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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

5 (ACRS) 497th MEETING

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7 THURSDAY, NOVEMBER 7, 2002

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9 ROCKVILLE, MARYLAND

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11 The Advisory Committee met at the Nuclear
12 Regulatory Commission, Two White Flint North, Room
13 T2B3, 11545 Rockville Pike, at 8:30 a.m., Dr. George
14 Apostolakis, Chairman, presiding.
15 COMMITTEE MEMBERS:
16 GEORGE E. APOSTOLAKIS, Chairman
17 MARIO V. BONACA, Vice Chairman
18 THOMAS S. KRESS, Member
19 GRAHAM M. LEITCH, Member
20 DANA A. POWERS, Member
21 VICTOR N. RANSOM, Member
22 STEPHEN L. ROSEN, Member
23 WILLIAM J. SHACK, Member
24 JOHN D. SIEBER, Member
25 GRAHAM B. WALLIS, Member

1 ACRS STAFF PRESENT:

2 JOHN T. LARKINS, Executive Director

3 SHER BAHADUR, Associate Director

4 SAM DURAISWAMY

5 HOWARD LARSON

6 MAGGALEAN WESTON

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

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

2 8:33 a.m.

3 VICE-CHAIRMAN BONACA: Good morning. The
4 meeting will now come to order.

5 This is the first day of the 497th meeting
6 of the Advisory Committee on Reactor Safeguards.
7 During today's meeting the Committee will consider the
8 following:

9 One, proposed resolution of Generic Safety
10 Issue 189, "Susceptibility of Ice Condenser and Mark
11 III Containments to Early Failure from Hydrogen
12 Combustion During Severe Accident."

13 Two, Early Site Permit Process.

14 Three, Peach Bottom License Renewal
15 Application.

16 Four, Westinghouse AP1000 Design.

17 Five, Risk-Informed Improvements to
18 Standard Technical Specifications.

19 Six, Report Regarding Recent Operating
20 Events.

21 And, seven, Proposed ACRS Reports.

22 This meeting is being conducted in
23 accordance with the provisions of the Federal Advisory
24 Committee Act. Dr. John Larkins is the Designated
25 Federal Official for the initial portion of the

1 meeting.

2 We have received no written comments or

3 requests for time to make oral statements from members

4 of the public regarding today's sessions.

5 A transcript of portions of the meeting is

6 being kept, and it is requested that the speakers use

7 one of the microphones, identify themselves, and speak

8 with sufficient clarity and volume so that they can be

9 readily heard.

10 I will begin now with some items of

11 current interest. You have in front of you a handout

12 with a pink cover. In it there are six speeches by

13 Commissioners as well as two significant regulatory

14 activities which have been summarized in this

15 document.

16 Before I start, I would like to know if

17 there are any remarks or comments that members would

18 like to make.

19 (No response.)

20 If none, I would turn to Dr. Kress, who is

21 going to lead us through the Proposed Resolution of

22 Generic Safety Issue, GSI-189. Dr. Kress.

23 MEMBER KRESS: Thank you, Mr. Chairman.

24 Just a couple of words of reminder: We

25 had a good Subcommittee meeting on this Tuesday. Most

1 of the members were not there, but we should be
2 familiar with this issue because we had a meeting and
3 a letter back in June. So a lot has not changed.
4 If you will recall, we thought it would be
5 useful if they considered some of the uncertainties in
6 this issue having to do with whether or not to provide
7 a back-up diesel to the igniters for ice condensers
8 and Mark III containments. So they did some
9 uncertainty analysis, and they are here to tell us
10 what the results are and what their conclusions are.
11 With that, I will turn it over to you,
12 Jack.
13 MR. ROSENTHAL: Thank you. My name is
14 Jack Rosenthal, and I am the Branch Chief of the
15 Safety Margins and Systems Analysis Branch in
16 Research.
17 Allen Notafrancesco, from my staff, was
18 the Project Manager. He has expertise in hydrogen.
19 Jack Tills, sitting at the side table, is a consultant
20 to Sandia, and he did some MELCOR calculations and
21 some uncertainty calculations. John Lehner, from
22 Brookhaven, did the benefit analysis, and Jim Meyer,
23 sitting next to him, from ISL, did the cost analysis
24 of this issue.
25 In the interest of time, it was decided

1 that I should be the principal spokesman, but surely
2 we have all the right people here to answer questions,
3 should they arise.
4 GSI-189 is the "Susceptibility of Ice
5 Condenser and Mark IIIs to Early Failure from Hydrogen
6 Combustion during a Severe Accident." We limit our
7 thoughts to station blackout scenarios. The issue was
8 raised within the context of risk-informing 50.44.
9 Let me just interject: We are not
10 considering late containment failure -- I will get
11 into it more -- because there you reach questions in
12 non-condensable gas overpressurizing the containment.
13 There is little benefit in terms of late containment
14 failure, but only in terms of early containment
15 failure.
16 After Three Mile Island, we had a chance
17 to consider the issue of hydrogen random ignition,
18 power to igniters, et cetera. The short answer post-
19 TMI was there was plenty of power around at TMI and
20 that the conjecture about what would happen if there
21 wasn't power was put aside.
22 Then with NUREG-1150 we had a chance to
23 reconsider the need for igniters. Then with the IPE
24 reviews we had another chance, and there was a
25 containment performance improvement program that was

1 conducted in parallel with the IPE reviewers about
2 that time.
3 The latest information is about the year
4 2000, where we completed a report on DCH, and we are
5 revisiting it once again within the context of risk-
6 informing 50.44. So there is quite a history of the
7 issue.
8 We met with the ACRS on June 6th. You
9 sent us a letter that said go do more uncertainty
10 analysis, which we did, and we did it in the cost
11 area, in the benefit area, and in the hydrogen control
12 area. I think we did extensive analysis within the
13 timeframes that we are trying to fast-track a decision
14 on GSI-189. The Commission has asked us to move
15 expeditiously.
16 I am going to summarize the benefit
17 analysis, then the cost analysis, just touch on some
18 hydrogen control, which we discussed at length with
19 the Subcommittee, and then go to summary and
20 recommendations. I want to allow lots of time in the
21 summary and recommendations because there are issues
22 of to what extent should you rely on prevention versus
23 mitigation, et cetera. We would truly like to hear
24 the views of the full Committee on these issues. But
25 as I go through the presentation, I will point out

1 where some of these come up.

2 There are nine ice condensers, four dual-

3 unit sites and four Mark IIIs at single-unit sites.

4 So let's get into it.

5 The first thing on the benefits side is to

6 estimate the benefit of enhancing the gas control

7 system during a station blackout and to address the

8 ACRS's comments on uncertainty. Now we are following

9 the NRC's cost/benefit guidelines. Sid Feld is an

10 economist in our Division, and he is, in fact, the

11 author and tells us that we are doing this right.

12 There is reasonably recent threshold

13 legislation on data quality and consideration of

14 uncertainties in the decision. We think that we are

15 doing it right within that context also.

16 We are looking at averted risk to the

17 public, and it is in terms of man-rem or property

18 damage. The numbers are about equal for these two

19 aspects.

20 So what we do for risk reduction or

21 averted risk is to look at the increment attributable

22 to the enhancement. So we are only looking at station

23 blackout because in other scenarios, of course, the

24 igniters would already be powered. We are mindful

25 that this will affect early but not late containment

1 failure.

2 By early, I mean you have a station
3 blackout, and if you don't have auxiliary steam-driven
4 aux. feedwater and batteries, and things like that,
5 then you go to core damage in two, three, or four
6 hours. If you have the steam-driven aux. feedwater,
7 you've got your batteries, you go maybe eight hours.
8 Ultimately, either you restore power or the plant will
9 go.

10 That is what I mean by an early failure as
11 distinct from post-progression in the accident
12 sometime later, where you ultimately have a core melt,
13 vessel failure, core on the floor, non-condensable gas
14 production due to melting core concrete interactions
15 and then a late failure 12 or more hours in the event.
16 So we are thinking in terms of the earlier event.

17 MEMBER KRESS: I think it is important for
18 the Committee to understand the sequences we are
19 dealing with here. You gave a pretty good
20 description.

21 Now for station blackout sequences, and I
22 presume there are several of them, but you lose
23 offsite power coming in.

24 MR. ROSENTHAL: You lose offsite power.

25 MEMBER KRESS: Your diesels, which there's

1 two or three of them, fail to start.

2 MR. ROSENTHAL: Typically, fail to start.

3 The fail to run probability is very good. If they

4 start, they are likely to run. So failure to start

5 would dominate.

6 MEMBER KRESS: And the batteries aren't

7 hooked to the igniters?

8 MR. ROSENTHAL: At this point you are

9 living on your station batteries, but you are --

10 MEMBER KRESS: Yes, but that is for the

11 other safety --

12 MR. ROSENTHAL: For other safety

13 equipment. The igniters are not connected, are

14 powered off the emergency diesel buses, but not off

15 the station batteries. They would have to be manually

16 connected anyway from the control room.

17 You are sitting there with injection to

18 the steam generators, no ultimate decay heat removal

19 because you've lost everything but your batteries.

20 You have your instrumentation. You have the lights,

21 and now it is a great race: Are you going to restore

22 AC power offsite or repair onsite before you deplete

23 the batteries, the station batteries, and go to core

24 melt.

25 The station blackout frequency is

1 dominated by very short loss of offsite power events.
2 However, we did have Hurricane Andrew in which Turkey
3 was without power for days. So it is the long,
4 weather-induced station blackouts that should give you
5 some worry.
6 This is a mitigative fix. It does not
7 affect the --
8 MEMBER KRESS: When we talk about the
9 frequency and the initiating event in this study here,
10 does that just look at frequencies of long blackouts
11 or of all blackouts?
12 MR. ROSENTHAL: John?
13 MR. LEHNER: John Lehner from Brookhaven
14 National Lab.
15 We are looking at both fast and slow
16 station blackouts.
17 MEMBER KRESS: In other words, it is all
18 station blackouts?
19 MR. ROSENTHAL: All station blackouts,
20 yes.
21 It is mitigative effects, so we are not
22 changing the frequency of occurrence. The change is
23 in the conditional core damage probability, the
24 conditional containment failure probability due to the
25 fix, due to the change.

