
2 the capital cost.

3 JUDGE KARLIN: And do you -- so the
4 \$200 million is the capital cost for the dry and wet
5 cooling towers?

6 MR. WADDILL: Correct.

7 JUDGE KARLIN: For Unit 3.

8 MR. WADDILL: Correct. Approximately.

9 JUDGE KARLIN: Okay. Earlier I think
10 there were some questions that Dr. Elleman -- and
11 perhaps, Dr. White, you can help up with this -- is
12 the impacts in the downstream. We're all wondering,
13 since there's no impacts on the fish or the
14 macroinvertebrates or anything else, what's the
15 problem? I thought the FEIS pointed out these
16 recreational socioeconomic aesthetic issues were of
17 concern. Can you address that, Dr. White?

18 DR. WHITE: Downstream?

19 JUDGE KARLIN: Yes.

20 DR. WHITE: To my -- you know, the river
21 is used recreationally. There is some canoeing, and
22 there is probably a little kayaking and fishing. It's
23 a popular small mouth bass area for fishing. And
24 basically, you know, from the results of the low flow
25 study we did and others, you know, I think the

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1 indication is that any impacts of that would be small.
2 That's what my understanding is.

3 Does anybody else have any thoughts about
4 that, Bill or -- on the --

5 MR. BOLIN: Well, I've been working on
6 that river since 1974, and it's really a very healthy,
7 vibrant, fully supporting body of water for fisheries
8 and benthics. There is some limited kayaking and
9 canoeing. Access is an issue. There are a few public
10 access points, but they're small.

11 Does that answer your question or --

12 JUDGE KARLIN: Well, I think it does. You
13 know, I think the FEIS talked about aesthetic
14 socioeconomic recreational impacts. We received
15 comments in the limited appearance statement session
16 about concerns about that, and it sounds like what I'm
17 hearing is, from your assessment and that of the
18 staff, that the fishery impact, the aquatic ecosystem
19 impacts, are modest to very small. But it seemed like
20 the other impacts might be the ones that were raising
21 some concern. But you've answered as much as I think
22 I could hope at that point.

23 Also, you heard the testimony this
24 morning, and we were -- hopefully, you were listening
25 in on that. And I asked the questions -- the staff

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1 talked about what -- the addition of Unit 3 will give
2 us a constantive forced evaporative loss of 8,707
3 gallons per minute from the lake, 8,700 gallons per
4 minute evaporative loss from the lake by the addition
5 of the wet and dry cooling towers for Unit Number 3.

6 And I, further, said that if you use dry
7 cooling that would drop to zero, as I understand it.
8 Is that correct?

9 DR. TAYLOR: Yes, Your Honor, that would
10 be correct.

11 JUDGE KARLIN: Okay. Yes. And with
12 regard to Units 1 and 2, what kind of water-saving
13 measures could be added or put to Units 1 and 2 that
14 might compensate or mitigate for that 8,700
15 evaporative loss?

16 MR. WADDILL: There really are no
17 mitigative measures that we could apply to Units 1 and
18 2 that would be practical, that the station as it is
19 designed and built was built as a once-through unit.
20 And so to modify that kind of system to make it a
21 closed cycle and incorporate dry cooling, which is
22 what you'd be talking about, to try to reduce the
23 water consumption, to say that that was a major
24 modification would be quite an understatement.

25 The condenser flows are different. The

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1 condenser design, the turbine, they're all designed
2 for specific temperatures and flows. So it's
3 completely impractical to begin to address that impact
4 with Units 1 and 2. If you were going to try to do
5 that, you of course focus on the unit that you're
6 going to build rather than making such a major change
7 to the existing unit.

8 JUDGE KARLIN: So what I hear is that you
9 could impose or you could apply dry cooling to Units 1
10 and 2 and eliminate the evaporative losses, but that
11 would be costly and expensive.

12 MR. WADDILL: Correct. It would be
13 rebuilding large, large portions of --

14 JUDGE KARLIN: How much would you
15 eliminate by virtue of -- how much evaporative loss
16 would be eliminated by virtue of doing that?

17 MR. WADDILL: Again, we didn't evaluate
18 that, because we deemed it as being an unreasonable
19 alternative to pursue. If we were going to go for
20 further mitigative measures, we would address them
21 with the new guy.

22 JUDGE KARLIN: Are you familiar with other
23 environmental programs whereby in return for getting
24 the Commission to build additional units the operator
25 agrees to position of additional controls on the

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1 existing units to mitigate the environmental impacts?

2 MR. WADDILL: Only briefly have we been
3 aware of that sort of thing.

4 JUDGE KARLIN: Okay. But that was not
5 considered here.

6 MR. WADDILL: No.

7 JUDGE KARLIN: Are there any other
8 measures that could be done to mitigate the
9 evaporative losses associated with Units 1 and 2,
10 short of installing the impractical dry cooling towers
11 that you were referring to?

12 MR. WADDILL: Only the idea of actually
13 derating the units and running them at a lower --
14 lower power level, yes.

15 JUDGE KARLIN: And so if you derated it,
16 you would just simply reduce the evaporative losses in
17 some direct proportion to the amount that you derated
18 the operation.

19 MR. WADDILL: Correct.

20 JUDGE KARLIN: Okay. And how much of a
21 derate would it take to compensate or mitigate for
22 8,700 cubic feet per minute -- gallons, gallons per
23 minute?

24 MR. WADDILL: I don't know that answer.

25 JUDGE KARLIN: Gallons per minute, yes.

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1 Okay. Sorry.

2 Let's see here. What would the -- there's
3 wet cooling towers and dry cooling towers associated
4 with Unit 3. All right? And as I understand from the
5 staff, the staff is not suggesting to impose any
6 operating rules or conditions upon the applicant for
7 how and when you would run the dry versus the wet.

8 I mean, the -- but what is the -- do you
9 have an operating proposal? When would you operate
10 the dry, and when would you operate the wet, as a
11 general matter? And what would the rules be? What
12 would the triggers be?

13 MR. WADDILL: Generally speaking, the way
14 that it's described in the ERs, that you would operate
15 normally using the hybrid tower, the wet tower. We
16 say hybrid, because it also has some dry elements in
17 it, so you get some water savings even with the wet
18 tower. You would operate there as long as you had 250
19 feet of elevation in the pool, in the lake, and you're
20 able to maintain your downstream flows, your required
21 downstream flows.

22 JUDGE KARLIN: And normal would be the --
23 operating with the wet tower, which you all call the
24 energy conservation --

25 MR. WADDILL: Energy conservation.

1 JUDGE KARLIN: -- which is another way of
2 saying it is the lower usage mode.

3 MR. WADDILL: Correct. Water is
4 available, and so we're able to use it to save energy.
5 If that level -- if water is not available, so the
6 lake level now has dropped below 250. Then, we would
7 turn on the dry towers. If you're at 95 degrees
8 outside, then the dry towers would be able to remove
9 the heat rejection for about a third of the load.

10 As that temperature drops, as Judge Cole
11 represented earlier, as the temperature drops more and
12 more the heat can be rejected using the dry towers
13 until at some point, some temperature, you're able to
14 remove all of the heat all with the dry towers.

15 JUDGE KARLIN: So at 95 degrees, the dry
16 towers would remove one-third of the thermal load, and
17 the other two-thirds would be removed via the wet
18 tower?

19 MR. WADDILL: Correct. Using evaporation.

20 JUDGE KARLIN: Right.

21 JUDGE COLE: And 95 degrees is considered
22 to be the worst situation?

23 MR. WADDILL: Yes, that's what we --

24 JUDGE COLE: For design purposes?

25 MR. WADDILL: -- refer to as the .4

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1 percent exceedance. So we wouldn't get over that too
2 much.

3 JUDGE KARLIN: Okay.

4 JUDGE COLE: I just have one question for
5 I believe it's Dr. Ryan. We had talked to the other
6 panel about problems associated with raising the lake
7 level six to 12 inches. And one of the comments was
8 that it would increase flooding potential. And
9 considering the lake levels over the past 25 or 30
10 years, do you think flooding is a problem?

11 DR. RYAN: Your Honor, I'd actually prefer
12 that Dr. Taylor answer this question. He is much more
13 familiar with this issue than I.

14 DR. TAYLOR: I'll try to answer Your
15 Honor. I think there -- and Mr. Vail referred to --
16 or talked about this in his earlier testimony, but
17 there is -- the flooding issues I think are of two
18 types. One is sort of the -- you know, that people
19 have their boat docks and their property. And
20 normally this lake, you know, even with a relatively
21 large, you know, influx of runoff, the stage doesn't
22 increase a whole lot.

23 In fact, the maximum recorded water level
24 is about elevation 252. That occurred twice, once in
25 February of 1979 and again in June of 1995. So from

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1 the property owners' perspective, they don't see a
2 whole lot of variation in lake level. So, you know,
3 if the lake comes up two feet from its normal cool,
4 you know, if their boat dock only has a foot or so of
5 freeboard, it's going to get inundated.

6 So that's -- you know, from a, you know,
7 property owner usage perspective, they might see, you
8 know, a 10-inch increase in lake level as something
9 adverse.

10 I'd like to differentiate that from
11 flooding from a safety perspective. The 100-year
12 flood elevation for Lake Anna, if you look on a FEMA
13 map, it shows an elevation of 255 feet. And that
14 hasn't been experienced at Lake Anna. The maximum
15 recorded level is 252.

16 We also talked -- heard about the probable
17 maximum precipitation and probable maximum flood.
18 That level is even higher. But, you know, those are
19 levels that reflect safety, safety of the site, safety
20 of the dam.

21 JUDGE COLE: Conservative design.

22 DR. TAYLOR: Correct.

23 JUDGE COLE: Should a balance be made of
24 the impact of raising the level six to 12 inches be
25 made against what sort of impacts it might create in

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1 inconveniences for the homeowners and docks? Has this
2 been looked at?

3 DR. WHITE: I think if, after we do the
4 study, we work with the state agencies in the
5 Commonwealth, and there is a desire on the parties to
6 look at raising the lake level to further tweak,
7 mitigate, whatever you'd like to call how we manage
8 the system, we certainly will have to balance the
9 competing uses.

10 I mean, we've been talking about seven
11 inches, six to 12 inches. It's conceivable --
12 conceivable -- that we could be talking three inches
13 or four inches. It's a matter -- when you start
14 balancing these interests, it could be that everybody
15 is happy with the three. I mean, if we go in that
16 direction. So we would have to certainly balance
17 those interests.

18 JUDGE COLE: Well, there's a lot of water
19 in an inch of 14,000 acres.

20 DR. WHITE: Yes. Exactly.

21 JUDGE COLE: Right?

22 DR. WHITE: Yes.

23 JUDGE COLE: Okay. Thank you.

24 JUDGE KARLIN: Dr. Elleman?

25 JUDGE ELLEMAN: Gentlemen, I tried this

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1 question on the panel that preceded you, and I had the
2 wrong collection of people. And so I'm going to try
3 again and see if I get any volunteers this time.

4 Dr. Taylor, you concurred a few minutes
5 ago that the water consumption from dry cooling would
6 be zero. And I wonder if there are secondary factors
7 that could be important. If you dump all of the waste
8 heat into the air, air temperatures go up. Does this
9 increase evaporative losses and water biota that are
10 critical?

11 If you dump the heat in the air, humidity
12 goes down, which affects the degree of fog formation
13 and affects local rainfall. If you look at
14 everything, is it possible that dry cooling really has
15 some water impact?

16 DR. TAYLOR: I'm afraid you're going to be
17 unsuccessful with me as well, so --

18 (Laughter.)

19 Perhaps John Waddill -- he might be able
20 to -- has a chance of answering that question.

21 MR. WADDILL: And about as successful with
22 me.

23 (Laughter.)

24 All I can say -- I don't really know the
25 answer to your question, but I do know that in the

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1 environmental report the impacts, the localized
2 impacts for temperatures, is evaluated. I don't
3 remember those temperature increases or humidity
4 changes as being consequential, but I'd have to refer
5 you there to the ER. Sorry.

6 JUDGE ELLEMAN: That's all right.

7 JUDGE KARLIN: I think that covers our
8 questions at the moment. Mr. Lewis, Mr. Haemer, do
9 you have any clarification questions you want to ask?

10 MR. LEWIS: May I have about two minutes
11 to confer with the panel, just to determine whether
12 there is anything that --

13 JUDGE KARLIN: No, I really don't want to,
14 you know, have an informal discussion here while we're
15 empaneled. I mean, we can come back later and
16 reconvene after we take a break. We're going to take
17 a break right now. But I'd rather get the new panel
18 up.

19 MR. LEWIS: I just wanted to make sure
20 there wasn't anybody -- any thought that needed to get
21 clarified or --

22 JUDGE KARLIN: Well, let me just ask, does
23 the panel have anything they'd like to add to clarify
24 I think where we went off track? I mean, anything
25 that was said this morning or questions that were

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1 raised this morning that you're burning to address and
2 want to get us straightened out on where we're off the
3 path? No?

4 (No response.)

5 Okay. Mr. Lewis, given that, is there
6 anything else?

7 MR. LEWIS: No. No further questions.

8 JUDGE KARLIN: Okay. I'd like to try to
9 proceed in this way. In the future, think of your
10 questions as we're going along rather than sort of
11 having a scrum in the middle of the hearing room or
12 where we try to do this.

13 All right. Thank you very much for your
14 testimony. It was very thoughtful. Obviously, both
15 the staff and the applicant have some professional and
16 thoughtful people on this issue. We appreciate your
17 time.

18 We're going to take a break now for 10
19 minutes, and then we will reconvene. So we will
20 reconvene in 10 minutes. That will make it about 12
21 after the hour by my clock. We are adjourned.

22 (Whereupon, the proceedings in the
23 foregoing matter went off the record at
24 3:02 p.m. and went back on the record at
25 3:14 p.m.)

1 JUDGE KARLIN: We're back on the record,
2 Mr. Court Reporter. We are now turning to Topic
3 Number 2, which we've generally called hydrology
4 ground water issues.