1 What we did was, in order to do
2 cost/benefit analysis, of course, you have to go to a
3 Level 3 PRA. This is somewhat problematic for us, as
4 I will discuss.
5 The approach really, given the timing, was
6 to use available information. Since we are putting
7 together station blackout frequencies, containment
8 failure probabilities, and consequence analysis from
9 various studies, we are not able to do a holistic,
10 full sensitivity study.
11 What you are going to see is a combination
12 of uncertainty analysis that was done for things like
13 the core damage frequency, along with some sensitivity
14 studies. I just take it as a whole. For perspective,
15 we try to show you some industry results, some IPE
16 results, some SPAR results, which are somewhat later.
17 In the study we assume that the igniters
18 would be 100 percent effective. I will get into that
19 when I talk about the cost side.
20 In terms of late containment failure,
21 although we are not taking credit for late
22 containment, for changing late containment failure, in
23 fact, if you can control the hydrogen, you buy
24 yourself time. You got farther out on the sequence,
25 so there is some time to recover and there is some

1 likelihood that you are going to repair equipment
2 onsite or, more likely, if you have gone eight hours,
3 you are going to recover offsite power.
4 So if you delay things, you do get some
5 improvement. There is also some small probability
6 that, all else happening, that to the extent that you
7 burnt off the hydrogen, there's less non-condensables.
8 So there is less overpressurization.
9 MEMBER WALLIS: Jack, if the containment
10 is going to fail anyway, why isn't the offsite
11 property damage the same whether or not it is early or
12 late? People you can evacuate, but the property
13 damage I would think would be the same.
14 MR. ROSENTHAL: Right. In your modeling,
15 buried in the assumptions of the MACCS code, you
16 really end up trading off person-rem and offsite
17 consequence. To the degree that you evacuate, you
18 reduce the person-rem, you run up the offsite
19 consequence cost for relocation, for moving people, et
20 cetera. So really it doesn't change.
21 MEMBER KRESS: And to some extent, the
22 late containment failure has a different source term
23 also.
24 MR. ROSENTHAL: And a different --
25 MEMBER WALLIS: Is that what changes the

1 property damage? What changes the property damage
2 between the two, between early and late?
3 MEMBER KRESS: Well, you get a lot of
4 cesium coming out early and that can do a lot of
5 property damage.
6 MEMBER WALLIS: It is the source term that
7 is different, that makes the difference?
8 MEMBER KRESS: More or less, it is going
9 to be the source term, yes.
10 MEMBER WALLIS: Explain to me why there
11 was this much averted risk from averting offsite
12 property damage if the containment failed a few hours
13 later.
14 MR. LEHNER: This is John Lehner from
15 Brookhaven.
16 The source term is usually quite different
17 from a late failure because you have had more
18 attenuation inside the containment, more weight out,
19 et cetera.
20 MEMBER WALLIS: Okay, so that's the
21 reason?
22 MR. LEHNER: Yes.
23 MEMBER WALLIS: It is not the time; it is
24 the source term?
25 MEMBER KRESS: But you have a good point.

1 I don't think this is considered. I don't think they
2 calculate the late containment failure and then
3 subtract that out of this number.
4 MEMBER WALLIS: So they may be giving
5 themselves more credit than they should?
6 MEMBER KRESS: We will ask them to answer.
7 MR. LEHNER: No, we did include late
8 containment failure. As a matter of fact, for the ice
9 condenser we ran a sensitivity case where we assumed
10 no containment failure, but we are not showing those
11 results. We are showing the results where there is
12 late containment failure.
13 MEMBER KRESS: Yes, but what you do is you
14 add again the benefits rather than subtract them.
15 MR. LEHNER: No, we did a case where you,
16 without the igniters, where you fail the containment
17 early and look at those consequences; then do a case
18 where you fail the containment late and look at those
19 consequences and subtract the two.
20 MEMBER KRESS: That was the question.
21 MEMBER WALLIS: Yes, I understand they did
22 that. I just wanted to know why it was different. It
23 is the source term difference. Thank you.
24 MR. ROSENTHAL: Which I want to touch on
25 in a moment.

1 Let me just point out that you do
2 cost/benefit within a set of prescribed guidelines.
3 For example, discount rates, et cetera, come from the
4 Office of Management and Budget. So they are standard
5 for government work.
6 We did a 7 percent discount, is the
7 numbers you are going to see. If you go to a 3
8 percent -- this is a sensitivity study -- then the
9 benefits would be 1.75 higher, about three-quarters
10 higher because your --
11 MEMBER KRESS: That is the guidelines in
12 the Regulatory Analysis Guidelines book. It came out
13 because historically the rate of inflation was about
14 7 percent, but for the last four or five years it has
15 been more like 3 percent. But you are using 7 percent
16 as your base and 3 percent as your sensitivity?
17 MR. ROSENTHAL: Right. So the numbers you
18 are going to see are 7 percent. Just keep in the back
19 of your mind that, if it would be 3 percent, that is
20 not quite twice the benefit because benefits out in
21 the future are worth more if the interest rate is
22 lower.
23 MEMBER KRESS: That's right.
24 MR. ROSENTHAL: But factors of two are not
25 -- our factors are two. We took a 40-year plant life,

1 assuming that everyone would go to life extension. If
2 you assume 20 years, there is about a 30 percent
3 difference again, because things out in the future are
4 just worth less than things that are more current. So
5 those are just things to keep in the back of your
6 mind, but I don't think that they sway the decision.
7 Let's get into 1150 a little bit more. I
8 am talking about internal events now. The mean core
9 damage frequency due to station blackout is about 10
10 to the minus 5. Let me point out that the 95th
11 percentile, 5 minus 5, the mean actually is closer to
12 the 95th than to the 5.
13 At the time that work was done there was
14 an expert elicitation --
15 MEMBER KRESS: In some of those 1150 cases
16 the mean turned out to be higher than the 95, which is
17 interesting, which means it is driven by the tails.
18 MEMBER WALLIS: I see. It is further from
19 the 5th than from the 95th on a linear scale. It is
20 just when you think logarithmically that it looks a
21 long way from the 5th.
22 MR. ROSENTHAL: Yes, when you look at the
23 distributions.
24 Eleven-fifty took credit for random
25 ignition. Clearly, if you are a full believer that

1 random ignition will always take place because there
2 is always some hot pipe or a spark, even though we are
3 in a blackout scenario, but if random ignition is 100
4 percent, then this proposed fix is worth nothing
5 because you burn off the hydrogen anyway.
6 There was an expert elicitation that took
7 place. It was documented in a separate report, which
8 is a back-up report for 1150. The experts came up
9 with a mean value of 15 percent. This is critical in
10 our thinking.
11 MEMBER ROSEN: Fifteen percent of the time
12 you will get random ignition?
13 MR. ROSENTHAL: I'm sorry, 15 percent of
14 the time that you have a station blackout, core
15 damaging event, you will have early containment
16 failure. That is dominated in an ice condenser by the
17 hydrogen.
18 I want to dwell on two slides which I am
19 going to show you twice. I know it is a busy slide,
20 but we are trying to spell our full understanding in
21 a tight place.
22 MEMBER KRESS: It might be useful to the
23 Committee to let them know that this is basically the
24 uncertainty part of the benefits in the equation.
25 That is why it is so busy. That is why there is so

1 much on there.

2 MR. ROSENTHAL: Going across this way, we

3 could look at changes in the station blackout core

4 damage frequency. Coming down this way, we can look

5 at differences in our understanding of a level of

6 containment phenomenology. I will get into the source

7 term in a minute.

8 Here we have the 1150 mean value, the 1150

9 95th percentile, and then from the DCH report, which

10 took no credit for random ignition and thought that

11 hydrogen would overwhelm direct containment heating,

12 they thought that early failure of containment would

13 be about .97.

14 Eleven fifty was done in 1985 and

15 represented the state of knowledge then. The DCH

16 report was completed in the year 2000, 15 years later,

17 and in some sense captures 15 years of further

18 understanding.

19 What you see in these boxes is the

20 incremental person-rem averted converted to dollars in

21 2000 dollars man-rem, plus the offsite cost. So that

22 what you are looking at is thousands of dollars.

23 Now I will get into the cost analysis

24 later, but what I would like you to think of, when you

25 are looking at this slide, is that we think that fixes

1 would be two, three, four hundred thousand dollars.
2 So anything that is around $300,000 would have a
3 cost/benefit ratio of 1. Things that are less than
4 $300,000 are just simply not cost beneficial of
5 themselves.
6 MEMBER WALLIS: Jack, could you point out
7 to the Committee which is, of the base -- 320 is the
8 base value before you -- based on the mean, right?
9 MR. ROSENTHAL: Three twenty is the mean
10 in NUREG-1150 based on assumptions where I am asking
11 you to just remember that there are some terms about
12 random ignition buried there.
13 MEMBER WALLIS: It is taking both means.
14 It is taking both means, a mean of probability of
15 event and containment failure?
16 MR. ROSENTHAL: Right.
17 MEMBER WALLIS: Three twenty is of the
18 base case there?
19 MR. ROSENTHAL: Yes, sir.
20 MEMBER WALLIS: Right.
21 MR. ROSENTHAL: But at least in my mind
22 one should not dismiss the direct containment heating
23 worth, which may be an equally credible representation
24 of reality.
25 MEMBER KRESS: To get that .96, .97, they

1 included pressurization due to DCH?

2 MR. ROSENTHAL: Right.

3 MEMBER KRESS: And then added hydrogen

4 combustion on top of that? Is that why it is so high?

5 MR. ROSENTHAL: Yes. Well, at the time of

6 vessel failure you have a lot of hydrogen that is --

7 MEMBER KRESS: That is secure inside the

8 vessel.

9 MR. ROSENTHAL: That is put out, and

10 you've got the hot --

11 MEMBER KRESS: So to believe that number,

12 you have to believe pretty heavily in the DCH

13 syndrome?

14 MR. ROSENTHAL: Yes. No. I'm sorry, no.

15 No, no, no. You believe that the hydrogen overwhelms

16 the DCH. The result of the report was that the real

17 risk is due to hydrogen --

18 MEMBER KRESS: I see. Okay.

19 MR. ROSENTHAL: -- and not due to DCH.

20 That is why DCH was dismissed in the report. I'm

21 sorry, I didn't say that as clearly as I should have.

22 MEMBER KRESS: Thank you for that

23 correction.

24 MR. ROSENTHAL: Okay, that is the random

25 ignition.

1 MEMBER KRESS: Now but in that case they
2 must have had a lot more hydrogen for some reason than
3 the NUREG-1150 people thought you had?
4 MR. ROSENTHAL: That I don't know. I
5 don't know. John, do you?
6 MR. LEHNER: I think one difference is
7 that there was no random ignition considered in that
8 at all. In other words, none of the hydrogen was
9 burned off. It just kept accumulating until it
10 ignited at vessel failure, whereas in 1150 --
11 MEMBER KRESS: So it was a high
12 concentration --
13 MR. LEHNER: It was a high concentration.
14 MEMBER KRESS: -- burning off ahead of
15 time?
16 MR. LEHNER: Yes.
17 MEMBER KRESS: Plus, they probably did
18 have more hydrogen, too. I could see how that --
19 MR. LEHNER: Yes.
20 MEMBER WALLIS: A kind of worst case. You
21 build it up and build it up and build it up until
22 you've got the maximum run and then you let it off?
23 MR. LEHNER: Yes.
24 MR. ROSENTHAL: Okay. Just going down
25 this line, we really had no way of taking a 95th on

1 the Level 2 and a 95th on a Level 1 because we weren't
2 involving a whole, entire analysis. But people
3 suggested that 10 times might be some sort of upper
4 boundary. And these are internal events.
5 Now Duke Power has been very cooperative
6 with us in providing information on what is in their
7 PRA. I wanted to give you a full picture.
8 So Duke starts with a mean early failure
9 of .29, which isn't that different than the .15.
10 Their mean value before plant mods is the 220,000. We
11 took their value and we said, well, what happens if
12 you use the 1150 source term? Duke and the NRC both
13 use MACCS, but Duke uses MAPP and 1150 used what was
14 the source code suite at the time.
15 I looked up -- 1150 at 29 percent of the
16 iodine released to the environment, and MAPP
17 calculation has 5 percent of the iodine released to
18 the environment. Because iodine and cesium just
19 dominate the health effects, that is enough to explain
20 the differences between the Duke and the NRC
21 calculation, is the assumptions buried inside of the
22 phenomenology and the progression and the retention of
23 just how much iodine is going to come out.
24 I can't stand here and say that the 1150
25 number is the right number, nor can I sit here and say

1 that the MAPP is the right number. But the spectrum
2 going between, let's say, the 220 and 790, a factor of
3 four, is attributable to alternate understandings of
4 that accident progression.
5 Then the last thing, which is really an
6 easy adjustment, if you adjust Catawba to the Sequoyah
7 site, you would end up with a multiplier of 1.8 just
8 on the population.
9 Okay, so then we go to look at Duke has
10 changed out their Westinghouse seals for the better
11 RCP seals. That buys you time. In the station
12 blackout scenario buying you time allows you time to
13 recover. They end up with a lower core damage
14 frequency.
15 There is an issue of a flood wall which is
16 important in their PRA. When they install that flood
17 wall -- I am sure that they will shortly -- they end
18 up with a mean value of 31,000.
19 What you see here is that you can drive
20 down the averted risk by driving down the core damage
21 frequency without doing the mitigation. So one of the
22 questions, one of the issues that we would like to
23 hear from you on is, to what extent should one
24 endlessly take credit for prevention, which is in some
25 ways preferred, over mitigation? We would like to

1 hear you on that.

2 MEMBER WALLIS: Now the flood wall has

3 such a big effect because the flood is the cause of

4 the core damage?

5 MR. ROSENTHAL: Yes.

6 MEMBER ROSEN: That is a very site-

7 specific consideration.

8 MR. ROSENTHAL: It is site-specific, but

9 some other plant could add a third diesel, add a

10 fourth diesel, ultimately end up dominated by common-

11 mode failure, but you can prevent -- conceptually, one

12 can make an endless round of preventive fixes.

13 MEMBER WALLIS: But the flood at Catawba

14 is a little unusual. I mean it doesn't presume this

15 is flood-sensitive. So it has about the same number

16 as Duke, as Catawba with the flood wall installed.

17 It is just that it seems to me that

18 Catawba is a little high because of the flood

19 sensitivity. When you remove that, then the core

20 damage frequency goes down significantly.

21 MR. ROSENTHAL: John?

22 MR. LEHNER: Yes. In Catawba most of the

23 station blackout frequency comes from the floods in

24 the area. By the way, that is an internal floods

25 scenario. That is not a hurricane-induced flood or

1 something like that. It is an internal flood
2 scenario.
3 But you're right, in Catawba it is a site-
4 specific situation where most of the station blackout
5 frequency comes from internal flood.
6 MEMBER WALLIS: Once you fix that, the
7 number looks much more modest than 31, and even 110 or
8 150 is still small compared with the 300 that you
9 started with.
10 MR. ROSENTHAL: Yes. I don't have DC Cook
11 numbers to show you, but conceptually DC Cook could
12 make those plant changes on the prevention side. That
13 would drive its number down also from wherever it is.
14 So I just look at this as some
15 representative cases. At least the issue in my mind
16 is you can drive down the risk by driving down the
17 prevention side, and what is this balance of
18 prevention and mitigation?
19 Okay, I am going to get back to this slide
20 in just a moment.
21 For Mark III, I assume that everybody has
22 this mental picture of a Mark III with a wetwell and
23 a drywell. In order to get a big release, you've got
24 to fail the wetwell. The drywell, our understanding,
25 our year 2000 understanding, is that if you are at

high pressure and you fail the vessel, the lower head, that between steam and you would discharge so much hydrogen that you would overwhelm even if you had igniters powered. You will fail the drywell, and then there is some probability, if you fail the drywell, that you do the structural matters; you fail the wetwell.

But the point is that the mitigative fix here of putting back-up power on the igniters is not going to work for high-pressure sequences. It will work for low-pressure sequences.

MEMBER RANSOM: Jack, could I go back? What is the reactor coolant pump seal? Why is that effective?

MR. ROSENTHAL: Okay. In the station blackout scenario, without pump seal cooling, you ultimately assume that you give yourself a LOCA, which could range from 30 gpm to -- I forgot what the numbers are -- maybe 400 gpm, depending on who assumed what.

Westinghouse came up with an improved pump seal package, and as plants worked on their plants over a period of time they changed out the seals for better seals, RCP seals. Changing out for better RCP seals reduced the likelihood of getting a small break

1 LOCA or a LOCA in the costly event. What you are
2 doing is you are buying time because you can recover
3 offsite or repair your diesels.
4 So that is why the pump seals, which
5 dominated -- it would be 23 or something, a very early
6 Generic Issue that took also decades to resolve, until
7 the better seals were taken credit for. So that is,
8 again, on the prevention side.
9 Now I don't have the equivalent of the
10 industry numbers to put up. So I am more reliant on
11 1150 for Grand Gulf. Ultimately, under the severe
12 action management process that NRR has undertaken in
13 the SAMDA, which is required as part of life
14 extension, the agency would learn more information.
15 Grand Gulf has a low internal core damage
16 frequency. At least in my own mind you have your
17 diesels, your normal big diesels. You have high-
18 pressure core spray with a diverse diesel, and it is
19 another way of putting water in the core. It is
20 something you can walk up and kick. So I don't think
21 it is an artifact of the numerical analysis, but it is
22 something you could reach out and touch.
23 Very similarly, the Mark IIIs have a very
24 deep suppression pool. At one time both GE and the
25 NRC independently bubbled fission gases through a

1 pool, and pool scrubbing really does work. So it is
2 a real feature.
3 So it is not surprising that the Mark IIIs
4 would come up with low consequences. I think that
5 some of that is truly real.
6 On the other hand, let me just point out
7 that the conditional probability of early failure is
8 like .5. You see low core damage frequency and weaker
9 containment.
10 Just to get some perspective, the NRC has
11 developed these so-called SPAR models. The Grand Gulf
12 number from SPAR is similar to the 1150 model, the
13 River Bend numbers, an order of magnitude higher --
14 I'm sorry, five times higher. That is not a QA'd
15 number, but it just gives you some perspective on the
16 way you have it.
17 MEMBER KRESS: Just a quick question on
18 the PWR results, just for my information. You noted
19 where the Duke plants had better CDF per station
20 blackout than 1150. If you go back to Sequoyah, if
21 you were to go to the Sequoyah people now and say,
22 "What does your current PRA tell us is your condition
23 of core damage frequency on station blackout," would
24 you get something different than, I think you said it
25 was, 1.5 times 10 to the minus 5? Would they tell you

1 some different number now, do you think?

2 MR. ROSENTHAL: Yes.

3 MEMBER KRESS: It would be more like 1

4 times 10 to the minus 6 or something? Maybe a factor

5 of 10 lower than what NUREG-1150 --

6 MR. ROSENTHAL: Everybody was in the

7 process of putting in the better seals, looking for

8 things that they could do.

9 MEMBER KRESS: What I am searching for is

10 another sensitivity input. That would be another one,

11 going to the actual plant and saying, "What's your CDF

12 condition on core damage on station blackout?"

13 MEMBER WALLIS: What you are saying is

14 that with the more recent CDF from the plant, that

15 number 320 would decrease? You would expect it to

16 decrease?

17 MEMBER KRESS: That was my implication,

18 yes.

19 MR. ROSENTHAL: It would decrease.

20 I just want to make the point that, if you

21 fail the wetwell and you scrub for the pool, you still

22 have low releases. So you are really concerned about

23 containment and drywell failure.

24 I told you, I explained why it doesn't

25 affect the high-pressure sequences. You overwhelm and

1 you fail anyway. But if you have igniters powered,
2 and here's a scenario where they would be continuously
3 powered, then it is believed that the igniters would
4 be effective.
5 MEMBER WALLIS: Those numbers of about a
6 half look to me like expert judgments.
7 MR. ROSENTHAL: They were. Well, all I
8 can say is this is my state of knowledge after --
9 MEMBER WALLIS: It just seems to me
10 strange that these containment failure numbers are so
11 much subject to expert judgment and estimate. You've
12 got these .5 and .2, .01. I mean pick your number,
13 either 1 percent, 20 percent, 50 percent. So they are
14 not based on a more thorough analysis.
15 MR. ROSENTHAL: Now the expert
16 elicitations that were done at the time of 1150 were
17 based on -- they just weren't guesses. I mean people
18 were provided with information, with the hydrogen
19 concentration as a function of position. There were
20 questions about -- they were very informed expert
21 judgments. But that is the state of it.
22 As a total aside, it would not be bad to
23 go back now, 15 years, 17 years after 1150, with a
24 fair amount of money and do an update once again, but
25 that is a programmatic issue. I have to deal with the

1 information I have before me.

2 Here is the averted person-rem. I'm

3 sorry, the averted cost/benefit in thousands of

4 dollars. You have to compare this to fixes that would

5 cost, two, three, to four hundred thousand dollars.

6 There is an issue here of, what's the

7 proper split between high-pressure and low-pressure

8 scenarios? If you say that all scenarios are low-

9 pressure -- okay, it is just a function of you open up

10 the SRVs. Can you keep the SRVs over it? You

11 ultimately run out of air and battery, and it already

12 closed. Or do you have some other failure of the

13 system that causes you to keep it open? But if you

14 would say that everything is at low pressure, then the

15 170 becomes 340, which is of the order.