5 Each of these topics is laid out in our
6 March 20th order in a little more detail than this.
7 A little more coverage, hoping to give the parties
8 some inkling of what we were interested in, what areas
9 we wanted to inquire into.

10 Are the staff attorneys ready?

11 MR. BIGGINS: We're waiting on a few
12 members of our panel. I don't believe they understand
13 that we're back in session.

14 JUDGE KARLIN: Well, could you, somebody go
15 get them?

16 MR. BIGGINS: Quite quickly, Judge.

17 JUDGE KARLIN: I know everyone's out there
18 enjoying the wonderful spring weather.

19 MR. LEWIS: Judge Karlin, we've revised
20 Dominion's exhibit list.

21 JUDGE KARLIN: Terrific. If the staff
22 would be so kind to join us, a little bit late here.
23 Was there some problem?

24 MR. WEISMAN: My apologies, Judge Karlin,
25 we needed to have a brief discussion with our

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1 witnesses and it took a little longer than I expected.
2 I apologize.

3 JUDGE KARLIN: We do want to try to move
4 along as quickly as we can. So, please try to be
5 crisp in terms of getting back here. We try to do
6 that, as well.

7 And I think it helps the entire
8 proceeding. All right. As, I said, we're on the
9 record and the staff, you have exhibits for the slide
10 show?

11 MR. BIGGINS: Yes, Judge.

12 MS. POOLE: They've been provided to you.
13 That is it.

14 JUDGE KARLIN: All right, fine. This time
15 we'll get it right. Welcome, Panel, please rise and
16 we'll swear you in for your testimony.

17 Please raise your right hand. Do you
18 swear or affirm that you will tell the whole truth and
19 nothing but the truth?

20 (Panel affirms.)

21 JUDGE KARLIN: Thank you, please be seated.
22 Welcome, please proceed with your presentation.

23 MS. POOLE: Judge Karlin, one very quick
24 matter. Mr. Dehmel has a correction to his Affidavit
25 and Statement of Professional Qualifications, if he

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1 could.

2 JUDGE KARLIN: All right.

3 MR. DEHMEL: Yes, Your Honor, since my
4 Affidavit was prepared and signed, I've been
5 reassigned within the Agency, within the NRC. And my
6 current, my current CV shows me as being in the Office
7 of Nuclear Reactor Regulation.

8 I am now in the Office of New Reactors.
9 And the division is now the Division of Construction
10 and Inspection Program. That's all.

11 JUDGE KARLIN: All right, thank you for
12 that correction.

13 MS. POOLE: It's a revision to exhibit,
14 Staff Exhibit 13.

15 JUDGE KARLIN: Okay, thank you. Do you
16 have a presentation that you're going to make? Please
17 proceed.

18 MR. BAGCHI: Good afternoon, my name is
19 Goutam Bagchi. I am a Senior Level Advisor in the
20 Office of New Reactors. Next slide, please.

21 This is Slide Number 2. Here there is a
22 little narration of the regulatory requirements
23 related to ground water movement, and I will not
24 elaborate on this. Next slide, please, three.

25 The hydrological setting. The soil is

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1 soft rock saprolite, which is disintegrated rock and
2 is described in the SSAR Page 2.2-140. Vadose zone,
3 which is unsaturated zone between the freelance
4 surface and the saturated zone discussed again in SSAR
5 Section 2.2-142. . And there are aquifers in the
6 unconfined upper layer or saprolite and the underlying
7 bedrock as well.

8 And they are interconnected. Next slide,
9 please. This is a little map showing the contour of
10 the piezometric head. There is a gentle slope in the
11 piezometric head, going from the south towards the
12 lake, away from the early proposed, early site permit
13 side towards the lake.

14 And this is in, this is Figure 2.4-16,
15 from SSAR Page 2.2-186, Rev. 9. Next slide, please.

16 JUDGE KARLIN: If I may, Mr. Bagchi, on
17 that slide, the piezometric head contour map, what, I
18 assume that that's covering the shallow ground water
19 as opposed to the aquifer, is that right?

20 MR. BAGCHI: Aquifer is both in the
21 saprolite, which is the shallow aquifer, and the
22 bedrock, they're interconnected. But this is for the
23 shallow water, determined from the other ratio, Your
24 Honor.

25 JUDGE KARLIN: Now there is an aquifer

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1 under this site which is a sole-source aquifer, as I
2 understand it designated?

3 MR. BAGCHI: Yes, Your Honor.

4 JUDGE KARLIN: And how deep is that?

5 MR. BAGCHI: That I would like to have --

6 JUDGE KARLIN: I'm sorry, I didn't, I just
7 want to distinguish what --

8 MR. VAIL: Your Honor, a correction.
9 That's not a sole-source aquifer, as specified by EPA.

10 JUDGE KARLIN: It isn't, okay.

11 MR. VAIL: It is not, and stuff. And, you
12 know, this is a saprolitic setting, basically meaning
13 that you have crystal and rock that breaks down as you
14 move up, and that forms the saprolites.

15 So it's not a sort of, sort of alluvial
16 aquifer system that you might be familiar with. It
17 just means that there's water as you move down deeper
18 into the rock.

19 JUDGE KARLIN: And it's continuous from the
20 surface?

21 MR. VAIL: Yeah, it's effectively
22 continuous from the surface and stuff. Crystalline
23 systems like that are controlled by fracture porosity
24 typically as you move deeper.

25 JUDGE KARLIN: All right. So, in terms of

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1 the piezometric head contour map that is being
2 displayed, how deep are we talking about, below the
3 surface grade? And I know the surface grade is going
4 to vary, but, you know.

5 Is it essentially the same as the lake,
6 the lake?

7 MR. BAGCHI: At one end it is 300 feet away
8 from the lake. At the other end it is 250. The lake
9 level is about 250.

10 JUDGE KARLIN: Which is the lake level.
11 Okay, all right.

12 MR. BAGCHI: Next slide, please. As
13 indicated in the piezometric map, head map contour, I
14 said that there was a gentle slope.

15 The general gradient is towards the lake
16 at .03 feet per foot, and the hydrological
17 conductivity is about 3.4 feet per day. With respect
18 to radiological contaminants, at the time of the staff
19 evaluation, there was no knowledge or information
20 about radioactive contaminants in the largely
21 undisturbed area of the proposed early site permit
22 site.

23 But I understand that, based on the COL,
24 observation well installation, some tritium has been
25 found in observation wells. However, that does not

1 change my conclusion, because it is based on the
2 permit condition that restricts any release of liquid
3 radioactive effluent.

4 JUDGE KARLIN: When you say radiological
5 contaminants, not at the ESP site. I noticed you had
6 some qualifiers on that. How many monitoring wells
7 are in the, at the ESP site, that are monitoring for
8 radiological contaminants?

9 MR. BAGCHI: Right now I'm not aware of
10 any.

11 JUDGE KARLIN: None?

12 MR. BAGCHI: None.

13 JUDGE KARLIN: If you don't look, you don't
14 find anything, right? So radiological contaminants,
15 none at the ESP site. There's no monitoring wells, so
16 nobody would know? Is that right?

17 MR. BAGCHI: There is more recent
18 information that there is some radioactive, some
19 tritium in the water.

20 JUDGE KARLIN: Well, this slide says none
21 at the ESP site.

22 MR. BAGCHI: At the time, when we did our
23 review --

24 JUDGE KARLIN: What was the time?

25 MR. BAGCHI: This supplement was issued,

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1 that's the date of the review.

2 JUDGE KARLIN: And there are no monitoring
3 wells?

4 MR. BAGCHI: There are no monitoring wells.

5 JUDGE KARLIN: So you wouldn't, you don't
6 monitor for it, you're not going to find it. Is that
7 surprising?

8 MR. BAGCHI: Well, it's not because. There
9 were observation wells from which water was drawn,
10 piezometric heads were established.

11 JUDGE KARLIN: How about the NAPS site.
12 Any radiological contaminants at the NAPS site, in the
13 ground water?

14 MR. BAGCHI: I am not aware.

15 JUDGE KARLIN: All right, we'll get to that
16 later. Chemical contaminants, and how many monitoring
17 wells are on the ESP site for chemical contaminants?

18 MR. BAGCHI: Well, not just from measuring
19 chemical contaminants. Chemical contaminant is
20 related to a non-safety use of water, and that's not
21 something that the safety portion of the review
22 concentrated on. So I did not review that. And there
23 were no chemical contaminants found in the observation
24 wells, at the time.

25 JUDGE KARLIN: Where were chemical

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1 contaminant monitoring wells on the ESP site?

2 MR. BAGCHI: My information now is that
3 they meet the drinking water standard.

4 JUDGE KARLIN: That's not what I asked.
5 Are there chemical contaminant monitoring wells on the
6 ESP site?

7 MR. BAGCHI: I'm not aware of any, sir.

8 JUDGE KARLIN: So, of course there's known,
9 if there's no monitoring?

10 JUDGE COLE: Sir, didn't they recently
11 construct seven or ten wells for chemical analysis on
12 the ESP site to support a COL application?

13 MR. BAGCHI: That is more recent than our
14 evaluation period.

15 JUDGE COLE: So, you're not familiar with
16 that?

17 MR. BAGCHI: I'm not familiar with that,
18 Your Honor.

19 JUDGE KARLIN: Well, my point is simple.
20 If you don't sample or analyze or something, you're
21 not going to find it, and so you can say, well, I
22 don't know of any. Because you haven't looked.

23 MR. BAGCHI: It's not relevant for the
24 safety determination, Your Honor.

25 JUDGE KARLIN: You're giving us a slide

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1 which says radiological contaminants, none at ESP
2 site.

3 MR. BAGCHI: None.

4 JUDGE KARLIN: You're presenting a slide,
5 and you're also saying no one's ever checked.

6 MR. BAGCHI: Now it has been checked and
7 some --

8 JUDGE KARLIN: And now there is some.

9 MR. BAGCHI: -- some tritium has been
10 found.

11 JUDGE KARLIN: Okay, please continue.

12 MR. BAGCHI: Next slide, please. I think
13 this is related to zero release which is reserved for
14 questions and answers, so I don't want to go through
15 this one.

16 My presentation is finished. And I'll
17 pass on to the next presenter.

18 JUDGE KARLIN: All right. Does that close
19 the presentation?

20 MS. POOLE: That completes the staff's
21 prepared presentation.

22 JUDGE KARLIN: Okay, thank you. Dr. Cole.

23 JUDGE COLE: Okay, during the construction
24 of one and two and subsequent to that, they determined
25 that there was a problem with the saprolite soils and

1 settling of different structures. Are you familiar
2 with that, sir?

3 MR. BAGCHI: Yes, Your Honor.

4 JUDGE COLE: Could you tell me what the
5 problem is or was?

6 MR. BAGCHI: The problem was related to
7 long-term settlement in saprolite. There was some
8 monitoring requirement of settlement because I think
9 lines going from one building to another was subject
10 to differential settlement and therefore it had to be
11 monitored and there were some remedial action as a
12 result of that.

13 JUDGE COLE: What was the remedial action,
14 do you know, sir?

15 MR. BAGCHI: I think anchors had to be
16 reinstalled and the engineered backfilling had to be
17 modified.

18 JUDGE COLE: At that time I also had a
19 construction permit for a, then, Plants 3 and 4, and
20 certain structures were constructed that were to be
21 associated with Plants 3 and 4, is that correct, sir?

22 MR. BAGCHI: I think only the foundation
23 portion of one of the units was laid out.

24 JUDGE COLE: All right, sir. Is there any
25 plan to use any part of that structure in the future

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1 construction of Plants 3 and 4?

2 MR. BAGCHI: Not at this site. They've
3 planned to remove that, was my understanding. But
4 this is not really relevant for hydrology.

5 JUDGE COLE: So that's not your area?

6 MR. BAGCHI: Well, I'm a Structural
7 Engineer, but if you looked at my --

8 (Laughter.)

9 JUDGE COLE: That's why I was picking your
10 brain. I'm just wondering what are they going to do
11 to make sure that they don't have a settlement problem
12 with the future plants?

13 MR. BAGCHI: I know that there are permit
14 conditions and one of the conditions is not to use
15 saprolite as engineer backfill.

16 JUDGE COLE: All right, sir.

17 MR. BAGCHI: And also to use lean concrete
18 if there are cracks, in the foundation level.

19 JUDGE COLE: You had 17 or 19 wells that
20 were just used to get the ground water elevation.

21 MR. BAGCHI: Yes.

22 JUDGE COLE: Why is that important? Drill
23 19 wells just to get the ground water level?

24 MR. BAGCHI: It would be one of the site
25 characteristics. There are several factors that

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1 depend on reliably locating the ground water. Because
2 one of the effects is buoyancy under structural
3 foundations.

4 JUDGE COLE: Potentially the storage cells
5 for the ultimate heat sink.

6 MR. BAGCHI: Certainly that's one of them.

7 JUDGE COLE: Yeah, how are they going to
8 build that? Are they going to drop the water level?

9 MR. BAGCHI: They'd have to.

10 JUDGE COLE: Okay.

11 MR. BAGCHI: Or build it and then fill it
12 up.

13 JUDGE COLE: So, generally the ground water
14 is just, most of it just flows towards the lake?

15 MR. BAGCHI: Yes, Your Honor.

16 JUDGE COLE: At 3.4 feet a day, on average?

17 MR. BAGCHI: On average.

18 JUDGE COLE: There's a hill there that
19 might create a problem if there's some certain soil
20 conditions there, with respect to sliding down the
21 hill, and how are they going to correct that problem?
22 Are you familiar with that?

23 MR. BAGCHI: I am familiar with the
24 elevated portion of the early site permit side.

25 JUDGE COLE: Is there a slope stability

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1 problem there?

2 MR. BAGCHI: We had questioned that, with
3 respect to hill slope failure. And, based on our
4 review, we did not find any historical evidence of
5 hillside failure into the lake, which would have
6 caused some kind of a wave effect for adding to the
7 flood elevation height.