16 What else did I want to say? In my own

17 mind if you are going to believe these numbers, then

18 what you have to say is you understand the initiating

19 event frequency and you understand the phenomenology

20 to the degree that I portrayed a little bit earlier.

21 Let's go to the next slide. So if you

22 look at Sequoyah and Grand Gulf and say, what's the

23 difference, Grand Gulf has got a lower CDF. The

24 containment accounts -- this is scrubbed release, and

25 the population accounts for a factor of five.

1 If you would go to Perry as another site,
2 that is a much higher population site than Grand Gulf.
3 So the multiplier, instead of five, would be one. So
4 you would say that Perry would be, let's say, six
5 times better than the equivalent at Sequoyah rather
6 than thirty times better. But that is sort of like,
7 how do you get to where you think that the total
8 factor difference is a factor of thirty?
9 Okay, I want to go even faster on the cost
10 side, if I may. I was an advocate of you could go
11 down to Trac Auto, you buy yourself a diesel, you
12 throw it on the back of the truck. You bounce it
13 around all the time, so it is by use seismically
14 qualified. You get some cables, you know, like jump-
15 start cables, and you run in and you connect up a
16 plant. In fact, it is far likely that they have some
17 sort of power source on a site like this. So the
18 costs were going to be very low, in my mind and in the
19 mind of others, that we would be really talking about
20 very, very small cost.
21 We asked ISL to do a legitimate
22 cost/benefit analysis. They correctly told us any
23 engineering is going to cost you 50 grand. Any sort
24 of training, put some procedures in place, is another
25 50 grand, some up to 100 grand. The equipment is

1 another 50 grand. So let's not quibble about, is it
2 a little bigger diesel or a little bit smaller diesel,
3 because the whole hardware is another 50 grand.
4 You can't just go touch your 1E electrical
5 circuits with impunity, so you need some sort of
6 scheme where you shed -- open up a breaker, open up an
7 existing breaker that connects the igniters to what is
8 now an unpowered switch gear and close some other sort
9 of breaker for some sort of isolation. You've got to
10 install some sort of panel.
11 They go through all the relevant costs,
12 and they come up with numbers that are of the order of
13 two, three, four hundred thousand. They have done a
14 sensitivity study, but the decision doesn't really
15 rest on the details.
16 MEMBER LEITCH: Jack, the last time we
17 talked there was a question about whether the fans
18 also had to be powered or not.
19 MR. ROSENTHAL: We believe that they
20 don't --
21 MEMBER LEITCH: They do not?
22 MR. ROSENTHAL: -- and I will get into
23 that in just a moment.
24 MEMBER LEITCH: Okay, okay. So diesel
25 sizing, the price, and all is based on just powering

1 the igniters, not the fans?

2 MR. ROSENTHAL: Yes, sir.

3 MEMBER LEITCH: Right.

4 MR. ROSENTHAL: Yes, sir.

5 MEMBER ROSEN: But the key point is, no

6 matter what you do, the size of the diesel is

7 irrelevant. You've got to do those other things if

8 you are going to tap into a safety-related bus. It is

9 going to be 150, 250, 300 thousand dollars by the time

10 you are getting this really in place.

11 MR. ROSENTHAL: Yes. So I stand

12 corrected. I mean, think in terms of like 300K --

13 MEMBER ROSEN: Yes.

14 MR. ROSENTHAL: -- not in terms of 30K.

15 We spoke about a portable diesel as a sort

16 of base case. We realized that it is better to think

17 in terms of pre-staged as the base case. These

18 wouldn't require the air returns to be -- we also

19 looked at passive autocatalytic converters,

20 recombiners. There are small differences due to

21 single-unit/dual-unit sites, common engineering, et

22 cetera.

23 But I think that we did our homework, and

24 then having done our homework, I realized it really

25 doesn't matter to the decision process. I think the

1 details don't because, when I look at these, which, as
2 I say, are based on sound -- it is sound work that
3 they did. You have to scope out some sort of scheme
4 in order to do a cost/benefit analysis. We recognize
5 this is nobody's final design.
6 It is likely that NRC requirements would
7 be in terms of performance requirements. Nobody is
8 going to say go buy a specific piece of equipment.
9 I see all these numbers for the ice
10 condenser and the Mark III are about 300K except for
11 the passive autocatalytic recombiners, which are quite
12 more expensive. That is the sort of message I wanted
13 to leave you with.
14 I am going to need more help. We are
15 doing good on time, because I want to just speak to
16 the hydrogen control issues for just a moment, and
17 then go to, how do we make a decision? That will be
18 the last half-hour.
19 MEMBER KRESS: That sounds good.
20 MR. ROSENTHAL: Dr. Kress advised me that
21 that really is the crux of the matter.
22 For the hydrogen assessment, we did two
23 things. One, as part of the 50.44 work, we had used
24 our latest version of MELCOR, did sensitivity studies,
25 and thought we were coming up with our best shot of

1 hydrogen source terms, which are of the order of 50 to
2 60 percent of the zirc-water interaction. You
3 actually don't get up to the 75 until you throw in an
4 ex-vessel. By the time you add any ex-vessel, maybe
5 you are up at a hundred, or actually a little bit
6 lower.
7 But that was to do our best shot on
8 MELCOR, and then we were able to do a number of
9 calculations of what would go on inside containment
10 using MELCOR. Then Tuesday there was a fair amount of
11 discussion about MELCOR would seem fine for diffusion,
12 but MELCOR doesn't really handle DDT, and there were
13 other insights. We can get into that.
14 They did a formal uncertainty assessment
15 with this. We have a range of hydrogen sources to
16 containment. I do want to point out that you are
17 talking about three hours or more into the event when
18 you start failing the core and oxidizing the core on
19 the MELCOR side.
20 So here was pressure. The red line goes
21 up to seven atmospheres. The containment -- I'm
22 sorry, this is absolutes. So then the containment is
23 minus 15. So it would be two atmospheres.
24 What this says is that there is a very
25 high belief that, if you don't have the igniters

powered and you do have a hydrogen burn, you will fail containment. This is like the 95th, 99th percentile. You know, seven atmospheres design, and what have you, you're going to fail containment.

MEMBER WALLIS: What initiates the burn here?

MR. ROSENTHAL: Excuse me?

MEMBER WALLIS: What initiates the burn? It seems to me important when it burns.

MEMBER KRESS: Vessel breach.

MEMBER WALLIS: What?

MEMBER KRESS: Vessel breach blows out hot metal.

MEMBER WALLIS: Vessel breach initiates the burn, okay.

MEMBER KRESS: Is this static overpressure?

MR. ROSENTHAL: This is static, and this came up at the Subcommittee meeting. On a timescale of hours, it looks like a spike, but on a timescale of milliseconds this is a quasi-static burn.

MEMBER LEITCH: Would I then be correct to say that, if you had an alternate power supply, if it wasn't permanently hooked up but something you had to work a little bit to get powered --

1 MR. ROSENTHAL: Right.

2 MEMBER LEITCH: -- that if you didn't

3 power it up within about three hours --

4 MR. ROSENTHAL: Two or three hours.

5 MEMBER LEITCH: -- it is not going to do

6 you any good? In fact, you're going to --

7 MR. ROSENTHAL: In fact, back in 1150

8 there were even considerations about the operators

9 making a mistake. Will they do it late? This is a

10 certain probability, in which case you are in deep

11 trouble.

12 MEMBER ROSEN: Yes, but, Graham, in free

13 states diesel and all those other things he showed us,

14 it seems to me capable of being powered up within

15 three hours. Is that your view?

16 MEMBER LEITCH: I would think so. It

17 depends on -- I mean, you've got a pretty bad event

18 going on and operator distractions and everything

19 else. But, I mean, I would think you could get it

20 powered up certainly before that -- remember that was

21 two-and-a-half hours or something before the hydrogen

22 really starts taking off there.

23 MEMBER WALLIS: Why are these igniters so

24 complex? Couldn't you just fire off one -- why work

25 in --

1 MR. ROSENTHAL: There are GM glow plugs --

2 MEMBER WALLIS: Yes, couldn't you fire off

3 a charge of some sort, a firework, launch a rocket

4 into the containment?

5 MR. ROSENTHAL: One, you need to have

6 enough dispersed sources so that you are burning off

7 the concentration -- you are keeping the concentration

8 in all the subcompartments small. So you wouldn't

9 want one spark plug, glow plug, but rather you needed

10 a dispersed set.

11 We also concluded that one train, one full

12 train, was adequate in terms of powering this, but you

13 need the full train and that you wouldn't want just a

14 single spot.

15 MEMBER WALLIS: That's the whole basis of

16 the .15 average containment failure estimate, is that

17 those experts considered that some sources, hot places

18 in the building, would set off fires before the big

19 burn. That's the whole basis of it, isn't it? So

20 anything that sets off a little fire earlier helps

21 you.

22 MR. LEHNER: Could I just interject? Some

23 of those premature burns actually led to containment

24 failure of themselves. So it is not necessarily

25 always helpful.

1 MR. ROSENTHAL: There's a phenomenon
2 called deflagration to detonation, which I was hoping
3 not to get into.
4 My other point was simply, and this is
5 just a representative case, is that we thought that if
6 you can control the hydrogen, which is the blue line,
7 then you would keep the mole fraction reasonably small
8 and avoid -- you would burn it off.
9 Then we looked at what the air return fans
10 might be worth, and that is the green line.
11 MEMBER ROSEN: I'm puzzled by that curve
12 a lot. I mean, why is kind of -- it is not bad, but
13 why is it a little worse with fans than without? Am
14 I seeing the colors wrong?
15 MEMBER WALLIS: Well, it is the upper
16 containment hydrogen control. It depends on the
17 hydrogen. The hydrogen varies throughout the
18 containment. You are looking at a particular place
19 here.
20 MEMBER ROSEN: Oh, okay. So in the upper
21 containment it is worse with igniters and fans?
22 MR. ROSENTHAL: Overall, what you have to
23 do is look at what you think would be the mass flow
24 rate due to just natural phenomena and circulation in
25 the containment. Then you add on -- if you add the

1 air return fans on, what is the change in the mass
2 flow rate and the velocity through the whole system?
3 It is a reasonably small change with the air return
4 fans.
5 Let me point out, though, the air return
6 fans were originally there for design basis events.
7 They are long before the --
8 MEMBER KRESS: They were there to enhance
9 the ice condenser's capability to commence steam.
10 MR. ROSENTHAL: The bottom line, we did
11 discuss at the Subcommittee the likelihood of
12 detonation or deflagration to detonation as distinct
13 from hydrogen burn. But my bottom line is that you
14 need to control the hydrogen control to keep the
15 containment. That is really the bottom line.
16 I am going to slow down now. Dr. Kress
17 suggested that we allow lots of time to talk about the
18 decision as distinct from the details of the
19 phenomenology, which are described in the reports that
20 we gave here.
21 Our recommendation is that to cope with
22 station blackout events, we should pursue further
23 regulatory action for the ice condensers and the Mark
24 IIIs. In the current process, if we concluded that
25 there was no further action that was needed, we would

1 write a letter to the EDO and close out the Generic
2 Issue. If we conclude that further action should be
3 taken, at that point NRR would undertake their work,
4 us having completed our technical work.
5 Further regulatory action might take the
6 form of rulemaking, plant-specific backfit. It could
7 take many forms. We, RES, would not prescribe the
8 form of that action to NRR.
9 But in talking, we believe that any action
10 would be more of a performance-based and it would not
11 be very prescriptive in terms of the details of the
12 hardware.
13 MEMBER LEITCH: So what kind of success
14 would you assume this back-up power supply would have?
15 MR. ROSENTHAL: Well, we were thinking
16 that you could achieve .95, .98 success. So that
17 earlier, maybe a couple of months ago, we were worried
18 about what the reliability was. It really is
19 irrelevant if it is 1 or .98 or .95 when I am sitting
20 here saying I don't know if random ignition is .15 or
21 .97 and that in my own mind that those are both
22 equally likely and plausible numbers. So that the
23 uncertainty in my mind is tied up in your
24 understanding of the Level 2 containment
25 phenomenology.