8 And there was no historical information
9 available for that. We looked for it.

10 JUDGE COLE: What about problems with the
11 location of the new reactors?

12 MR. BAGCHI: I did not believe that the
13 slope was high enough to worry us. But this is for
14 some, this is something that the COL Applicant might
15 have to convince the future reviewer.

16 JUDGE COLE: I thought that would be
17 associated with a site suitability.

18 MR. BAGCHI: Site is suitable, minus what,
19 you know, any kind of a slope that's built up or
20 embankment that's built up, or a cut that's created
21 that would lead to an unstable condition.

22 So, at this point, that is not an
23 essential part of the early site permit review.

24 MS. POOLE: Your Honors, Dr. Munson, in the
25 area of Seismic Safety would also address this

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1 question, if you would like to hold it also, until Dr.
2 Munson is on.

3 JUDGE COLE: Okay, thank you.

4 MR. LEWIS: Dr. Cole, Dr. Davie, who is on
5 our Seismic Panel, can also address some of these
6 questions, too.

7 JUDGE COLE: Okay, thank you.

8 MR. VAIL: Could I make a correction?

9 JUDGE KARLIN: Sure.

10 MR. VAIL: This is Lance Vail. There was
11 a statement of, I think Judge Cole mentioned the
12 velocity of the water going towards the lake at 3.4
13 feet per day. That's actually the conductivity.

14 JUDGE COLE: Oh, I'm sorry.

15 MR. VAIL: So, it's not moving that fast.

16 JUDGE COLE: Right, okay, thank you. We
17 need another factor.

18 (Laughter.)

19 JUDGE ELLEMAN: Yes, we, as you're aware,
20 asked a lot of questions. We sent in two sets of
21 questions, one with respect to the SER, another with
22 respect to the FEIS.

23 Some of those questions dealt with the
24 transport of radioactive materials that might be
25 spilled into the ground, and then moved by water flow,

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1 diffusion, whatever process, to some point of release
2 that might be detrimental from a safety standpoint.

3 We got several different kinds of answers
4 to the questions we asked. One example, one answer
5 that we got was that because the exact location of the
6 release point is not known at this time, because we
7 don't have specific plant location and design, that
8 this issue has to be deferred to the OL or COL.

9 And, for example, you can see the answer
10 to Question 50-A, of the Environmental Statement for
11 an answer of that kind.

12 Another kind of answer we got is that
13 because the Applicant has committed to zero release
14 design, that this is not an issue that has to be dealt
15 with and is, in effect, a non-issue.

16 And you can look to the answer for Safety
17 Question 51, for that kind of an answer. I'm looking
18 now at a part of RS-002, the guidance for ESP
19 evaluation.

20 And I'm looking at the Section 2.4.13,
21 called Accidental Releases of Liquid Effluence in
22 Ground and Surface Waters. And I'm going to read from
23 this section, a very brief paragraph that's on Page
24 2.4.13-3.

25 And it says for early site permit reviews,

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1 the findings will summarize the Applicant's and the
2 staff's estimates of dilution factors, dispersion
3 coefficients, flow velocities, travel times and
4 potential contamination pathways, between the site and
5 the nearest water user in conformance with 10 CFR
6 Parts 52 and 100.

7 If the estimates are comparable, or if no
8 potential problem exists, staff concurrence with the
9 Applicant's estimates will be stated.

10 If the staff predicts substantially more
11 conservative conditions, a statement of the staff
12 basis will be made.

13 It does not appear to me that this has
14 been done. Am I wrong? Or, has this not been done?

15 MR. BAGCHI: I would like to first attempt
16 to answer this question, Your Honor, and then I'll
17 pass it on to Mr. Vail.

18 JUDGE ELLEMAN: Okay.

19 MR. BAGCHI: Part 120-C3 says in situ
20 measurements of those coefficients and these could not
21 be reliably determined when the entire site area near
22 the rad waste building is going to be disrupted by
23 construction activities.

24 And this in situ reliable data are not
25 available at the ESP site at the time of the ESP

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1 evaluation.

2 JUDGE KARLIN: The regulation does not
3 refer to in situ.

4 MR. BAGCHI: It does, Your Honor, 120-C3.

5 JUDGE KARLIN: 120-C3. Quote, factors
6 important to hydrological radio nuclear transports,
7 such as soil, sediment and rock characteristics and
8 absorption and retention coefficients, ground water
9 velocity and distances to the nearest surface water
10 body of water must be obtained from on-site
11 measurements.

12 MR. BAGCHI: On-site.

13 JUDGE KARLIN: So you're equating that with
14 in situ?

15 MR. BAGCHI: Yes, Your Honor.

16 JUDGE KARLIN: You're not quoting the reg,
17 okay. And you're suggesting that that's been done?
18 You suggest that factors important to hydrological
19 radio and nuclear transport, such as soil, sediment
20 and rock characteristics, absorption and retention
21 coefficients, ground water velocity and distances near
22 surface water must be obtained. Must be obtained from
23 on-site measurements. Has anybody done any on-site
24 measurements?

25 MR. BAGCHI: Not for any of the ESP

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1 Applications, Your Honor.

2 JUDGE KARLIN: But isn't that what the reg
3 requires?

4 MR. BAGCHI: I believe --

5 JUDGE KARLIN: It says it must be obtained
6 from on-site measurements.

7 MR. BAGCHI: At the ESP stage I did not
8 feel, we did not feel that it is feasible to do that
9 reliable.

10 JUDGE KARLIN: Well, you have a plant
11 parameter envelope for everything else, why can't you
12 have some parameters associated with the location,
13 assumed of the waster water treatment systems and the
14 pipes and the other, you know, pieces of equipment
15 that are relevant?

16 MR. BAGCHI: The site does not have any
17 characteristics like karst or other pathological
18 condition under which any kind of release is going to
19 immediately reach a potential exposure point.

20 So, we did not feel that the site was
21 intrinsically unsuitable. We felt that at the time
22 reliable estimates are not available. It is best to
23 preclude any releases and, in fact, the COL state the
24 Applicant wants to have some modification of the
25 permit, they can do that.

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1 JUDGE COLE: Is it you didn't conduct these
2 tests because the site will be reworked or modified,
3 such that the, any analyses done would be meaningless?

4 MR. BAGCHI: Would not be very meaningful,
5 Your Honor, that was the exact thinking that went
6 through out collective thinking.

7 JUDGE KARLIN: But if the reg requires that
8 you provide hydrological, radio nuclide transport
9 factors, such as sediment, rock characteristics,
10 absorption, retention coefficients, ground water, have
11 you provided those things?

12 MR. BAGCHI: The Applicant had attempted
13 some of those things. We had looked at those
14 calculations. It's that SSAR has that information.

15 JUDGE KARLIN: So the reg says these must
16 be obtained from on-site measurements and you decide
17 you don't need to comply with the reg?

18 MR. BAGCHI: No, Your Honor, I did not say
19 that. They did not use the on-site characteristics,
20 that's why we felt that we, they did not need the
21 regulation, that aspect of the regulation. Therefore,
22 we should preclude it.

23 JUDGE KARLIN: Preclude it, what do you
24 mean preclude it?

25 MR. BAGCHI: Preclude any kind of release.

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1 Use the design features, engineered features.

2 JUDGE KARLIN: Just say that there will be
3 none.

4 MR. BAGCHI: There will be none.

5 JUDGE KARLIN: Just by a magic wand, make
6 them go away.

7 MR. BAGCHI: Not magic wand, Your Honor,
8 there are design features that are possible.

9 JUDGE KARLIN: Now, is there contamination
10 emitting from the existing Units 1 and 2? Is there
11 tritium contamination in the ground water from Units
12 1 and 2?

13 MR. BAGCHI: Not from the reactor building.
14 Not that I know of.

15 JUDGE KARLIN: Well, you just said that
16 there was tritium contamination found in the ground
17 water, earlier.

18 MR. BAGCHI: We don't know where that came
19 from.

20 JUDGE KARLIN: Oh, okay. I don't care
21 where it came from, unless you're suggesting it came
22 from something other than Units 1 and 2, as a whole?

23 MR. BAGCHI: Even that, I don't know. Even
24 that, I do not know.

25 JUDGE KARLIN: The final environmental

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1 impact statement says that there is a certain amount
2 of tritium being emitted from the existing unit, does
3 it not? Thirty-one hundred picocuries or curies per
4 year, I believe, is that correct, Mr. Bagchi?

5 MR. BAGCHI: I will have Mr. Stoetzel --

6 MR. STOETZEL: My name is Greg Stoetzel, I
7 work for Pacific Northwest National Labs. I did the
8 radiological portion of the EIS. And, yes, that's
9 true, the liquid rad release source term was 3,100
10 curies per year, initially, for the liquid. And with
11 source term in red nine of the environmental report
12 was changed to 850 curies per year.

13 JUDGE KARLIN: No, I'm referring to the
14 contamination from Units 1 and 2. How much, what's
15 the amount of picocurie pre-contamination occurred
16 from Units 1 and 2?

17 MR. STOETZEL: Oh, okay. In the waste
18 treatment facility, that is part of the radiological
19 environmental monitoring program, the levels in,
20 average levels in the waste treatment facility and
21 they have the one location in Pond 2, where they
22 surface the sample for cooling water, that's roughly
23 3,000 picocuries per liter.

24 And then at the one down, the north end,
25 down river location, about, I think it's approximately

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1 five to six miles downstream. That location is also
2 around, I don't have the exact numbers, around 3,000
3 picocuries per liter, also.

4 I have those numbers in my presentation.

5 JUDGE KARLIN: Okay, we'll get to the
6 tritium in the next session. But I was just trying to
7 understand.

8 MR. STOETZEL: There also is one, as part
9 of the radiological environmental monitoring program,
10 there's one on-site well, and the results for the
11 past, we've reviewed reports for the past six years,
12 and in that one well location has shown background
13 levels for those six years.

14 JUDGE KARLIN: And where is the well
15 located, up gradient or down gradient?

16 MR. STOETZEL: I can't answer that, I'd
17 have to look.

18 JUDGE KARLIN: It would make a huge
19 difference if it's up gradient. And of course it's
20 going to show background, right?

21 MR. STOETZEL: I'd have to look at --

22 JUDGE KARLIN: Are there any down gradient
23 wells? Down gradient of the Units 1 and 2, that are
24 monitoring for tritium or any other ground water,
25 radiological contamination?

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1 MR. STOETZEL: That is the only well I'm
2 aware of. It's part of their environmental
3 monitoring.

4 JUDGE KARLIN: And you don't know where
5 that one is located?

6 MR. STOETZEL: It's at the Biology Lab. I
7 don't know whether it's up or down gradient.

8 JUDGE KARLIN: But isn't that critical?

9 MR. STOETZEL: As part of our, this is kind
10 of getting into our discussion on rad, but as part of
11 that we looked at what information was provided in
12 their radiological environmental monitoring reports to
13 evaluate the rad impacts off-site.

14 And it was, we, we just looked at the one,
15 that one well, that one well location in the surface
16 water numbers to evaluate that impact.

17 JUDGE KARLIN: Okay, well, please proceed.
18 I don't know who was asking questions at this point.

19 JUDGE ELLEMAN: I read earlier the passage
20 from RSO to listing suggested requirements for an ESP.
21 I think the answer I heard was that these are
22 inappropriately constituted requirements.

23 That because the site is being disturbed,
24 that it doesn't make sense to do the things that this
25 procedure says. Did I misunderstand, or is that your

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1 position?

2 MR. BAGCHI: Personally, I believe that
3 great expense of acquiring on-site measurement data
4 for those coefficients and preparing a statement about
5 that requirement, is going to be subject to change
6 because of construction activities related to
7 construction.

8 Pathways are going to be substantially
9 altered. And coefficients are going to be changed by
10 backfill and things of that nature.

11 So I personally believe that RSO will do
12 it. It's a document that, that advises the staff how
13 to conduct a review. But it has, in my opinion, some
14 limitations.

15 JUDGE ELLEMAN: Yeah. Sir, I would not,
16 under any circumstance, wish to challenge your
17 judgement, and you may well be completely incorrect in
18 what you say, but how do you reconcile the fact that
19 you're faced with a procedure which is defining the
20 way you're supposed to behave, in evaluating an ESP,
21 and you are, in effect, ignoring that procedure and
22 I'm not sure whether you've attempted to make any
23 changes in it or not.

24 But, the things that we've read are not
25 being done and I gather there's no intention to do

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1 those, at the ESP stage?

2 MR. BAGCHI: ESP, this is the first of a
3 kind exercise by the staff. RSO, too, was developed
4 in a very short period of time, just to give you some
5 background.

6 Without having had the experience of doing
7 some of these reviews. Examining, critically, some of
8 the regulations that get into staff considerations.

9 Therefore, that lack of experience really
10 hindered us from critically examining the limitations
11 in the guideline documents that we had.

12 And, I have to go back and look at our
13 outdated documents. RSO, too, has now been replaced
14 and subsumed into Reg Guide 1.206, and the standard
15 review plan, new Reg 0800, the latest revisions.

16 Given what we have learned, I would say
17 those are limitations that we ought to consider in the
18 future upgrade of our review guidance documents.

19 JUDGE ELLEMAN: Let me for the moment, if
20 I may, just play Devil's Advocate on this point. Most
21 powerblocks that I have been to at nuclear power
22 plants, are fairly compact.

23 If you have a good arm, you could probably
24 throw a rock from one side of it to the other side.
25 And so I would submit that the area that is disrupted

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1 for construction, probably is much less than the
2 distance radioactive material would have to travel to
3 a release point at a lake or stream or wherever else
4 it's going to be released in the environment.

5 . Would you feel that's a correct statement,
6 or would you dispute that?

7 MR. BAGCHI: Your Honor, that's probably a
8 correct statement. Then when depths are in the water
9 of 40 to 60 feet, so therefore an excavation to
10 accommodate the powerblock, is going to be
11 substantially more than the nominal dimensions.