1 MEMBER LEITCH: But this back-up supply
2 would not be --
3 MR. ROSENTHAL: One train, non-safety
4 grade.
5 MEMBER LEITCH: Yes, non-safety, no
6 prescribed surveillance test.
7 MR. ROSENTHAL: You would have to do some
8 sort of surveillance and testing, and whatnot, to be
9 determined, to know that it is there and hasn't been
10 lost over the years.
11 MEMBER LEITCH: Right, right.
12 MR. ROSENTHAL: But it would be
13 surveillance and testing consistent with what we have
14 said to the industry about SAMDA.
15 MEMBER LEITCH: About what?
16 MEMBER ROSEN: Severe accident mitigation.
17 MR. ROSENTHAL: Severe accident
18 mitigation.
19 MEMBER LEITCH: Okay, yes, right.
20 MR. ROSENTHAL: I mean, it would be in
21 that world. In fact, you don't want another dual-
22 valve diesel. You want something small and diverse
23 and different because you got in trouble in common
24 cores.
25 VICE-CHAIRMAN BONACA: The question I had

1 was now the seals have been improved, as you
2 mentioned --
3 MR. ROSENTHAL: Right.
4 VICE-CHAIRMAN BONACA: I am trying to
5 understand the combination of the improvement in seals
6 at a time we spoke about here of how soon do you have
7 to hook up. Do they contribute, the two things
8 together, to the 96 percent success that you are
9 mentioning there?
10 MR. ROSENTHAL: The hardware guys said
11 that they can go out and buy commercial grade, high-
12 quality commercial grade, not safety grade, and
13 achieve reliabilities of, let's say, .98. In
14 discussion we realized that it doesn't matter if it is
15 .98, .99, .95 compared to what is driving the
16 decisions.
17 VICE-CHAIRMAN BONACA: I understand.
18 MR. ROSENTHAL: I have this slide and I
19 have another one for ice condensers. I am going to
20 rock back and forth, and this is the end of the
21 presentation.
22 The hashed values -- maybe we should have
23 used color -- the hashed values are cases where we
24 think that the benefit exceeds the cost. Where the
25 cost is two, three, four hundred thousand dollars, if

1 I go out to the 95th percentile because I'm risk-
2 averse, I can make an argument to do it. Dr. Kress
3 said that maybe you should look at the 5 percent. I
4 will tell you, there was some discussion of taking the
5 5 -- before we saw you, of not even showing the 5
6 percent because it confused the situation and, as
7 regulators, we should be risk-averse and think on the
8 95 percent.
9 Dr. Kress at the Subcommittee meeting
10 pointed out that, wait a minute, this is an
11 enhancement. As an enhancement, maybe you want to err
12 the other way.
13 I personally think that you want to worry
14 more about the 95th. Let me point out that I think
15 that the mean in the 95th are likely closer. So it is
16 not a bad basis for the decision.
17 This is internal events. You should get
18 some additional credit for external events.
19 MEMBER WALLIS: Did you face the 1.174
20 issue that Dr. Kress raised, that given that you had
21 put it in at Duke, then they could apply to have it
22 taken out using 1.174 because there's no probabilities
23 involved? They would use a mean. They wouldn't use
24 some extreme value.
25 MR. ROSENTHAL: We don't think 1.174 is

1 the realm of backfit. Alan Rubin, Alan is a
2 colleague --
3 MR. RUBIN: Alan Rubin, a member of the
4 PRA Branch of Research.
5 As a result of the Subcommittee meeting,
6 and even before that, we looked at what the
7 requirements are of the backfit regulation. In order
8 to have a backfit in the 50.109, it says you need to
9 demonstrate substantial improvement and safety and
10 then consider cost/benefits to see that the benefits
11 are consistent with what the estimated costs are.
12 If you make that determination and require
13 backfit, then that would preclude somebody coming back
14 and saying in the Reg. Guide 1.174's space that you
15 would be permitted to take out this modification that
16 the agency said was required to put in, to be a
17 benefit that the agency considered to be substantial.
18 So there is that check-and-balance issue.
19 You don't go in this bureaucratic circle of requiring
20 something be put in and then permitting it to be taken
21 out because it was a marginal increase in risk.
22 MEMBER KRESS: You know, that is sort of
23 regulatory stuff. My point was that, if you take the
24 mean numbers for CDF -- well, for LERF anyway -- for
25 the Catawba plant as the bottom line with these

1 improvements, take the mean LERF that it has now, and
2 you look at the delta LERF, assuming this device is
3 already in there, and you look at the LERF that
4 results from having the device, and then you take it
5 out and look at the delta LERF you get due to taking
6 it out, and then you look on the 1.174 guidelines, you
7 would conclude that they could take this thing out on
8 a risk-informed basis.
9 Now all this regulatory controls and stuff
10 doesn't matter to me because there is no reason
11 somebody can't come back later with the 1.174 and say,
12 "We want to take this out. We don't need it, and we
13 can justify it on the basis of 1.174." The regulatory
14 space ought to allow them to do that.
15 If they could take it out, it is kind of
16 crazy to make them put it in the first place. That
17 was my point.
18 MR. RUBIN: Well, I certainly agree with
19 that. If they could take it out, it would be not
20 prudent to require them to put it in.
21 MEMBER KRESS: I didn't actually run the
22 numbers. I just looked at them in my mind and then
23 did them.
24 MR. ROSENTHAL: I think you're right. The
25 difference in your mind between the 150 and 540 has

1 got to be in your understanding that the 150 is based
2 on 5 percent iodine released in the environment, that
3 the 540 is based on 29 percent release to iodine.
4 MEMBER WALLIS: But, Jack, why do you
5 start with that? Because I know that Duke is
6 installing a flood wall. I know, then, that in a
7 couple of years it is going to be 31, not 150.
8 MR. ROSENTHAL: It will be 31 or is the 31
9 really 110? I am not going to move the plant from one
10 location to another. Is the 31 really 110 due to just
11 your understanding of iodine, and is the 31 versus a
12 number that is 300 or 500 tied up in your
13 understanding of what is going on in terms of hydrogen
14 phenomenology inside containment?
15 So it becomes a matter of how well do I
16 think I know the containment phenomenology, how well
17 do I think I know the source term. If you have
18 cost/benefit ratios that are less than .1 or greater
19 than 10, it is easy. Unfortunately, we are stuck with
20 values that are -- well, the 31 is an order of
21 magnitude lower, right? But as soon as they start
22 asking other questions, I end up 100 and 300; we're in
23 a judgment area.
24 We would like your advice. As I say, one
25 of the issues that is driving it is, can you do

1 preventive fixes, which we say are preferred, and
2 drive down the frequency? Do you have to have a
3 balance in mitigation, and what is that balance? Is
4 defense-in-depth having multiple diesels and
5 procedures and things like that or does defense-in-
6 depth say that you need some sort of diversity called
7 the containment? I think that those are the issues
8 now that really are driving the decision process.
9 We can go back -- I personally think we
10 have done enough number crunching over 20 years, that
11 it is time to make a decision.
12 MEMBER ROSEN: Well, I agree with that 100
13 percent.
14 MEMBER LEITCH: Jack, shortly after our
15 last Subcommittee meeting, we had an opportunity to
16 tour an ice condenser plant. We went into the
17 simulator. I asked the guys how they would go about,
18 in a station blackout situation, how they would go
19 about powering up these igniters.
20 They had some interesting rabbits that
21 they could pull out of the hat. I mean, even after
22 you've lost all site power and the safety grade
23 diesels, they had other sources of power that they
24 could --
25 MR. ROSENTHAL: Sure.

1 MEMBER LEITCH: I am just wondering, if we
2 looked at these plants -- and there are not 100 of
3 them, fortunately; there's nine units or so -- if it
4 is not amenable to a plant-by-plant solution; some of
5 these plants may have station blackout diesels that
6 could be somehow utilized.
7 MR. ROSENTHAL: Yes.
8 MEMBER LEITCH: In other words, I guess
9 what I am saying is, isn't this amenable to a solution
10 that says: Think about this, guys, and see if you
11 can't figure out some way or some emergency procedure
12 to power up these things?
13 MR. ROSENTHAL: Yes, right. Absolutely,
14 and maybe when I was saying that we would have
15 finished our technical analysis, and it would now go
16 to NRR; NRR could choose plant-specific or generic
17 backfit. From discussion with my colleagues in NRR,
18 I know that we would try to come out with some sort of
19 performance-based criteria rather than saying: Go add
20 another active power source.
21 I would imagine the plants could then --
22 as you said, what are all the alternate rabbits that
23 would fulfill the performance-based criteria? So
24 there is still room, yes.
25 MEMBER LEITCH: Okay.