12 Nevertheless, those kinds of excavations
13 are going to substantially cut into the liquid
14 pathway. And, on top of that, if the accidental
15 discharge of liquid effluent has to come through
16 engineered backfill, then one would have to specify a
17 required set of properties for that engineered
18 backfill, if one assumes that effluent will travel
19 through the backfill.

20 There are substantial impediments in being
21 able to reliably predict how long it's going to take,
22 at this year's state. Unless the site has a very
23 substantially pathological condition like karst and
24 oils and other things which hardly any nuclear power
25 plant site will have.

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1 JUDGE ELLEMAN: After a plant has been
2 constructed, would you feel, and there's no longer
3 disruption occurring of the subsurface, everything is
4 in place.

5 Would you feel, at that point, such a
6 study would be appropriate, or would you feel it would
7 be unnecessary to do that?

8 MR. BAGCHI: At that point it will be
9 appropriate.

10 JUDGE ELLEMAN: It would be appropriate at
11 that point?

12 MR. BAGCHI: To verify.

13 JUDGE ELLEMAN: And so studies of transport
14 involving absorption coefficients, flow of subsurface
15 water, would then be appropriate?

16 MR. BAGCHI: Yes, Your Honor.

17 JUDGE KARLIN: Can I ask a follow up on
18 that one. As I understand it, you just after the
19 facility was constructed, studies could be done
20 effectively to understand ground water transport
21 issues.

22 MR. BAGCHI: And meet the words of the
23 regulation.

24 JUDGE KARLIN: Okay, we're always important
25 to meet the words. So after it's constructed, we're

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1 now at the ESP stage. And you're saying you don't
2 want to do it now, let's wait until the COL stage, if
3 I'm understanding that correctly. Is that right?

4 MR. BAGCHI: Well, we have said it
5 differently.

6 JUDGE KARLIN: Okay.

7 MR. BAGCHI: We precluded it. And that
8 might mean several things. There are many ways of
9 meeting that permit condition. One is certainly an
10 engineered solution.

11 You can have guard pipes, you can have all
12 kinds of other protective criteria and requirements
13 that really would preclude accidental releases.

14 Accidental release is something that has
15 been in practice for a very long time, in my mind, as
16 a measure of defense and depth.

17 JUDGE KARLIN: Well, let me just try to
18 follow my train of concern and questions. One the one
19 hand it's the ESP stage and the staff is saying,
20 you're saying, if I understand, Mr. Bagchi, it's not
21 possible, it's not appropriate to try to study the
22 ground water contamination issues and flows at this
23 point, because we don't where the buildings are going
24 to be located, and the structure is going to be
25 located.

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1 You then said, if I understand you
2 correctly, a good time to study that would be after
3 the buildings have been built and the structures have
4 been located, and then you could study that. There's
5 an intermediate step which is the COL step.

6 At the COL step, are we going to know
7 anything more than we know now, because are you
8 proposing that this facility be built and then we
9 study the ground water problems, afterwards?
10 Potential problems afterwards?

11 Let me just read you. We asked the
12 Question 48, relating to the SER. The SER states
13 that, quote, no site-specific data are available to
14 determine the chemical characteristics of ground water
15 at the ESP site.

16 It then goes on to talk about
17 radiological. Please provide, the question was,
18 please provide any data on the chemical or
19 radiological characteristics of the soil, vadose zone
20 and ground water on or below the ESP site and the
21 portions of the NAPS site, within 600 feet.

22 That was our question. The answer was the
23 Applicant stated in the NAPS, both a radiological and
24 environmental monitoring program is conducted. The
25 pre-operational program is described in North Anna.

1 While there is not site-specific data
2 available to determine the chemical characteristics of
3 ground water at the site, the Applicant stated that a
4 detailed numerical model will be developed as part of
5 the COL Application.

6 So, when we asked please provide any data
7 on the chemical and radiological characteristics,
8 blah, blah, you didn't give us anything. You failed
9 to provide. Is the answer you have none?

10 We asked please provide it and you didn't
11 provide anything. Can you help us with that?

12 MR. BAGCHI: We gave you logical
13 environmental monitoring program is carried out for
14 normal releases. If I failed that's because I was
15 focusing on accidental liquid effluent release.

16 JUDGE KARLIN: Okay, I mean we were looking
17 for any data that the staff had, because we think that
18 this regulation is important and we don't, we're
19 having trouble seeing how the staff complied with it,
20 100.21., I guess is C-3.

21 And we're looking for whatever chemical
22 radiological data the staff has on the existing site
23 and proposed ESP site. And you didn't seem to give us
24 any.

25 You told us what the Applicant was doing.

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1 Did --

2 MR. BAGCHI: Your Honor, confusion lies in
3 the way one deals with the routine normal releases
4 versus accidental releases.

5 JUDGE KARLIN: Are not accidental releases,
6 but, accidental releases can be prolonged, low, slow
7 leaks that occur, can they not? By that do you
8 include accidental or suddenly accidental releases?

9 MR. BAGCHI: Sudden accidental releases is
10 how we, I have considered it to be.

11 JUDGE KARLIN: So the tritium studies,
12 which have been done, in which the staff did in
13 September, 2006, talked about long-term tritium-type
14 of releases that occurred.

15 Not short-term accidental spills, but
16 long-term leaks of small quantities.

17 MR. BAGCHI: That's right, Your Honor.

18 JUDGE KARLIN: Are you excluding those when
19 you talk about accidental releases?

20 MR. BAGCHI: I am excluding those, those
21 where primarily came from leakages from spent fuel
22 pools and so on.

23 JUDGE KARLIN: All right, well let me just
24 go back to your answer to this Question Number 48.
25 While there is no site-specific data available to

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1 determine the chemical characteristics of the ground
2 or at the site, the Applicant stated that a detailed
3 model would be developed as part of the COL. Right?

4 Why can't some assumptions be made about
5 the PPE and do such a model now? Isn't that what the
6 whole ESP is about? I mean could you make some
7 assumptions, plant parameter envelope assumptions, and
8 do a study of that now?

9 Who chooses to answer that, Mr. Bagchi?

10 MR. BAGCHI: Your Honor, I was going to get
11 clarification about your point of how long-term leaks
12 are treated and how it was analyzed in the context of
13 this here. I just wanted to clarify, get
14 clarification.

15 JUDGE KARLIN: Fine. While you're doing
16 that, somebody else can think of the answer to the
17 other question.

18 MR. DEHMEL: Your Honor, I was responsible
19 for Chapter 11 of the Supplemental SER. And looking
20 at normal routine effluent releases, it addressed
21 releases managed under an operational program.

22 Meaning that there are procedures in
23 place. That the tanks are analyzed. That a
24 determination is made as to the radioactivity level
25 concentration, and then those concentrations are

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1 compared to the Part 20, Appendix B, Table 2,
2 concentrations.

3 And then a determination is made as to
4 where the alarm set points should be set on a monitor,
5 and then the release is allowed to be discharged into
6 the discharge canal.

7 Those are routine control and managed
8 effluent releases. With leaks and spills, they are
9 not captured --

10 JUDGE KARLIN: Let me ask something on
11 those routine releases. So, routine releases include
12 the routine air emissions radioactivity that the plant
13 emits?

14 MR. DEHMEL: Yes, that's right.

15 JUDGE KARLIN: And are those monitored at
16 the plant, at the source?

17 MR. DEHMEL: Yes, monitored and controlled.

18 JUDGE KARLIN: How are they monitored?

19 MR. DEHMEL: By release monitors and by
20 knowing the discharge flow rate.

21 JUDGE KARLIN: All right, so there's a
22 monitoring point somewhere?

23 MR. DEHMEL: Yes, the monitoring point is
24 in the stacks, the monitoring point in the discharge
25 pipe.

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1 JUDGE KARLIN: Okay.

2 MR. DEHMEL: And it's all established
3 within, you know, two or three key operational
4 programs, one that which is the off-site --

5 JUDGE KARLIN: So there's routine releases
6 that are routinely monitored. There's accidents which
7 are sudden events, where a spill occurs.

8 And there's long-term, slow leaks which
9 are the subject of the tritium study. And I'm
10 focusing on long-term ground water contamination
11 potential contamination issues and whether or not the
12 site has been studied adequately on that basis.

13 MR. DEHMEL: Your Honor, you're right. And
14 the point of clarification I wish to make here is that
15 the protracted releases from those leaks and spills,
16 are not part of routine monitoring program.

17 JUDGE KARLIN: Okay, we've got that.

18 MR. DEHMEL: So, basically, what happens is
19 that, is that if there were a leak, and material was
20 moving through the ground and reaching either the
21 ground water or the lake, that aspect would have to be
22 treated separately. And then, at that point, the
23 Licensee would have to make a determination and
24 determine whether it needs to be remediated.

25 What kind of alternate measures need to be

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1 put into place. And those releases, associated with
2 those inadvertent releases or abnormal releases, an
3 assessment would have to be made and compared to what
4 the impact might be to off-site resident or user of
5 the water.

6 So they're treated, they're addressed
7 separately, but they are not routine effluent
8 releases, as part of the, the way it's understood
9 within the context of complying with Part 24, Appendix
10 I.

11 JUDGE KARLIN: Okay, I think I understand
12 that. I mean, let me tell you where I'm coming from
13 or sort of give you an illustration.

14 In industry, and I worked in industry and
15 working with companies, the first thing you want to do
16 when you're going to propose to construct or acquire
17 or use an existing site, is to do an environmental
18 baseline assessment of the site.

19 The ground water on the site. You want to
20 know if there are any contaminants in the ground water
21 at that site. So that when you build something on
22 that site, you will know whether you're adding to it
23 or not.

24 You need to take a photograph of the
25 ground water situation at that site, before you build

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1 something on it. This is especially true at a brown
2 field site, which is what this is.

3 This is a site where an existing, large
4 nuclear operation has been for many years, and there
5 appears to be some contamination in the soil or ground
6 water, and in the lake.

7 And I would think it would be critical for
8 a regulator to be able to distinguish between the
9 amount of contaminations being added by Units 3 and 4,
10 to distinguish those against the amount of
11 contamination that's already being contributed by
12 Units 1 and 2.

13 Don't you think there's some value in
14 understanding what's the delta there?

15 MR. DEHMEL: Yes, I understand, Your Honor.

16 JUDGE KARLIN: And has the staff have any
17 effort to do that?

18 MR. DEHMEL: With respect to the SER, we
19 did question, as Mr. Stoetzel just pointed out. And
20 we looked at the information that we supplied by the
21 Applicant, and that, the only well near the, one of
22 the laboratories, there was no radioactivity reported.

23 Since then, we've learned, I think, on
24 April 17th, the Applicant provided additional
25 information with a number of observation wells, as

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1 well as wells below the powerblock, that there is some
2 contamination.

3 Now we haven't had the opportunity to
4 actually take this data and superimpose it onto the
5 analysis that we've done up to now and determine what
6 the radiological impacts are.

7 But, one thing I'd just like to clarify is
8 that, is that the presence of the radioactivity, if
9 ultimately it is confirmed, based on the response to
10 Question 48, provided by the Licensee, the
11 Supplemental Response to Question 48, this information
12 is related to the operational aspect of Units 1 and 2.

13 JUDGE KARLIN: All right, I mean this makes
14 sense. If there is radiological contamination on the
15 site now, it would probably come from the nuclear
16 reactors on the site now.

17 MR. DEHMEL: And it would have to be taken
18 into the context of its operating condition, it's
19 operating license.

20 JUDGE KARLIN: And how would you
21 distinguish if the new units come on line or, we're
22 looking at a site, try to decide whether the site is
23 suitable.

24 The site may have some existing
25 contamination on it. It apparently does. How do we

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1 know what, so now we're going to add another activity
2 on the site that could increase the contamination of
3 the site.

4 The question is how are you going to
5 distinguish between what was put there before and
6 what's being added by this operation? Or don't you
7 care?

8 MR. DEHMEL: No, we do care because when,
9 at the time that the COL Application is submitted, the
10 requirements of Chapter 11 of the SRP, there are
11 specific aspects that have to be addressed.

12 One which, in Chapter 11.5 of the SRP
13 addresses the existing radiological condition on the
14 site for the purpose of structuring and augmenting
15 radiological ground monitoring program, as well as
16 your off-site dose calculation manual, parameters.

17 So there are requirements that essentially
18 the staff would look at, at the time the COL
19 Application is submitted, and determine whether or
20 not, in light of information that has transpired
21 between the time the ESP might have been issued, and
22 the time that COL Application is being evaluated, this
23 information would have to be reviewed and evaluated by
24 the staff.

25 And, at that point, the staff would make

1 a determination as to whether or not have conditions
2 of the plant changed such that the characterization
3 that were presented in th ESP, no longer supports the
4 dose projections that were presented in my case in the
5 SER.

6 And, at this point, I would make a
7 determination whether or not there's a delta that has
8 occurred, and a delta needs to be --

9 JUDGE KARLIN: Your said the delta between
10 what's known now and what's known at the COL?

11 MR. DEHMEL: Correct.

12 JUDGE KARLIN: One of our questions, let me
13 just pause for a minute here.

14 JUDGE ELLEMAN: While you're pausing, would
15 you presumably prepare an addendum in some way to the
16 FEIS or the safety report that reflects this new
17 insight and this new information?

18 MR. DEHMEL: That's a licensing question,
19 but this would definitely be raised by the staff as
20 part of their request for additional information.

21 Because what we would do is we would look
22 at the application, compare this to what was proposed
23 in the ESP, look at the staff's analysis, both the SER
24 and the EIS, and make a determination whether or not
25 there's a difference.

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1 And if there is a difference, the staff
2 would generate what I call a request for additional
3 information, and at that point this would be put into
4 the licensing process.

5 And whether or not, you know, we issue a
6 supplemental EIS, I don't know. That's not, I cannot
7 answer that question. I don't know, the licensing
8 procedure at that stage.

9 JUDGE KARLIN: Now, Question 50 that we
10 asked, the safety inquiries. We referred to the SER,
11 Section, Page 2-136, and quoted the SER.