1 MR. ROSENTHAL: Based on just a cost --
2 here are the Mark III numbers. Just because of our
3 understanding of pool scrubbing, pool bypass, the
4 wetwell versus drywell failure, et cetera, the fact
5 that they have hit this, it is even harder to make a
6 cost/benefit argument.
7 MEMBER ROSEN: But don't go away from that
8 slide for a minute. You've got a couple of values
9 shaded down in the lower righthand corner.
10 MR. ROSENTHAL: Yes, sir.
11 MEMBER ROSEN: That is really the basis
12 for your including these plants in your
13 recommendation?
14 MR. ROSENTHAL: That's part of my basis.
15 MEMBER KRESS: You might give that little
16 speech that you gave that I liked.
17 MR. ROSENTHAL: Yes, sir, okay. So now,
18 in fact, can I have the two back-up slides of the Mark
19 III and the ice condenser?
20 Let's say that you strip away your
21 knowledge of what you think you know about containment
22 phenomenology, that it is just uncertain. Then you
23 say that you have weaker containments, metal
24 containments, atmospheric design pressure.
25 Here's an ice condenser, right. Let's

take and morph the ice condenser into a Mark III. They are both steel-lined. They both have about the same design pressure. They both have about the same free volume.

In one case I have a circle of ice, not a circle, a ring or annulus of ice surrounding it. In the other case I've got an annulus of water surrounding it. So you say, if I really don't understand the phenomenology, these aren't that different. They are small and they are weak containments; that station blackout is very important to total core damage frequency, and that you shouldn't be in a situation where you on some plants, like Grand Gulf, in NUREG-1150, that was 95 percent of the core damage frequency, was station blackout, that you shouldn't be right in there with a weak containment that you think is going to fail, relying solely on a low probability of occurrence.

So that is an extremist -- that is a perception where you have to strip yourself of what you think you know about the phenomenology. So that is a weak containment.

Yes, sir?

MR. NOTAFRANCESCO: Just one other point along those lines. I am Allen Notafrancesco.

1 BWRs have a lot more zirconium, about four
2 times the inventory of hydrogen, which weighs into
3 this.
4 MR. ROSENTHAL: So I was doing a "Fiddler
5 on the Roof" type of exercise, where I said, hey,
6 follow the backfit process, which would say put more
7 weight on the means than on the uncertainties. It
8 tells you to pay attention to the uncertainties, but
9 it doesn't tell you what to do other than pay
10 attention.
11 On the other hand, I say, wait a minute,
12 these are weak containments with high containment
13 conditional core damage frequencies. On one side, I
14 say prevention is preferred to mitigation because it
15 saves the plant. In fact, we have said that in
16 regulatory space. On the other side --
17 MEMBER WALLIS: That doesn't exactly save
18 the pond. You are going to fail the containment
19 anyway. It is just a question of time. Isn't that
20 true?
21 MR. ROSENTHAL: I'm sorry, if I put my
22 eggs in prevention, I save the plant.
23 MEMBER WALLIS: Oh, I see. You mean don't
24 let it happen at all?
25 MR. ROSENTHAL: Yes. Well, I reduce the

1 -- I don't change the station blackout -- I'm sorry,
2 I don't change the offsite power frequency.
3 MEMBER WALLIS: Your igniters don't save
4 the plant?
5 MR. ROSENTHAL: Correct.
6 MEMBER WALLIS: They just change the
7 scenario?
8 MR. ROSENTHAL: Yes, sir.
9 MEMBER KRESS: But, Jack, it seems to me
10 like this discussion you just had was basically the
11 reason they passed the station blackout rule in the
12 first place and came up with the fixes to the thing
13 because of this. That is where you already have your
14 defense-in-depth built in, I think. It is just
15 because of the reason that you said, I think, mostly.
16 So we already have a station blackout rule
17 that deals with this. Now we are talking about a
18 different arena. That is a little bit of enhancement.
19 MR. ROSENTHAL: The goal of the station
20 blackout rule was a core damage frequency of about 3
21 minus 5. Presumably, plants meet that or do better.
22 Is defense-in-depth in the mitigation or
23 defense-in-depth in the multiple means of prevention?
24 That is a decision process that we are going through
25 right now.

1 MEMBER KRESS: Yes. Once again, we fall
2 back on, just what is defense-in-depth and where do
3 you put it, and how much is the right amount? It is
4 always an issue we wrestle with. I am not sure we
5 know yet the answers to that.
6 MEMBER WALLIS: I think we also have to
7 ask about risk-informed regulation and what does this
8 tell you. It tells you that you shouldn't impose
9 small enhancements that don't really contribute to the
10 risk status of the plant. Isn't that the
11 interpretation that is usually given to it?
12 VICE-CHAIRMAN BONACA: Well, I think Reg.
13 Guide 1.174, I mean, has also an integral
14 decisionmaking process that has considerations --
15 MR. ROSENTHAL: Back when Sniezik and
16 company were promulgating 50.109 with the backfit
17 rule, there were two things, substantial improvements,
18 and that it be cost/benefit --
19 MEMBER WALLIS: So where's the
20 substantial --
21 MEMBER KRESS: The substantial
22 improvement, though, was predicated on CDF. They
23 didn't know about LERF then. So this is not a CDF
24 issue, it seems to me. You really can't make a
25 substantial improvement argument based on CDF here.

1 MR. ROSENTHAL: Right, but, clearly, they
2 didn't want nickel-and-dime fixes. I mean, even if it
3 was cheap, if it didn't change things, they didn't
4 want to impose a lot of little things.
5 MEMBER KRESS: Yes, but I maintain that
6 this substantial improvement guidelines, which has
7 your CDF chart in it and decision boxes, should have
8 had a LERF box, too, just like 1.174. Then if it had
9 one that was appropriate and consistent with the
10 safety of those, that you would have gone into it and
11 probably come out with a decision that this was not a
12 substantial improvement. Then you would have stopped
13 right there. You would have missed that screening.
14 You wouldn't have had to go to this cost/benefit.
15 I think that would have been the case. I
16 am speculating because I don't know what the numbers
17 actually turn out to be. We don't have such a box in
18 the regulatory decision process. I say there ought to
19 be a box like that.
20 MR. ROSENTHAL: We have not communicated
21 -- we are agonizing over a decision, and I have yet to
22 communicate that decision to either the EDO or NRR,
23 and say I think the number crunching has stopped. So
24 we look forward to your views, and we would like a
25 letter.

1 MEMBER KRESS: Since you have asked for
2 our views, particularly on how to go about making the
3 decision and what we think, I am willing to throw the
4 floor open to the Committee. I don't want to put
5 anybody on the spot right now because we haven't
6 discussed it and go around and say, "What's your view?
7 What's your view?" But if anybody wants to volunteer
8 a view at this point, before we have our own internal
9 discussions, why, I would sure welcome that at this
10 point.
11 MEMBER ROSEN: Yes, I have a view. I
12 think, for one thing, and I have said it already, you
13 have certainly done all the analysis a man could ever
14 want.
15 MEMBER KRESS: Yes, that's clear. That's
16 clear.
17 MEMBER ROSEN: We've got paralysis by
18 analysis at this stage. So we want to get off the
19 dime one way or the other.
20 MEMBER KRESS: With one exception to that.
21 I would have thought they might have gone back to each
22 of these licensees and said, "What's your current PRA
23 tell you about your conditional CDF on station
24 blackout and your conditional early containment
25 failures?" I would have thought that would have been

1 another input they might have looked for.

2 MEMBER ROSEN: The issue of prevention

3 versus mitigation, if you have a small class of

4 licensees who have this issue and you say, "Well, we

5 will let you get away with prevention. You don't have

6 to do this mitigation," but don't you have to have a

7 regulatory process where they commit some sort of

8 additional prevention feature that says, "Okay, I

9 won't do the standby diesel, or whatever you have

10 recommended here. I'm going to make some sort of

11 change in my CDF, in my plant, hardware, procedures,

12 or something, which will lower my CDF some more."?

13 But you have to have that in some sort of

14 regulatory basis. So that gets complicated.

15 The third point: In this kind of thing,

16 I think if the U.S. NRC staff and ACRS, and perhaps

17 even Commissioners, are agonizing about whether to do

18 something or not, that seems to me an immediate flag

19 that says it's marginal; the decision is right on the

20 cusp; we should always come down on doing it.

21 MEMBER KRESS: And I would have said,

22 since it is an enhancement, you should come down on

23 not doing it if it is marginal.

24 MEMBER ROSEN: I might have said that in

25 a past life, but in this life I say, when it is not

1 all that clear and there are good arguments on both
2 sides, I would say you pass it on to NRR and say: Try
3 to find a way, a reasonable accommodation, to get this
4 additional feature in the plants that need it.
5 MEMBER KRESS: Does anybody else want to
6 volunteer?
7 MEMBER WALLIS: Jack, in your
8 recommendations you say you are not recommending back-
9 up power for the return fans. If I understand the
10 argument that you made the other day, it was primarily
11 because of the deleterious effect that it would have
12 on the melting of the ice. Is that correct? As I
13 understand it, are you --
14 MR. ROSENTHAL: We made the observation
15 that if you ran the fans, you melted the ice a little
16 bit sooner, and that that was a downside. But if a
17 licensee came in and said, "Hey, I intend to power the
18 igniters and the fans because it gives me greater
19 certainty that I know what's going on inside the
20 containment," we would surely accept that. I haven't
21 quantified the other.
22 The reason for not recommending the air
23 return fans is that, based on what I now know in the
24 year 2000 as distinct from prior analysis, when I used
25 my MELCOR, when I consider the tests that were done at

1 -- there were tests done at a Nevada testsite. There
2 was a Mark III test of flames over the pool. We have
3 calculations of what the mass flow rates are with and
4 without the fans going. We truly believe that you
5 don't need the air return fans. So that would be the
6 reason.
7 MEMBER WALLIS: But this is not a
8 prescriptive recommendation?
9 MR. ROSENTHAL: No. As I say, in talking
10 to my NRR colleagues, on the one hand, you had to come
11 up with some sort of conceptual design that you can
12 touch. You know, you had to go to a catalog and look
13 up, what does it cost to get a diesel, a break, or so
14 much cable, what is the cost of engineering, in order
15 to come up with this idea of two, three, four hundred
16 thousand dollars in cost.
17 Having done that, we would proceed forward
18 in some sort of performance-based requirement rather
19 than a prescriptive requirement. Then under that
20 performance-based requirement -- maybe half this
21 equipment already exists on the site. Maybe there's
22 electric crossties. I think there are things that
23 might well be there. You would still incur procedural
24 costs. I mean nothing is free.
25 But, philosophically, if nothing else, we

1 think that if you went forward, it would be on a
2 performance-based rather than prescriptive, having
3 convinced ourselves that, yes, there are reasonable
4 things that you could do. So that is why I don't want
5 to pay too much attention to the specifics of the
6 cost.
7 Charlie, did you want to say something?
8 I'm sorry, Charlie Ader is my Deputy Division
9 Director.
10 MR. ADER: Jack, a couple of comments
11 around the table I had heard, and I wanted to just
12 kind of summarize where we are.
13 As Jack said at the beginning, this issue
14 has been dealt with several times over the years. It
15 was looked at in the CPI program. The decision at
16 that time was we couldn't make a generic conclusion,
17 so we put it into the IPE program because there is a
18 lot of plant-specific attributes to a decisionmaking
19 process here.
20 The licensees looked at it in IPE space.
21 I think all concluded that it wasn't cost beneficial.
22 One of the new pieces of information was the DCH study
23 which showed a much higher likelihood of containment
24 failure. There was more to that than just random
25 ignition. They also looked at loads, load

1 distribution, containment fragility distributions,
2 where do the two cross, but a big assumption was
3 random ignition. So that was a new piece of
4 information.
5 In fairness, the memo we sent down with
6 the package at this point in time has the research
7 staff at the Division level recommending that we feel
8 there is enough to go forward on the ice condensers
9 with igniters. The memo actually said we were
10 probably going to defer on the Mark IIIs.
11 There has been subsequent discussion since
12 that memo came down and some of the issues Jack has
13 raised about defense-in-depth, the weaker containment.
14 It is being reconsidered with the opportunity to meet
15 with the Committee. We want Dr. Kress to continue
16 getting your all's views because we felt that was
17 going to really help us inform that decision, whether
18 we decide that we should make a recommendation across
19 the board to NRR that they go further in powering
20 igniters, we say just ice condensers and not Mark
21 IIIs, but these other attributes we do really value
22 the Committee's comments, thoughts.
23 There was some good discussion at the
24 Subcommittee. There were some things to think about
25 there. But that is kind of where we are as of today.