12 It states, quote, the staff concludes that
13 because of incomplete knowledge of the subsurface
14 hydrological and chemical properties and the likely
15 composition of the rad waster effluent itself,
16 significant uncertainty exists in the characteristics
17 of the radio nuclide migration in the subsurface at
18 the ESP site at the time of the ESP review.

19 The staff has determined that after the
20 reactor design is selected and additional details
21 related to rad waste tank design and the location
22 within the proposed site is known, appropriate
23 subsurface hydrological characterization can be
24 completed.

25 Now why can't, plant parameter envelope.

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1 It is a set of parameters that the Applicant submits
2 to you as to various ways, types of designs. Seven
3 different proposed reactors.

4 Why don't you just simply, so you ask the
5 staff has determined that after the reactor design is
6 selected. You have the seven reactor designs that are
7 being proposed. Isn't that a plant parameter
8 envelope?

9 Couldn't you do a calculation now based on
10 the plant parameter envelope values?

11 MR. BAGCHI: Your Honor, certainly within
12 the PPE, the variety in the dimensions, whether or not
13 it's a modular reactor or a large reactor of the
14 boiling type or the pressurized water type. The
15 footprint is substantially different.

16 JUDGE KARLIN: But isn't that the nature of
17 PPE? That there is a large variety between a gas-
18 cooled reactor in a pebble bed versus, you know, the
19 other kinds?

20 Don't you have to have a PPE in order to
21 issue an ESP?

22 MR. BAGCHI: There is an PPE of the
23 dimensions. It's very large, and there is this very
24 substantial lack of precision in going with that.

25 As I explained earlier, there are issues

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1 related to backfill, related to construction
2 activities. We determined that it was best to
3 preclude any accidental release.

4 All of my answers in the safety side is
5 related to accidental release.

6 JUDGE KARLIN: Right, the answer to that
7 question, Question A, 50-A, what prevents the
8 Applicant and staff from developing more sufficient
9 knowledge on the subsurface hydrological and chemical
10 properties at the time?

11 Isn't this an appropriate part of the ESP
12 assessment? And you said without knowing the exact
13 location and elevation of the likely point of an
14 accidental release.

15 We're not talking about accidental
16 releases, sudden quick releases. We're talking about
17 slow, slow releases, such as tritium. Without knowing
18 the exact location and elevation, there's no way you
19 can do it.

20 Why do you need the exact location? Can't
21 you just have a plant parameter envelope with some
22 assumptions in it? Just like you're doing for every
23 other parameter at this site?

24 MR. BAGCHI: Your Honor, 50-A, let's see,
25 that's talking about accidental release. I did not

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1 talk about routine releases at all. I did not.

2 JUDGE KARLIN: Right, okay, we didn't focus
3 on accidental, we focused on, well, there is routine
4 that are monitored, as I understand from Mr. Dehmel.

5 And there's accidental, which are sudden.
6 And there are the long-term releases or leaks that
7 sometimes occur, such as with tritium, studies have
8 shown.

9 Okay. Let me see if I've got anything
10 else for you guys. Okay, that's all we have at this
11 point. If you'll just hold for a minute, staff, do
12 you have any clarification questions?

13 MR. WEISMAN: With your indulgence, Your
14 Honor, we'd like to ask a few questions to clarify
15 some of the points in the presentation?

16 JUDGE KARLIN: Sure.

17 MR. WEISMAN: And anybody on the panel can
18 answer these questions. So, in looking at Section
19 100.20-C3, I'm sorry, we see that the Applicant is
20 supposed to characterize, suppose to give soil,
21 sediment and rock characteristics, adsorption and
22 retention coefficients.

23 And my question is what, could you please
24 describe what adsorption and retention coefficients
25 would have to do with tritium in ground water?

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1 MR. VAIL: Tritium isn't, is non-sorbing,
2 so it isn't affected by those properties. So it's
3 indifferent to those. So anything that is non-
4 sorbing, basically moves with water like tritium will.

5 JUDGE KARLIN: Let me ask is tritium the
6 only contaminant that goes into the ground water from
7 facilities? I understand strontium-90 is also
8 reflected in the ground water report that was issued
9 in September, 2006?

10 MR. DEHMEL: There are other radio nuclide
11 class, depending on the source of the water. And so
12 the distribution radio nuclide you might expect in a
13 spill or a leak would come, would have to be obviously
14 dependent on the source of the radioactivity.

15 JUDGE KARLIN: And tritium is water.

16 MR. DEHMEL: So, basically, what happens is
17 that the tritium moves with the ground water, so it's
18 the first wave of contaminant that moves, while the
19 other radio nuclide, if there are any, move at much
20 slower rate, because they're subject to those other
21 capabilities or properties of the soil, its absorption
22 properties of the soil.

23 They move at a much slower pace. So the
24 tell-tale indicator of initial ground or soil ground
25 water contamination is the tritium, because it moves

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1 with the ground water.

2 JUDGE KARLIN: That's the leading edge of
3 it?

4 MR. DEHMEL: That's the leading edge of the
5 plume, but once you know that, you should be aware
6 that maybe other contaminants essentially trailing
7 beyond, forming a plume with different shape and
8 traveling at a much, much slower rate than that of
9 tritium.

10 JUDGE KARLIN: Okay, this is just a funny
11 question. I was with Shell Oil Company for seven
12 years so I, can anything travel faster, such as either
13 through other solution or, than the water itself? The
14 plume can go faster than the water would move itself?

15 Some contaminants would move faster than
16 the water itself? Is that right?

17 MR. VAIL: There are -- this process is
18 called anion exclusion, which instead of things trying
19 to sort to soil, they would actually be repelled.
20 They're sort of more theoretical than I've actually
21 ever seen anyone encounter what we would call negative
22 KD. Usually, that's the sorption coefficient, and
23 that's limited to zero. So there is, theoretically,
24 in anti-exclusion process, it would basically reduce
25 that volume.

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1 JUDGE KARLIN: Okay. I was thinking more
2 of diffusion: drop a glass of colored ink into water,
3 and, even if the water is not moving, the dye will
4 disperse throughout the water by diffusion, moving
5 faster than the water which is not moving.

6 MR. VAIL: Yes. Diffusion is a process
7 that occurs, but it's going to be much slower than
8 dispersion is in a normal ground water --

9 JUDGE KARLIN: Okay. That's kind of a
10 diversion. Please, go ahead.

11 MR. WEISMAN: Thank you, your Honor.
12 Another question, and that is what is the underlying
13 safety concern behind 100.20 C3? Why does the
14 regulation request this kind of information for
15 siting?

16 MR. VAIL: From experience with a lot of
17 sites, site specific information is required.
18 Hydraulic conductivities can vary dramatically for a
19 similar slit of soil over relatively small areas.
20 There's a limited amount of information on sorption
21 data so, basically, requires some consideration of the
22 site-specific characteristics to get good sorption
23 information. And, clearly, things like hydraulic
24 conductivity are going to be very site specific, so,
25 in those cases, I think the desire was that you came

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1 up with look at the site specifically to ensure you
2 came up with bounding estimates for those values.

3 In our case, in a sense, looking at 2413,
4 you know, we did come up with bounding values for all
5 those attributes basically by saying there was no
6 sorption, the velocity of the ground water was so fast
7 that it was irrelevant. But by the permit condition,
8 we precluded accident concern.

9 MR. WEISMAN: And maybe go a little
10 further. So how is it that the permit condition helps
11 design? Maybe I should ask it this way: does the
12 permit condition require by design what we might
13 otherwise be requiring by siting?

14 MR. VAIL: Correct.

15 MR. WEISMAN: Okay. I've got a couple of
16 more clarified questions. If during the construction
17 and perhaps after construction, when the building
18 locations are known and the soil can be characterized
19 where all that activity is taking place, even if an
20 applicant chose not to comply with the permit
21 condition, the requested variance from the permit,
22 what would be the basis, what would they have to show
23 the staff in order to be able to do that?

24 MR. VAIL: I think you're requiring to
25 compliance with the regulations as far as the dose

1 consequences, and they would basically have to
2 estimate the release from the tank and the pathway and
3 the travel time that resulted in those consequences.

4 MR. DEHMEL: I want to elaborate on this.
5 There is, as part of the SRP in Chapter 11.2, there's
6 a requirement there as part of the COL application
7 package that one of the scenarios that's considered is
8 the rupture of the tank containing radioactive liquid
9 waste. So what the COL applicant is supposed to do as
10 part of the application package: examine the type of
11 radioactive waste, liquid waste and wet waste that
12 will be generated. From those different type of waste
13 streams, identify one of the waste streams that has,
14 perhaps, the higher contamination level; put this into
15 a tank that will be used for storage; and then assume
16 that 80 percent of the tank fails, the tank fails, 80
17 percent of content is released; and assess the
18 radiological impact to the nearest groundwater well or
19 nearest water surface body which may be used for
20 drinking purposes. That's the requirement in Chapter
21 11.2 of the SRP. So the COL applicant has to address
22 this at the COL stage.

23 JUDGE KARLIN: Anything else, Mr. Weisman?

24 MR. WEISMAN: I think that's all the staff
25 has. Thank you, your Honor.

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1 JUDGE KARLIN: Okay. Thank you very much.
2 What I think we'll do, rather than taking a break, is
3 just see if we can proceed right along with the
4 applicant's witnesses at this time. So you all may
5 step down. Thank you.

6 MR. LEWIS: Thank you, Judge Karlin.
7 Dominion is going to present a panel of individuals:
8 Dr. Stewart Taylor, Mr. Carl Tarantino, Mr. Carter
9 Cooke, Mr. Loran Matthews, and Mr. Donald Hintz.
10 They're on their way up.

11 JUDGE KARLIN: Thank you. Do we have the
12 name tags that we could get to be helpful to the court
13 reporter and to us, too? Thanks. That's a help.
14 That helps us. Let's see if we can get this right.
15 Let me ask you all to stand and raise your right hand,
16 please. Do you all swear or affirm that the testimony
17 you're about to give is the truth, the whole truth,
18 and nothing but the truth?

19 (Whereupon, the panel members were sworn.)

20 JUDGE KARLIN: Thank you. Please be
21 seated, and we await your presentation.

22 MR. TARANTINO: Good afternoon, your
23 Honors. My name is Carl Tarantino. I'm a certified
24 health physicist and a Corporate Nuclear Licensee
25 Support Department for Dominion. For 24 years I've

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1 been with the company. I've been affiliated most
2 recently, that is in the last several months, with the
3 ESP project in supporting them in response to some
4 selective environmental questions, predominantly the
5 areas of the radioactive effluence and environmental
6 monitoring, but not all the environmental questions.
7 So I come in that role here with this panel. This
8 afternoon we will be providing you all the information
9 on the site characterization for hydrology,
10 specifically soil and groundwater, for the ESP site,
11 as well as for the existing North Anna Units 1 and 2.

12 On our panel, we have Mr. Loran Matthews
13 will be presenting hydrogeology focus for the ESP. I
14 also have here Dr. Taylor, who, although doesn't have
15 in this particular presentation but is available for
16 questions in the area of hydrology and aquatics. Mr.
17 Carter Cooke is here to address any chemical data that
18 will be presented in this area. I, myself, will be
19 presenting radiological data. And then with us here
20 is Mr. Don Hintz, our hydrologist, who has been a
21 participant on our groundwater monitoring initiative
22 team, which I lead at Dominion, and is available for
23 questions, as well.

24 So with that, I'll ask Mr. Loran Matthews
25 to begin our segment here with the characterization

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1 for hydro-challenging.

2 MR. MATTHEWS: Thank you, Mr. Tarantino.
3 My name is Loran Matthews. I'm a geologist with
4 Bechtel Corporation, who is a contractor to Dominion
5 for the North Anna ESP, and I was the lead on doing
6 the groundwater investigation for the ESP project.

7 Let me start by saying, looking at slide
8 number three here, let me start by saying that the
9 investigation of the groundwater at the North Anna ESP
10 site was performed to address NRC regulations
11 regarding the determination of site groundwater
12 levels, movement, and other parameters. It was also
13 conducted to investigate the potential effects of
14 groundwater on a plant at the North Anna site and the
15 effects of such a plant on groundwater at the North
16 Anna site.

17 As a result of our investigation, it
18 consisted of four primary objectives, as you'll see
19 here. The first objective was to determine the
20 maximum site groundwater elevation that could be used
21 as a design basis for hydrostatic loading on
22 subsurface structures. Second objective was to
23 evaluate the availability of groundwater as a source
24 of plant water supply, and I'll come back to that one
25 in a minute. The third objective was to evaluate

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1 impacts on groundwater withdrawal on offsite users.
2 And the fourth objective was to consider the potential
3 impact of accidental liquid releases to groundwater.

4 Going back to the second bullet, early on
5 in the investigation we determined that, based on the
6 characteristics of the aquifer beneath the North Anna
7 site and based on groundwater wells, characteristics
8 of groundwater supply wells for Units 1 and 2, this
9 was not a viable source of water for safety-related
10 purposes for the North Anna ESP site. Next slide.

11 JUDGE COLE: Why is that? Because of the
12 soil conditions where you were --

13 MR. MATTHEWS: It's just the aquifer is a
14 low-yielding aquifer, so it doesn't produce a whole
15 lot. Generally, on the order of 5 to maybe 50 gallons
16 a minute funnel well.

17 JUDGE COLE: Thank you.

18 JUDGE KARLIN: And when you go back to
19 that slide, you talked about the impact of accidental
20 liquid releases. Do you define accidental as sudden
21 accidental, as the staff seemed to be doing?

22 MR. MATTHEWS: Yes, we do. Yes.

23 JUDGE KARLIN: So you're excluding the
24 slow, low leaks that might occur?

25 MR. MATTHEWS: That's correct. We

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1 specifically addressed SAR Section 2413, which deals
2 with accidental liquid releases. There are no other
3 areas that I know of in the regulations that require -

4 -

5 JUDGE KARLIN: Now, with regard to the
6 Tritium problems that have been found at other
7 facilities, will you characterize those as accidental
8 liquid releases in accordance with that definition?