1 MEMBER KRESS: Well, I would offer one
2 comment, that notwithstanding whether you decide to do
3 anything or nothing, if you decide something needs to
4 be done, I would agree that you do it for both Mark
5 IIIs and ice condensers.
6 MR. ROSENTHAL: I'm sorry?
7 MEMBER KRESS: If the decision is that you
8 do something, my opinion is that you do it for both
9 Mark IIIs and ice condensers, pretty much based on
10 your off-the-cuff reasoning, without knowing the
11 phenomenology.
12 I think if you require something of ice
13 condensers, I think there's enough uncertainty in all
14 this that you probably ought --
15 MR. ROSENTHAL: I'm arguing prudency, and
16 at that point they don't look that different, but --
17 MEMBER KRESS: Yes, just based on that
18 kind of reasoning, I would say go forward with both of
19 them.
20 MR. ROSENTHAL: There is also the issue of
21 different shape of different views on what I will call
22 regulatory coherence. Containments for the same
23 design pressure, both with some pressure suppression,
24 et cetera, why require one for the other?
25 MEMBER KRESS: I think there is a lot to

be said about this comment that there is a lot more zirc in BWR Mark IIIs, too. So you still have more hydrogen to deal with.

MR. ADER: Jack, if I could, one other point: Ultimately, the staff of NRR or the agency will have to make the finding to backfit test. So we have to do the substantial increase --

MEMBER KRESS: This is just an input to the NRR people.

MR. ADER: -- and the cost/beneficial part of it. So that is going to weigh in the decisionmaking process.

VICE-CHAIRMAN BONACA: I think, to think like Steve, I feel there is uncertainty enough that, if there was a flexible recommendation that says, as a minimum you must obtain, there are some means of powering, and Mr. Leitch here pointed out to go into a site and find that they probably have already means of doing it. If there was that kind of flexibility, I would say that I would lean in the same direction that Mr. Rosen was pointing to.

But, again, it is a hard call just because, again --

MEMBER SHACK: I'll come back to I just don't see the substantial increase in safety. It

1 seems to me the argument here is really whether you
2 are willing to accept the benefits you get from the
3 prevention part versus the mitigation part.
4 At this point I would accept the
5 prevention. I prefer prevention. It is hard to see
6 a substantial increase in safety when all you are
7 really trying to do is to maintain your balance
8 between mitigation and prevention. So I don't see
9 that it passes the substantial increase in safety
10 test.
11 MEMBER KRESS: I think that was my view
12 also.
13 MEMBER SHACK: And the other one, I am
14 willing to believe that, if it ever came to it and
15 these guys really had to scramble, they would be
16 scrambling whether you had a regulatory rule or not,
17 to find an alternate power source. In that situation
18 all bets are off and everybody is doing everything you
19 can. Whether you have a regulation that says go look
20 for every alternate power source I've got onsite or
21 not, he's going to be looking for it.
22 MEMBER SIEBER: Well, you know, you can go
23 along and look at the licensee's viewpoint, and he is
24 probably sitting back and saying, "Why is somebody in
25 Rockville trying to re-engineer my plant?" He is

1 faced with a decision, for example, if it is a PWR,
2 you know, I could spend a quarter of a million dollars
3 putting in a diesel on a truck or in a sheet metal
4 building or I can spend a quarter of a million dollars
5 and fix my pump seals.
6 Which would you rather do? If you buy the
7 diesel and have the event, you've got a messed-up
8 containment. If you fix the pump seals, you've got
9 three more hours until you mess up your containment.
10 If you take that to its extreme, every
11 kind of mitigating or preventive measure you take
12 lessens the importance of containment, and you could
13 get to the point where you ask yourself the question:
14 Why do I have a containment at all because it is not
15 doing anything for me? Then you leave the engineering
16 realm and get into the political realm.
17 But going back to what Bill said, you have
18 to ask yourself the question, what is driving you to
19 make any change at all? Are the plants unsafe? If
20 they are unsafe, then that should drive you.
21 But it seems to me, seeing the effort of
22 these plants, it is pretty good. So what's the
23 forcing function here?
24 So that would be sort of my viewpoint on
25 that. When you think through all the branches, you

1 end up at a bunch of different extremes, which upsets
2 the balance between preventing initiating events,
3 mitigation, prevention of the actual scenario versus
4 defense-in-depth.
5 It is almost like the difference between
6 being a Republican and a Democrat: What's your
7 philosophy? Where do you want to put all your eggs?
8 MEMBER KRESS: Well, it has been a good
9 discussion so far.
10 MEMBER POWERS: Dr. Kress, I assume that
11 at your Subcommittee you explored the adequacy of
12 MELCOR for doing these kinds of calculations?
13 MEMBER KRESS: We talked about the
14 business of a lump parameter model to deal with
15 hydrogen distributions and recognized that there was
16 some difficulties with that, but we thought it was
17 relatively good for the source of hydrogen. When they
18 did the modeling of containment, they didn't put any
19 artificial nodes in. Each node was a compartment with
20 boundaries and walls. Of course, you have the well-
21 mixed assumption in each one of those.
22 But we thought this was a pretty good
23 scoping type of analysis that would be -- we
24 recognized that it wouldn't give you something that a
25 good CFD might do, but we talked about it and we

1 didn't come to any conclusion, except that we thought
2 that the conclusions that you would get, you didn't
3 have conditions that would be conducive to transition
4 to detonation or deflagration. We thought that was
5 robust enough because they had also gone back and
6 looked at other reviews of this issue, and they had
7 experts looking at these things and trying to make a
8 judgment.
9 Basically, the question is: Are you going
10 to have detonation or are you going to have some sort
11 of a control burn? We thought, in general, I think
12 the Subcommittee thought that was a robust enough look
13 that you could make that conclusion.
14 MEMBER POWERS: The challenge you have in
15 looking at these things is, especially in the ice bed,
16 if you get a concentration front that gets into the
17 detonatable regime, you can never detect it in a lump
18 node code unless you very finely nodalize --
19 MEMBER KRESS: Well, actually, the lump
20 node code did show that in the ice condenser
21 compartment itself conditions were high enough to be
22 detonable. I mean, that was one of the outcomes of
23 the calculation.
24 MEMBER WALLIS: It also varied the nodes,
25 I understand, in the ice chest, the sensitivity

1 studies to the nodalization in the ice chest.

2 MEMBER KRESS: But they thought that the

3 primary mode would be it would ignite at the exit of

4 the ice condenser compartment and there would be a

5 downward propagation of the burn, and that the

6 conditions weren't right for a transition to a

7 detonation. That was based on expert opinion. You

8 know, there's no way MELCOR can tell you that.

9 MEMBER POWERS: That's a remarkable

10 conclusion, considering the amount of structure that

11 you're passing through.

12 MR. NOTAFRANCESCO: The expert opinion

13 back in the early eighties was that the high

14 probability that diffusion flame at the top of the ice

15 chest would be highly likely. So it is a combination

16 of that is the dominant mode, and we did look at,

17 let's say, the fundamentals of DDT and some of the

18 criteria and the lambda or the cell size, and in a

19 cold environment you would need a wide channel and

20 things quite open in the ice chest. There is no

21 confinement. There is a lot of lateral potential

22 flow.

23 But based on overall judgment and the

24 overall evidence of expert judgment, experiments, and

25 calculations, it didn't seem to be a likely event to

1 have a DDT in an ice chest.

2 MEMBER KRESS: I'm not sure whether that

3 is relevant to the question of having back-up power to

4 igniters. You have that question whether you have

5 that or not.

6 Anyway, I think we are out of time. Thank

7 you. We will let you know what we think later on when

8 we hash it out. You know, we are likely to have

9 knock-down, drag-out differences, too.

10 VICE-CHAIRMAN BONACA: Okay, so with that,

11 do you have any other questions?

12 (No response.)

13 Okay, let's take the break for 15 minutes.

14 We will resume the meeting at 10:25.

15 (Whereupon, the foregoing matter went off

16 the record at 10:14 a.m. and went back on the record

17 at 10:30 a.m.)

18 VICE-CHAIRMAN BONACA: Okay, let's resume

19 the meeting.

20 The next item on the agenda is the early

21 site permit process. We do have a presentation from

22 the staff, and also NEI has prepared some slides. Dr.

23 Kress, we've got you.

24 MEMBER KRESS: Yes, it is me again.

25 This is, I think, an initial jump in the

1 ACRS emphasis right now because there are three
2 organizations that are looking for early site permits
3 already. You might ask, what is our interest in that?
4 Well, ACRS has traditionally for a long time been
5 interested in siting issues, in siting questions.
6 Not only that, but I think siting is an
7 important part of the equation of safety. Part 52.23,
8 which is the certification, part of the certification
9 rule, actually requires that the Commission refer a
10 copy of any application to the ACRS, who must then
11 report on those portions of the application which
12 concern safety. So we are going to be in the loop.
13 It is time we got started because the
14 applications are coming in, and we need to understand
15 what the standards for siting and how they are going
16 to go about dealing with early site permitting.
17 So, with that, I will turn the floor over
18 to Jim Lyons to see if he has any introduction.
19 MR. LYONS: Thank you, Tom. This is Jim
20 Lyons. I am the Director of the New Reactor Licensing
21 Project Office.
22 I talked to most of you yesterday when I
23 put up our schedule. We will talk a little bit about
24 schedule here, too. I know that there were some
25 questions that you all were looking forward to asking.