9 MR. MATTHEWS: I would not address my area
10 of expertise.

11 JUDGE KARLIN: So your study would not
12 cover anything that might be associated with that kind
13 of Tritium problem?

14 MR. MATTHEWS: That's correct.

15 JUDGE KARLIN: Okay.

16 MR. MATTHEWS: The next slide, and I'd
17 like to thank the NRC for this slide, we stole this
18 from them and saved me some time from doing the
19 highlights that they did for us.

20 JUDGE KARLIN: It looks familiar.

21 MR. MATTHEWS: What we did, we designed a
22 network of 19 observation wells at the site to
23 investigate groundwater levels and provide other
24 groundwater characteristics that were required by the
25 regulations. Ten of the wells were existing wells for

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1 Units 1 and 2, and we installed nine additional new
2 wells as part of the ESP site subsurface
3 investigation. Groundwater levels were measured in
4 those wells quarterly for one year, and then there was
5 one additional fifth measurement that was taken in
6 February of 2005 in response to I think it was an RAI
7 or I forget which.

8 Next slide, please. Slide five. Going
9 back to the first objective of our study, in
10 initiating the study, we looked at existing
11 information for Units 1 and 2 with respect to
12 groundwater, and we found that there had been a study
13 on that site, which indicated the maximum groundwater
14 levels in the power block area of Units 1 and 2 or in
15 that general site grade, indicated maximum groundwater
16 levels in the range of elevation 265 to 270. And the
17 observation wells that we installed at the site and
18 the groundwater contours that we constructed using
19 water level measurements taken in those wells
20 substantiated the fact or confirmed those predicted
21 levels for Units 1 and 2.

22 JUDGE KARLIN: Could I ask, going back to
23 that isometric head contour map, Units 1 and 2, could
24 you point out where they're located? I think I know,
25 but I just want to confirm. Do you have a laser

1 pointer or something? Is that where it is?

2 MR. MATTHEWS: Yes.

3 JUDGE KARLIN: So that's where Units 1 and
4 2 are located?

5 MR. MATTHEWS: Right.

6 JUDGE KARLIN: Okay. Does that mean that
7 all the 19 wells are upgrading to Units 1 and 2?

8 MR. MATTHEWS: Yes, that's right. Either
9 upgrading it or cross grading, basically, from this.

10 JUDGE KARLIN: All right. We're on slide
11 five?

12 MR. MATTHEWS: Yes.

13 JUDGE KARLIN: All right.

14 MR. MATTHEWS: And as I was saying, the
15 ESP groundwater level measurements that were taken in
16 those wells generally reflected elevations in the
17 range of 265 or below that. Therefore, the NRC, in
18 its safety evaluation report, set a maximum
19 groundwater level elevation of 270 feet or one foot
20 below the free surface, whichever is higher, as a site
21 characteristic.

22 Next slide. The third objective of our
23 study, looking at groundwater impacts. We determined
24 from the site observation wells that the ESP site is
25 hydrologically isolated from offsite groundwater

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1 users. In other words, Lake Anna to the north and the
2 lake and discharge canal to the east and then
3 tributaries to the lake on the south and the west form
4 hydrologic boundaries to groundwater movement. In
5 addition, there's a groundwater divide to the south of
6 the site, which results in groundwater generally
7 flowing to the north in that area.

8 JUDGE ELLEMAN: Excuse me. You said you
9 determined that. How did you determine that, other
10 than just it appears that would be a logical barrier?

11 MR. MATTHEWS: Well, it appears that it
12 would be a logical barrier. I mean, you have the
13 presence of the lake, you have the presence of the
14 tributaries, and groundwater flow is relatively
15 shallow in the area that would be considered and the
16 area that would be impacted by the site facility.

17 JUDGE ELLEMAN: Okay. So that's the way
18 in which it was determined?

19 MR. MATTHEWS: Right, yes, yes.

20 JUDGE ELLEMAN: Okay.

21 MR. MATTHEWS: And then, basically, as we
22 say there, due to the flow directions and the presence
23 of the hydrologic divides, the groundwater impacts by
24 a new plant is not expected to affect offsite users of
25 groundwater. They're either all on the other side,

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1 well, they generally are on the other side of those
2 divides.

3 JUDGE KARLIN: So you're saying all the
4 groundwater is going into the lake --

5 MR. MATTHEWS: Correct, yes. Next slide.
6 As part of the groundwater investigation, we
7 determined several parameters and general movement of
8 groundwater. As you can see on the previous slide of
9 the observation wells with the contour maps or contour
10 lines, groundwater, again, generally moves to the
11 north and east from the ESP site. The ESP site is
12 hydraulically upgrading it to Units 1 and 2, again, as
13 we discussed there. Three of the parameters that
14 would determine hydraulic gradient, hydraulic
15 conductivity, and effective porosity are shown there.
16 Those three parameters were used to determine a
17 groundwater velocity of 0.31 feet per day flowing from
18 the site toward the lake. And, again, the NRC, in its
19 safety evaluation report, determined that this would
20 result in a 16-year travel time from the ESP area to
21 Lake Anna.

22 JUDGE KARLIN: And that's assuming there
23 are no other conduits or cracks or crevices or pipes
24 that might carry that flow?

25 MR. MATTHEWS: That's correct, yes. It's

1 just basically on the assumption of the site
2 characteristics as of today, the way the site --

3 JUDGE ELLEMAN: So the velocity is not a
4 measured velocity. It is calculated from the other
5 parameter.

6 MR. MATTHEWS: That's right, yes. Next
7 slide, slide eight. This slide addresses our
8 evaluation of the potential impact of accidental
9 releases at the site. We see here that we did not do
10 any specific evaluation of liquid releases because of
11 the lack of information with respect to the design of
12 new plants. I mean, we were looking at a number of
13 new plants that were being considered at the time, so
14 there's no specific information with respect to
15 locations of potential spills and distances from the
16 lack and depths of the embedments of the various
17 foundations, that kind of thing. And the NRC had a
18 permit condition that required us to design the plant
19 to prevent such releases from occurring.

20 JUDGE KARLIN: Well, let me ask
21 characterization demonstrates ample time to respond to
22 any inadvertent release. By inadvertent release, you
23 mean accidental release?

24 MR. MATTHEWS: Yes.

25 JUDGE KARLIN: And by that, you mean

1 sudden release?

2 MR. MATTHEWS: Right, yes.

3 JUDGE KARLIN: What about slow leaks?

4 MR. MATTHEWS: Well, that kind of gets to
5 the next bullet, where Dominion has committed to a
6 Groundwater Protection Initiative, which will be
7 discussed by one of the panelists later.

8 JUDGE KARLIN: Okay. I thought that was
9 dealing with accidental releases, as well.

10 MR. MATTHEWS: Well, it can. It can deal
11 with either one, I believe, so it --

12 JUDGE KARLIN: All right. Well, let me
13 ask on the bullet number two, characterization and
14 ample time to respond to inadvertent release, do you
15 know what the nature and extent of the radiological
16 chemical contamination, if any, is under the ESP and
17 map site now?

18 MR. MATTHEWS: That would be addressed
19 subsequently by Mr. Tarantino, yes.

20 JUDGE KARLIN: Well, can you answer that
21 now? I mean, I know you have a radiological release
22 section here, but you're talking about response, how
23 would you even know there was one if you don't know
24 what's down there now?

25 MR. MATTHEWS: We have the monitoring

1 wells that we do have measurements that I'll be
2 addressing in this next segment. It's a segue way
3 actually right into --

4 JUDGE KARLIN: Oh, okay. I don't know how
5 you would know there was an inadvertent release if you
6 don't know what contamination, if any, is down there
7 now. Well, we'll get to that.

8 MR. MATTHEWS: Well, we are kind of there.
9 That was my part of the presentation.

10 JUDGE KARLIN: We got this organized.
11 People will think we had this planned.

12 MR. TARANTINO: The radiological data that
13 I'm now going to present to the Board here
14 demonstrates and shows that these groundwater
15 conditions here that are shown on this slide, number
16 nine, that leaks or discharges to the groundwater,
17 first of all, are not part of normal plant operations
18 and that the ESP site is considered a non-impacted
19 area insofar as the soil and groundwater contamination
20 are not expected, and the data now that we're now
21 subsequently going to show should demonstrates that.

22 JUDGE KARLIN: When you say leaks or
23 discharges not part of normal plant operation, you
24 mean you don't plan for them to happen?

25 MR. TARANTINO: That is correct, your

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1 Honor.

2 JUDGE KARLIN: Are you saying they never
3 happen or just they don't --

4 MR. TARANTINO: No, I'm saying they're not
5 planned by the normal operations of our facility or
6 intend for them to occur.

7 JUDGE KARLIN: That's good. I wouldn't
8 think you would.

9 MR. TARANTINO: This colorful but yet very
10 busy slide, number ten, really tailgates the next
11 slide because it's going to depict on there these
12 observation wells that have been taken. The envelope
13 for ESP, the 600 feet, there are seven observation
14 wells. If we can look at them, they look like they're
15 designated by colored blue and they're like hourglass
16 symbols. So those are the, you see those on this map,
17 and they will show the different wells that have been
18 installed and which we did take Tritium measurements
19 from. In the big sense, you can see where they're
20 strategically located. The next slide --

21 JUDGE KARLIN: Well, before we go into
22 that, it would be very helpful if we had a blowup of
23 this slide. I mean, we can't read much of the
24 material or data on it. I don't know. Maybe it's
25 just notional, but we'll let it pass. But let me see

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1 if I understand. The blue hourglasses are the what?
2 The monitoring wells for Tritium?

3 MR. TARANTINO: That we took Tritium
4 measurements from. Those are the observation wells.

5 JUDGE KARLIN: Okay. Now, let me ask are
6 they upgrading or downgrading?

7 MR. TARANTINO: They are upgraded.

8 JUDGE KARLIN: They're all upgrading?

9 MR. TARANTINO: Yes, sir.

10 JUDGE KARLIN: Don't you think it's
11 important to take some downgrading? If the source is
12 coming from the operation of the unit, upgrading would
13 be zero and downgrading would be the delta of any
14 increment that's being added.

15 MR. HINTZ: Your Honor, the wells were
16 installed as part of the COL investigations, so they
17 were on the ESP site naturally --

18 JUDGE KARLIN: They were already there.

19 MR. HINTZ: That's correct. We gathered
20 groundwater samples basically as a --

21 JUDGE KARLIN: Well, it's kind of like the
22 joke where a man goes out to the parking lot at night
23 and he sees another guy on the ground looking around
24 for his keys, right? And he says, "Can I help you?"
25 "I'm looking for my keys." "Okay. Where did you drop

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1 them?" "Well, I dropped them 50 feet that way."
2 "Well, why are you looking here?" "Because the light
3 is good." You know, why are you sampling upgrading
4 when that's not going to tell us anything?

5 MR. HINTZ: Actually, there's a parallel
6 program going on at the groundwater protection issue
7 that Carl will get into shortly.

8 JUDGE KARLIN: Oh, okay. All right. So
9 these seven wells --

10 MR. TARANTINO: Observation wells taken
11 Tritium measurements. Next slide. These are the
12 seven wells, and you can see by their identification
13 and well number, those ones, if you can read them from
14 that previous slide, that might make a little bit more
15 sense in terms of where they're located. But the
16 results for Tritium for each of the observation wells
17 are shown here, and in each of the wells, with
18 exception of Unit 3, well number 946, had a result of
19 1610 picocuries per liter. They were all, they were
20 reported as less-than values. And the less-than
21 values relate to the minimum detectable concentration
22 that the analysis is capable, the instrumentation
23 that's used to do the analysis is capable of
24 achieving. So that's why they're different. It might
25 be less than 461 in one case or less than 477 or 500.

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1 JUDGE ELLEMAN: Excuse me. Did you look
2 only for Tritium, or was it that Tritium was the only
3 thing you found?

4 MR. TARANTINO: We did the Tritium
5 measurements and, in some samples of some wells, we
6 also did gamma isotopic, but not in all of them. So
7 we did a combination of just Tritium measurements,
8 Tritium and gamma isotopic, and, in some wells that
9 I'll be reporting later, we did do strontium 89 and
10 90, as well.

11 JUDGE ELLEMAN: In the gamma isotopic, did
12 you pick up that were above background?

13 MR. TARANTINO: All the results were less
14 than minimum detectable concentrations in all of the
15 gamma isotopics that were done in all the
16 measurements.

17 JUDGE COLE: Where is well U3? I mean,
18 sorry, U3 well 946? Which one is that?

19 MR. TARANTINO: That's shown, I think it's
20 by the railroad tracks.

21 JUDGE COLE: Oh, I see. Yes.

22 JUDGE COLE: It's about 9:00.

23 JUDGE COLE: Okay. 946. I got it.
24 That's way upgraded.

25 MR. TARANTINO: Next slide. In addition

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1 to -- now, these were the wells that were inside the
2 600-foot envelope of the ESP. In addition to that,
3 now, this slide number 12 is reporting groundwater
4 data specifically for the Tritium measurements for
5 wells outside this envelope. The first station, 01A,
6 the monitoring well, which is also a well that was a
7 part of our existing program, shows its result for
8 Tritium. Again, less than a minimum detectable
9 concentration value there of 465 picocuries per liter.
10 There, we had gamma emitters that were less than the
11 minimum detectable concentration in each case and also
12 strontium 89 and 90 that were less than the minimum
13 detectable concentration.

14 JUDGE COLE: May I ask what's the
15 difference between minimum detectable concentration
16 and less than 465?

17 MR. TARANTINO: The actual value reported
18 for the 465 in that case would be what the instrument
19 or equipment was capable of actually reporting. And
20 for that instrument, that has what they call a minimum
21 detectable concentration.

22 JUDGE COLE: With respect to gamma
23 emitters less than minimum detectable concentration,
24 how did you find out that they were there if you
25 couldn't detect them?

1 MR. TARANTINO: That is, based on the
2 library of the nuclides for the gamma isotopic
3 analysis done by that equipment has, it's loaded with
4 a library of radionuclides, and they each have a tie
5 to certain gamma. So in doing the analysis, if that
6 instrument is capable of detecting it down to that
7 level, it will read the energy line for that, and it
8 identifies it as that nuclide from this library of
9 nuclides.

10 JUDGE COLE: I gather that none of these
11 analyses for non-Tritium isotopes were done by
12 chemical separation and beta counting or whatever,
13 which is usually the more sensitive way of detecting
14 the presence of isotopes.

15 MR. TARANTINO: These were done by our
16 onsite lab using a tricar liquid simulation counter.

17 JUDGE COLE: Yes. So they were all done
18 by non-separative instrumental techniques.

19 MR. TARANTINO: That is correct, your
20 Honor.

21 JUDGE KARLIN: Are you suggesting there
22 are more sensitive instruments, Dr. Elleman, that
23 could have detected lower levels?

24 JUDGE ELLEMAN: I'm sure, as Mr. Tarantino
25 would testify, yes. By chemically separating specific

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1 radioisotopes, you can lower your ability to detect
2 those isotopes.

3 JUDGE KARLIN: All right. And you agree
4 with that?

5 MR. TARANTINO: Yes, I do, your Honor.
6 And, in fact, a strontium 89 and 90 analysis, by
7 virtue of its, that's what it does. It does a
8 chemical separation.

9 JUDGE KARLIN: Right. But those tests
10 weren't done here in these samples?

11 MR. TARANTINO: No, that is correct.

12 JUDGE KARLIN: Okay.

13 MR. TARANTINO: We also had our two
14 independent spent fuel storage installation monitoring
15 wells that received the same type of analyses; then
16 our North Anna training center and security center
17 building wells; and a header for three domestic water
18 supply wells, which two of those three wells are also
19 within that 600-foot envelope. One was outside the
20 envelope.

21 Okay. In addition to those wells and also
22 as part of our groundwater initiative, we have
23 groundwater data collected for Units 1 and 2 power
24 block. And here is reported on slide 13 results for
25 Units 1 Aux Building groundwater monitoring well,

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1 Units 1 and 2 mat sumps and header, and Unit 2 valve
2 pit. And these particular samples and where they were
3 taken is tied into our drainage portions of systems,
4 such as our casein cooling and RWST systems into the
5 mat sump. So where these samples were taken was the
6 bottom of the sumps and on the walls of the valve pit,
7 which is connected to the Safeguards Building. So
8 just to give you an idea where they were kind of
9 collected from. These are definitely in-plant
10 samples.

11 Next slide. This is showing the contour
12 here of the wells that I had just mentioned. There
13 you can see where the Iskersee location is and the
14 monitoring wells associated with that where Units 1
15 and 2 containment shown in the envelope and the
16 safeguards in and around that area where the power
17 block samples were taken, and then a couple of the
18 other peripheral wells that we talked about earlier,
19 the observation wells.

20 Next slide. In conclusion on the
21 groundwater data, they were all found to be below the
22 EPA drinking water standard, which is the 20,000
23 picocuries per liter. And our data shows that there's
24 an absence of what we would consider significant
25 contamination.

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1 And next slide. In addition to the
2 monitoring well samples, soil data at locations
3 outside of the ESP site were also obtained. And what
4 we have on slide number 16 are the soil samples in
5 conjunction with the radiological environmental
6 monitoring program, which includes a shoreline sample
7 that is collected semiannually, and that sample is at
8 the waste heat treatment facility. It's at that
9 location.

10 JUDGE KARLIN: The waste heat treatment
11 facility is how many thousand acres?

12 MR. TARANTINO: It's --

13 JUDGE KARLIN: Four thousand?

14 MR. TARANTINO: Forty-eight or something
15 like that.

16 JUDGE KARLIN: So that's a big area.
17 Where is this?

18 MR. TARANTINO: More specifically, it's
19 about 3.4 miles in the south of the plant location.

20 JUDGE KARLIN: Okay. It's some specific
21 place that's sampled every year at the same location?

22 MR. TARANTINO: In and around the same
23 general vicinity.

24 JUDGE KARLIN: And how did that particular
25 spot get picked? I mean, there's some logic to it, I

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1 suppose.

2 MR. TARANTINO: As with all the samples in
3 the REMP program, they were looked at from the
4 strategic location to what sector are they in and what
5 would be considered a direct line from centerline of
6 Unit 1 or Unit 2. All the REMP samples were based on
7 a sector mapping, if you will, from the site
8 centerline of the unit.

9 JUDGE KARLIN: Okay.

10 MR. TARANTINO: And, of course, based on
11 a pathway, appropriate pathways. In addition, the
12 aquatic sediments from three locations are collected
13 semiannually, and the three locations is one is at the
14 waste heat treatment facility, upstream in Lake Anna
15 about 13 miles in the west sector, and downstream
16 North Anna River about approximately six miles in the
17 southeast sector from the site. So these were, again,
18 three selected that we had in our REMP program since
19 the beginning of the station's operations.

20 And then the third set of soil samples is
21 collected on a tri-annual basis and up to twelve of
22 these type of samples are taken. And they range from
23 taking it at our site boundary, which is approximately
24 one mile from the plant, to offsite locations in the
25 various sectors out to as far as 22 miles. So we have

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1 a range of that for the 12 soil samples. That
2 comprises, collectively, all of the soil sample that's
3 done outside the ESP.

4 Next. The Groundwater Protection
5 Initiative, Dominion has been participating in this
6 since July of 2006. It's a volunteer initiative that
7 we've been participating in, and it is to demonstrate
8 our commitment to controlling licensed material, how
9 we can minimize and control and manage unplanned,
10 unmonitored, unintended releases to the environment
11 that could potentially occur from plant operations of
12 Units 1 and 2.

13 The initial site action plan that we put
14 together is listed on the things, the objectives that
15 this plan has designed to meet, including the
16 inspection of all of our systems for any potential
17 leakages that might occur; review of any prior
18 reports/notifications that were made for any spills or
19 leaks; our 50.75 gulf decommissioning file, evaluation
20 and review of all of those records to see what we have
21 historically. And then with the assistance of Mr.
22 Hintz, our hydrologist, part of our team is looking at
23 the hydrogeology and the potential for migration of
24 contamination and what are our detection and
25 monitoring capabilities, what they should be, what

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1 they are, and what we may have to develop. And we're
2 in the process of doing that at this time. And I
3 would like to, at this time --

4 JUDGE KARLIN: Are we still on this slide
5 here? Are you finished with this slide?

6 MR. TARANTINO: Yes, I am, your Honor.

7 JUDGE KARLIN: Okay. Let me just ask, if
8 I may, on this GPI site action plan, it says you'll
9 inspect, you'll review, you'll review, and you'll
10 evaluate. Then are you going to put any -- does the
11 GPI site action plan actually involve syncing any
12 wells and doing any monitoring?

13 MR. TARANTINO: Absolutely, absolutely.
14 On this slide, 17, it's just putting what the very
15 initial actions that Dominion took when it launched
16 it's groundwater protection initiative. Our action
17 plans includes a whole separate section just for the
18 hydrology part and the drilling of wells, where they
19 should be, and that whole section. This is just
20 intended to show how we initially launched it. It's
21 much more comprehensive than that, your Honor.

22 JUDGE KARLIN: Okay. Because this just
23 sounds like looking at pieces of paper at that point.
24 The final bullet, Dominion will monitor groundwater
25 downgrading of Units 2 and 3. Could you elaborate on

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1 that?

2 MR. TARANTINO: Could you repeat that
3 question again?

4 JUDGE KARLIN: The last bullet, what is
5 that all about? Will monitor groundwater. How many
6 wells, how frequent --

7 MR. TARANTINO: This is the determination
8 where these wells should be drilled, some of which
9 would be down gradient, and determining where and
10 when, what makes the best strategically hydrologically
11 where these wells should be to give us the most useful
12 information, so that if we had talked about these
13 long-term possibly undetected leaks, how would we know
14 that we can detect them? Well, one is if we make a
15 thorough and comprehensive assessment where they
16 should be drilled to begin with and put would give us
17 a good footprint then of where. We understand the
18 migration pathway of them, where they should be. Then
19 if there is a leak, we should be able to detect it.

20 JUDGE KARLIN: Yes. I mean, it seems to
21 me that Units 1 and 2 are relatively close to the
22 lake. The lake is where the groundwater is going, so
23 there's kind of a thin strip of land that you can use
24 to drop your groundwater wells that are in between the
25 lake and the units. You think that takes a lot of

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1 study to figure out where those wells should be? I
2 guess so.

3 MR. HINTZ: It's job security. I'd
4 imagine, though, that it's very difficult.

5 JUDGE KARLIN: I'm sure there are places
6 that you could be more likely to find something and
7 less likely to find something.

8 MR. HINTZ: You're absolutely right.
9 That's true. You know, right now, we're in the stages
10 of actually doing utility clearance at North Anna to
11 actually say, okay, let's draw an X and drill here.
12 And probably within 45 days, we're going to be
13 probably putting holes in the ground, so we have a
14 good idea where these wells are going in. They will
15 be used to monitor Units 1 and 2 right now, but
16 they'll also be downgrading to the ESP site, yet the
17 ESP site will be part of the GPI, and they'll have
18 their own set of monitoring wells once that whole site
19 is initiated.

20 JUDGE KARLIN: Does the data that you've
21 reflected here so far on the limited sampling and
22 analysis you've done, is it your conclusion that this
23 indicates that the activities on the existing site
24 have contributed to some radiological contamination in
25 the groundwater, or is this all background?

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1 MR. TARANTINO: I think it's a
2 combination, your Honor. Before the Groundwater
3 Protection Initiative, aside from the REMP program and
4 our effluence program, which we'll also be addressing
5 on another topic, there's certainly possibly
6 undetected that we don't look for it and you say you
7 don't have it. So from that standpoint, from Units 1
8 and 2 operations, the potential that there may be
9 leaks that we haven't discovered is a real thing. But
10 what I can say is that from the limited data that we
11 have and ongoing of collecting more data, it strongly
12 appears that we do not have any active and known found
13 leaks from Unit 1 and 2 operations into groundwater.

14 JUDGE ELLEMAN: Is that equivalent to
15 saying that you are not aware of any past spills or
16 leaks that could be the source of detected material?

17 MR. TARANTINO: No, that is not what I'm
18 saying, your Honor. We believe we have a very good
19 handle on our, historically, our legacy of spills and
20 leaks at the North Anna power stations. And through
21 the NEI initiative, we've reported those leaks and
22 spills that we've identified and known and have a very
23 good handle on that.

24 JUDGE ELLEMAN: From those known leaks, do
25 you think you know reasonably well the concentrations

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1 of radionuclides that went into the soil?

2 MR. TARANTINO: As we speak, I couldn't
3 give you numerically what that might be, but that's
4 something that could be determined from the data that
5 we have from those spills and leaks. Some of them may
6 have been falling under the notification premise that
7 we have, things such as LERs and other documentation
8 that would quantify and show that type of data. So we
9 have the information to do that.

10 MR. HINTZ: And I think it falls under the
11 second bullet. We're just starting a process to,
12 we're doing recon at this point in time.

13 JUDGE ELLEMAN: One last question, and
14 then I'll transfer to my associates. Can you think of
15 any possible source for the detected Tritium other
16 than from Units 1 and 2?

17 JUDGE KARLIN: Or anything else.

18 MR. TARANTINO: Well, there's well-known
19 mechanisms that Tritium can come from condensation.
20 You have situations where humidity conditions and
21 temperature conditions where you might have it falling
22 out from that.

23 JUDGE ELLEMAN: You're talking about
24 Tritium that's produced in the upper atmosphere
25 through cosmic rain --

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1 MR. TARANTINO: That's part of that. I
2 mean, those types of things.

3 JUDGE ELLEMAN: They couldn't produce the
4 kinds of levels you're observing, though, could they?

5 MR. TARANTINO: No. But I'm saying that
6 that's other mechanisms that are identified that we
7 believe could contribute to that.

8 JUDGE ELLEMAN: Okay.

9 JUDGE KARLIN: And you had one more slide?

10 MR. TARANTINO: Now, at this point, I
11 wanted to turn it over to Mr. Carter Cooke, who's
12 going to present the chemical data as part of the site
13 characterization topic.

14 JUDGE KARLIN: Mr. Cooke, I have to ask.
15 I see that you're referring to as Mr. Carter Cooke,
16 and it says Arthur Cooke. Which one is right?

17 MR. COOKE: Yes, your Honor. My full name
18 is Arthur Carter Cooke. I go by Carter. Good
19 afternoon. My name is Carter Cooke, and I'm Senior
20 Environmental Compliance Coordinator at North Anna
21 Power Station. And I want to talk to you a very short
22 time this afternoon concerning your question of
23 potential chemical contamination in the ESP site.

24 I've been an Environmental Compliance
25 Coordinator at North Anna for almost 20 years now, and

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1 we have no history of chemical releases or spills in
2 the ESP site. Potential sources of chemicals are all
3 down gradient from the ESP site.

4 We do have two drinking water wells which
5 are in the ESP site. An analysis of the data from
6 these wells by the Virginia Department of Health does
7 not indicate any chemical contamination. In fact, we
8 drink that water with no treatment whatsoever. We
9 don't even chlorinate it.

10 JUDGE KARLIN: May I ask how deep are
11 those wells?

12 MR. COOKE: I thought you might ask that.

13 JUDGE KARLIN: Yes, it seems logical.

14 MR. COOKE: All right. The two wells on
15 that site are 305 feet and 375 feet deep.

16 JUDGE KARLIN: So they're well beyond the
17 impact of contamination that might occur in the
18 hydrological connection by the groundwater with the
19 lake?

20 MR. COOKE: I really can't speak to that.
21 I would expect so.

22 JUDGE KARLIN: Yes. I mean, are they
23 likely to pick up anything if you had a spill
24 somewhere on the surface or a tank that was leaking?
25 How does the groundwater flow close towards the lake?

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1 MR. COOKE: Correct.

2 JUDGE KARLIN: So some of it goes down,
3 some of it goes horizontal? I'm not sure what --

4 MR. COOKE: I'm not sure of flow
5 characteristics.

6 JUDGE KARLIN: -- horizontal, but pretty
7 deep for those groundwater wells, as you should be.
8 That makes sense. But the fact that they don't show
9 anything is useful; it's good to know. I'm glad they
10 don't.

11 MR. COOKE: Well, similarly, we have storm
12 water runoff from the vicinity of the ESP site, and
13 that also shows no chemical contamination.

14 JUDGE ELLEMAN: You are looking here, I
15 guess, for specific chemicals that you know you work
16 with onsite; is that correct?

17 MR. COOKE: No, no, sir. No, your Honor.
18 What we're looking for, when we submit the VPDES
19 permit application, we had to take strong water
20 samples, and they're looked at for just about every
21 chemical you can think of for analysis by the State
22 Department of Environmental Quality to determine if we
23 need to do any more monitoring of the storm water
24 runoff throughout the life of the permit.

25 JUDGE ELLEMAN: Okay.

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1 MR. COOKE: So it's a pretty broad range
2 of chemicals they look for.

3 JUDGE KARLIN: Surface water runoff, you
4 take the sample, you do the analysis or --

5 MR. COOKE: Our system lab did the
6 analysis for the --

7 JUDGE KARLIN: Okay. And what suite of
8 chemicals you analyzed for?

9 MR. COOKE: I didn't bring that
10 information. It's about a three-page list of
11 chemicals.

12 JUDGE KARLIN: Okay. Give me some
13 examples.

14 MR. COOKE: All the metals, all the
15 chemical pesticides --

16 JUDGE KARLIN: Solvents, PCBs?

17 MR. COOKE: PCBs. Yes, everything that
18 you really might expect to find.

19 JUDGE KARLIN: And all finding none
20 detectable in all those?

21 MR. COOKE: There were some, like in the
22 metals. The area that we're sampling, all throughout
23 this area were gold and silver and sulphur mines,
24 gold, iron, and sulphur mines. There's a lot of
25 metals in the area. I couldn't say that they were all

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1 non-detectable. I'm sure some things showed up, but
2 they were not at levels that the Department of
3 Environmental Quality thought that we needed to be
4 concerned with.

5 JUDGE KARLIN: All right.

6 MR. COOKE: It was for those reasons that
7 it was not necessary to initiate more extensive data
8 collection for this area. Next slide, please. Slide
9 number 19. North Anna Power Station has a very good
10 working relationship with its state environmental
11 regulatory agencies, both the Virginia Health
12 Department and the Department of Environmental
13 Quality. One of the reasons that we have such a good
14 relationship is our compliance history. We've had a
15 very good compliance history with our spills and
16 releases to the ground, and we also try to answer any
17 questions the agencies have as quickly and completely
18 as we can.

19 Now, one of the reasons for our good
20 compliance history is the fact that North Anna is very
21 aggressive in its programs to prevent spills and
22 releases and to mitigate them when they do occur. And
23 we've made a lot of strides in that direction over the
24 past few years. And that concludes my presentation
25 and this section.

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1 JUDGE KARLIN: All right. Well, let me
2 ask you a couple on that slide 18. No indication of
3 chemical contamination at the ESP site. One of the
4 things we're concerned about is being able to
5 distinguish between pre-existing contamination in the
6 area and any new contamination that might be added.
7 So let's say you change the title to that slide, no
8 indication of chemical contamination at the North Anna
9 PS site, plant site. Could you say that? Is that
10 true? There's been no indication of chemical
11 contamination at the North Anna site?

12 MR. COOKE: We don't actually go out and
13 take soil samples. I can give you a history of our
14 chemical spills at the North Anna site.

15 JUDGE KARLIN: I mean, the ESP site is
16 kind of an empty site.

17 MR. COOKE: Right. Well, we've had three
18 significant oil spills at the site that I'm aware of
19 throughout the life of the station. One was the
20 transformer fire. One was the tanker truck that
21 turned over next to the discharge canal, and the third
22 was the hydraulic line break in the year 2000, and
23 that released 35 gallons of hydraulic. Well, that was
24 near the ESP site downgrading from it. But all these
25 sites, all these accidents we cleaned up immediately

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1 and properly disposed --

2 JUDGE KARLIN: No, no, I'm sure they were.

3 MR. COOKE: -- so I wouldn't expect any
4 contamination from those accidents. And we've had no
5 chemical releases that were greater than the RQ for
6 that particular chemical.

7 JUDGE KARLIN: What I'm suggesting is the
8 ESP site is an empty site. There's nothing there.
9 It's upgrading to the current Unit 1 and 2 sites.

10 MR. COOKE: Correct.

11 JUDGE KARLIN: There's no chemical
12 contamination at the ESP site. There's nothing going
13 on at the ESP site.

14 MR. COOKE: Right.

15 JUDGE KARLIN: But there are things going
16 on at the map site.

17 MR. COOKE: Correct.

18 JUDGE KARLIN: So there have been
19 indications of some spills or contamination, chemical
20 contamination at the map site.

21 MR. COOKE: There have been some iron
22 spills.

23 JUDGE KARLIN: Right. And part of the
24 concern, I'm just thinking, is just to understand, if
25 I were buying this property and going to build a new

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1 facility on this property as sort of a stranger, the
2 first thing I'd want to do is have a pretty good
3 handle on what the contamination is in the area so
4 that when I came in nobody could blame me for anything
5 that was there beforehand. And so that's the thought.
6 process I go through when I look at, well, the idea is
7 we want to use this site for two new nuclear reactors
8 or 16 new nuclear reactors, whatever it may be, and
9 sort of thinking through as a regulator that would it
10 be useful to be able to distinguish between any
11 increment that's already there versus the increment
12 that might be a function of the two new units at the
13 site. So that was it, just those questions.

14 JUDGE COLE: Mr. Cooke, your statement
15 that the data from drinking water wells does not
16 indicate any chemical contamination in the vicinity of
17 the site. The two drinking water wells you're
18 referring to are down below the 350-foot level?

19 MR. COOKE: Correct.

20 JUDGE COLE: And the streams opening that
21 up are probably down around that level or below it,
22 right?

23 MR. COOKE: Well, probably just above that
24 level, I would think.

25 JUDGE COLE: So it's a long way down?

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1 MR. COOKE: True.

2 JUDGE COLE: Okay. It's analysis of
3 those, the water from those wells, leads you to make
4 the statement that they didn't find it in the drinking
5 water and it looks okay?

6 MR. COOKE: Right.

7 JUDGE COLE: Thank you.

8 JUDGE ELLEMAN: I'm sure you heard the
9 view of the preceding panel that the regulatory
10 requirements for measuring dispersal of materials in
11 the soil and the measurement of distribution
12 coefficients was premature at the ESP stage. And also
13 their view that the RSO02 guidance related to the
14 quantities that should be collected at the ESP stage
15 was probably not appropriate to do. Do you have
16 anything to add to that point of view or to those
17 comments?

18 DR. TAYLOR: Yes, your Honor, if I could
19 add something. One thing I would like to point out is
20 that in conducting these kinds of analysis that one
21 might do for a Section 2413, a radionuclide transport
22 analysis, I mean, it does require a characteristics,
23 subsurface characteristics like the hydraulic
24 conductivity, hydraulic gradient. And those
25 characteristics or attributes were determined on a

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1 site-specific basis for the ESP site. I just wanted
2 to make that clear.

3 JUDGE ELLEMAN: But distribution
4 coefficients were not determined?

5 DR, TAYLOR: That's correct, your Honor.
6 And I'd like to give you a little bit of background
7 information. The distribution coefficients are
8 element specific, and the difficulty at the ESP stage
9 is to know what your source of liquid is that could be
10 accidentally released. And what I found -- I've had
11 the benefit of looking at some other, actually doing
12 these analyses for some other sites, and what you see
13 is the contents, the isotopes presence, their
14 concentrations, are widely variable from design to
15 design. And also the tank that you might select to
16 look at in looking at a rupture scenario, the volume
17 of that is important. And that again becomes specific
18 to a particular design.

19 So with that background, it becomes very
20 difficult to know which elements you'd actually need
21 to do the KD analysis for. You know, take those
22 samples and send them to an offsite laboratory. It's
23 really not, I mean, in my experience, we've gotten to
24 some draft of a design certification document where
25 there's tables that I could go in and look at the

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1 contents of some tanks and actually figure out what
2 might be released into the ground water.

3 One other point I'd like to clarify. I
4 believe Judge Karlin asked a question about the slow
5 release versus accidental release. In doing these
6 types of analysis, what you always find is that,
7 assuming that you have this rupture instantaneously
8 and you're taking that whole inventory and putting in
9 the groundwater, assuming it's instantaneously, all of
10 this gives you more conservative results in assuming
11 that you've got a slow leak that might occur over
12 months or years.

13 JUDGE ELLEMAN: Because you saturate the
14 absorbing sites in the soil, and they move faster
15 because of that and for those kinds of reasons?

16 DR. TAYLOR: Just the sheer volume, the
17 sheer activity leads to higher concentrations at, you
18 know, surface water bodies or groundwater bodies.

19 JUDGE KARLIN: Let me ask on that. But
20 that would be a function of time, would it not? That
21 is to say if a slow release went undetected for
22 several years, you might very well end up with a worse
23 situation than a large release that was detected
24 within several weeks?

25 DR. TAYLOR: That's correct, your Honor.

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1 What I was trying to clarify was when one does the
2 analysis required for 2413 that the instantaneous
3 release gives you more conservative results than a
4 slow release.

5 JUDGE KARLIN: Within a same amount of
6 time?

7 DR. TAYLOR: Yes.

8 JUDGE KARLIN: Okay. Let me ask, maybe
9 you've already tried to answer this question, but
10 we've raised this question number 48 in the safety
11 inquiries and question number 50. The rest of the
12 plant associated with this application, this early
13 site permit application, the regs seem to ask and then
14 perhaps require the applicant to provide parameters,
15 plant parameters. Why do we not expect the plant
16 parameters for the different kinds of waste streams
17 and waste units? Could you not give us some
18 parameters for that, some assumptions, at this point?

19 DR. TAYLOR: Being a hydrologist, I can
20 only give you a limited perspective, and you might
21 want to follow this with a nuclear engineer. But in
22 the ESP application, I believe there were seven plants
23 considered, and some of those plants, the reality was
24 they were simply concepts on paper. So actually
25 trying to figure out a plant parameter envelope when

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1 only maybe two of those designs were somewhat realized

2 --

3 JUDGE KARLIN: Robust. Robust is the
4 word.

5 DR. TAYLOR: Okay. Robust. Would have
6 been difficult, and I don't think you could be
7 guaranteed that you'd come up with a bounding plant
8 parameter envelope. If there were seven and you had
9 information for two, I'm not convinced that you could
10 defend the resulting plant parameter envelope.

11 JUDGE KARLIN: Okay.

12 JUDGE ELLEMAN: But if you thought the
13 plant was going to be an ESPWR, which Dominion has
14 expressed some interest in, then you could probably do
15 it for that plant, could you?

16 DR. TAYLOR: Yes, you could, your Honor.

17 JUDGE KARLIN: Any more questions? I
18 think that's very helpful. I don't know that we have
19 any other questions at this point. Mr. Lewis, do you
20 have any clarification questions you would like to
21 ask?

22 MR. LEWIS: I would like to try one
23 clarification.

24 JUDGE KARLIN: Okay.

25 MR. LEWIS: Mr. Tarantino, Judge Elleman

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1 asked you about whether any samples were measured by
2 using chemical separation. Is my understanding
3 correct that for the measurements of strontium 89 and
4 strontium 90 that those measurements would have been
5 done by an offsite lab using chemical separation
6 techniques?

7 MR. TARANTINO: That is correct.

8 MR. LEWIS: That's all.

9 JUDGE KARLIN: All right. Thank you, Mr.
10 Lewis. I think, with that, we're going to call it a
11 day. It's been a long, warm day. We hope that the
12 air conditioning will get better as we go along. I
13 appreciate the time and effort that these experts put
14 into it and to answering our questions and your
15 patience. What we'll do is convene tomorrow at 9:00
16 sharp, and I guess we'll probably turn at that point
17 to topic number three, which is Tritium; is it not?
18 And the staff will be putting on its witnesses at that
19 time.

20 Oh, let me ask this before we adjourn
21 tonight. We had a break today of an hour and 15
22 minutes for lunch. I don't know whether that was
23 adequate, inadequate, or more than we needed,
24 depending on the restaurants and that sort of thing.
25 So I'd like your opinion on whether that's a fair

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1 amount of time, or you need more or less?

2 MS. POOLE: The staff found it adequate,
3 your Honor.

4 JUDGE KARLIN: Okay.

5 MS. POOLE: About the same time would
6 probably be in order.

7 JUDGE KARLIN: So you think we need an
8 hour and 15? Okay.

9 MR. LEWIS: We were boxing in sandwiches
10 to avoid taxing the local places.

11 JUDGE KARLIN: That's a lot of boxes.
12 Okay. So an hour and 15. You could even do an hour,
13 I suppose. You guys are efficient, right? All right.
14 We'll probably try and shoot for the same time, but we
15 like to get it moving as much as we can. All right.
16 With that, we will adjourn for the day. Thank you
17 all.

18 (Whereupon, the foregoing matter was
19 adjourned at 5:15 p.m.)
20
21
22
23
24
25

CERTIFICATE

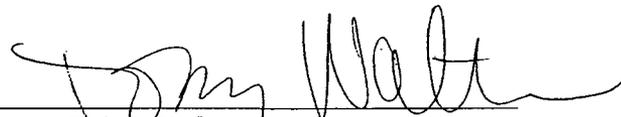
This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: Dominion Nuclear North Anna

Docket Number: 52-008-ESP

Location: Louisa, Virginia

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.



Toby Walter
Official Reporter
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