1 We have two presenters today: Ronaldo
2 Jenkins and Michael Scott. Ronaldo is our program
3 lead for the early site permits. He is also one of
4 the project managers for the early site permits sites
5 that are coming up, which are Clinton, Grand Gulf, and
6 North Anna. Ronaldo is the Grand Gulf project manager
7 for the early site permit. Mike Scott has been
8 working with us to help us develop a review standard
9 for the early site permit.
10 So, with that, let me turn it over to
11 Ronaldo and let him go through and give you an
12 overview what the early site permit is all about.
13 MR. JENKINS: Good morning. My name is
14 Ronaldo Jenkins. I work in the New Reactor Licensing
15 Project Office of NRR.
16 Just to outline our purpose here, we would
17 like to summarize the early site permit process and
18 some of the recent developments that have occurred, as
19 a background for this discussion.
20 I would like to also talk about the review
21 standard, which parallels the expanded power uprate
22 review standard process. We would also like to talk
23 about the various developments in terms of how we
24 developed this document.
25 The next slide will just be a timeline.

1 I will talk about the background on the process, and
2 my colleague, Mike Scott, will talk about the review
3 standard itself. At the end we will entertain
4 questions.
5 The early site permit by itself really
6 does not have that much meaning. It is part of an
7 overall scope under Part 52. As this slide depicts,
8 the big picture is that you have the early site permit
9 along with the standard design certification that
10 would be referenced in the combined license, and there
11 would be a review process separate from the early site
12 permit and the standard design certification, along
13 with a hearing.
14 An applicant could go directly to the COL
15 stage, providing the same information that is
16 contained within the early site permit and the
17 standard design certification. Following that, the
18 staff would implement verification of ITAAC, the
19 Inspections, Tests, Analysis, and Acceptance Criteria,
20 just prior to reactor operation.
21 The next slide basically -- yes?
22 MEMBER LEITCH: The three site permits
23 under consideration now are at existing sites? They
24 are operating reactors?
25 MR. JENKINS: That's correct.

1 MEMBER LEITCH: Is the process different
2 if it were to be at a new site?
3 MR. JENKINS: The process would not be
4 different. However, there are considerations that
5 have to be taken into consideration, given the fact
6 that you have an existing site there. Radiological
7 consequences would have to be looked at. So you are
8 essentially permitting another reactor to be built on
9 that existing site.
10 MEMBER LEITCH: It is difficult for me to
11 understand. When you have a site where the reactors
12 are already operating and you have an early site
13 permit application with no specificity as to reactor
14 type or number of reactors, or anything else, what are
15 you really approving in the early site permit? I
16 don't really understand the essence of what the
17 approval really is here.
18 MR. JENKINS: Well, the next slide talks
19 about why an applicant would want in an ESP. That is,
20 the Part 50 process, essentially, you had a
21 construction permit and you had an operating license.
22 The early site permit allows you to disposition siting
23 issues prior to actually starting construction for
24 that new plant, so that you can resolve those issues
25 associated with a new plant without necessarily

1 expending any resources involved with the
2 construction.
3 MEMBER LEITCH: When you don't know what
4 kind of reactor you are going to build, you don't know
5 how many you are going to build, it seems to me that
6 it is very vague, but I will listen. Go ahead with
7 your presentation, and I will defer my questions.
8 MR. JENKINS: All right.
9 MEMBER KRESS: Suppose somebody came in
10 and said, "I am going to build a 3,000-megawatt
11 electrical plant there." Would that have been
12 allowed? Is that something that the early site
13 permitting would have excluded?
14 MR. JENKINS: Well, the main focus of the
15 early site permit is to look to see whether or not the
16 new facility will meet Part 100.
17 MEMBER KRESS: I see. Part 100 is the
18 issue?
19 MR. JENKINS: Yes, and so that leads us to
20 facility basically --
21 MEMBER KRESS: So the major criteria for
22 this is Part 100?
23 MR. JENKINS: Yes. There are other parts
24 of it. As we go through the presentation, we will
25 talk about that, but there are basically three major

1 parts, one having to do with emergency preparedness;
2 the other one, environmental review to satisfy NEPA
3 requirements, and the last one is the site safety
4 review, which involves both a seismic and non-seismic
5 review criteria that is found in Part 100. There is
6 also a piece of it that was moved from Part 100 that
7 is now in 50.34(a)(1).
8 MEMBER LEITCH: I just don't see, without
9 knowing the reactor type, how can you say anything
10 about Part 100. I mean, obviously, we are not going
11 to allow anything to be built there that doesn't meet
12 Part 100, right?
13 MR. JENKINS: Right, and that is really
14 the beginning criteria that you look at in terms of
15 making a decision: Can the site accommodate another
16 reactor or reactors at that facility?
17 The reactor type issue is something that
18 the staff has looked at, and the industry has proposed
19 an alternative approach plant parameter envelope to
20 provide surrogate facility information. So that is
21 where we are currently looking at in terms of an
22 alternative approach.
23 But the review process, and maybe this
24 will become clearer as we go along, the lower branch
25 is the environmental review. That is comparable to

1 what we do in license renewal. The upper branch is
2 the site safety, and that would involve the Committee
3 in the review of the safety evaluation report. That
4 would include both the site safety and the emergency
5 preparedness review effort.
6 This is basically a summary statement of
7 the intent. Once again, the ESP is intended to
8 provide Commission approval prior to, and separate
9 from, a combined license or a construction permit.
10 Now into the contents that is what the
11 applicant must submit; it should have a description,
12 a safety assessment, including evaluation of the major
13 structure, systems, and components of the facility
14 that would imply a radiological consequence, both
15 normal and accident conditions.
16 MEMBER KRESS: Doesn't that imply they
17 need to have some sort of plant in mind, a type and a
18 power?
19 MR. JENKINS: It would imply that there
20 should be sufficient information so that the staff
21 could make a determination regarding the acceptability
22 of that. That is where we get into the bounding plant
23 parameter concept.
24 MEMBER KRESS: That is where this NEI
25 proposal --

1 MR. JENKINS: Yes, and they are going to
2 talk about that later.
3 MEMBER KRESS: Okay.
4 MR. BELL: Excuse me. Dr. Kress, if I
5 may, I am Russell Bell with NEI. After the NRC staff
6 completes their presentation, I look forward to the
7 opportunity to try to explain exactly how we are going
8 to meet the challenge you both have pointed out,
9 getting through this process in the absence --
10 MEMBER KRESS: That's what you guys are
11 doing. Okay, that would be helpful.
12 MR. BELL: Thank you.
13 MR. JENKINS: So this is really to spell
14 out what is in the regulations now, and industry is
15 proposing an alternative method of meeting these
16 requirements.
17 So the site characteristics must comply
18 with Part 100.
19 The next couple of slides talk about
20 "should." That is, the applicant should provide the
21 following information, and that is where your question
22 regarding reactor type comes in.
23 MEMBER KRESS: Is it really important that
24 it is "should" instead of "shall"?
25 MR. JENKINS: Well, for the lawyers, it is

1 very important.

2 (Laughter.)

3 For those of us who are engineers, if you
4 look at the Part 100 criteria, it is relatively
5 neutral in terms of reactor technology that you need,
6 because your focus is on the site and what
7 characteristics of the site that could impact the
8 reactor operation.

9 So there you have a number of different
10 types of parameters, type of cooling system, seismic,
11 hazards, industrial and military and transportation
12 facilities, in order to determine potential hazards,
13 and also a feature population profile.

14 MEMBER KRESS: Is there any safety goal
15 considerations in this process anywhere?

16 MR. JENKINS: What's that now?

17 MEMBER KRESS: Are there any safety goal
18 considerations in this process?

19 MR. JENKINS: Not specifically, no.

20 MEMBER WALLIS: So this industrial,
21 military, transportation facilities, that doesn't
22 include something like a baseball stadium? That would
23 include the population profile?

24 MR. JENKINS: That would be considered
25 under the population profile. For example, Part 100

1 has a goal of not locating the facility near a high
2 population --
3 MEMBER WALLIS: Even though they are very
4 transient populations?
5 MR. JENKINS: Right. For example, at Zion
6 station, where you would have the theme park right
7 next door --
8 MEMBER WALLIS: Or, for example, Seabrook,
9 near a beach?
10 MR. JENKINS: That's right.
11 MEMBER WALLIS: A transient population,
12 yes. Okay.
13 MR. JENKINS: Right. The staff would have
14 to make some kind of determination in situations like
15 that.
16 As the next slide talks about, this is the
17 environmental reporting requirements that have to be
18 addressed, the main point being that at this point in
19 the process the EIS does not have to assess the
20 benefits, that is, the need for power, but it must
21 consider alternatives, alternative sites.
22 The major features of the emergency plan
23 are a complete emergency plan can be proposed by the
24 applicant and --
25 MEMBER KRESS: Now my understanding was

1 that some of the applicants or some -- I don't know,
2 maybe it is NEI -- would like not to have this feature
3 of having to look at alternative sites, and they had
4 reasons, justification for that?
5 MR. JENKINS: Well, currently, it is on
6 our list of issues to be discussed.
7 MEMBER KRESS: It is an issue?
8 MR. JENKINS: We do not know exactly what
9 their proposal is going to be, but we are scheduled at
10 our next meeting in December to talk about alternative
11 site under this provision.
12 MR. LYONS: Excuse me for a second. This
13 is Jim Lyons again.
14 On the issue of alternate sites, NEI has
15 proposed a petition to the rulemaking to remove the
16 review of alternate sites. That petition is in the
17 process of being forwarded up to the Commission with
18 our recommendation.
19 MEMBER ROSEN: So the words, "obviously
20 superior alternate" exist in the existing rule?
21 MR. LYONS: Yes.
22 MEMBER ROSEN: Okay.
23 MEMBER LEITCH: Does that mean alternate
24 types of power generation or alternate sites for
25 nuclear plants?

1 MR. JENKINS: I believe it's sites in
2 terms of power plants.
3 MEMBER LEITCH: Any kind of a power plant?
4 MR. JENKINS: Right.
5 MEMBER LEITCH: In other words, we are
6 going to build a 1,000 megawatts here; we could --
7 MR. JENKINS: Right
8 MEMBER LEITCH: -- evaluate doing it with
9 nuclear? We have to evaluate building a 1,000
10 megawatts elsewhere with fossil or --
11 MR. JENKINS: Right.
12 VICE-CHAIRMAN BONACA: Once the ESP is
13 granted, would the ESP contain conditions that
14 authorize some of the issues described here, such as
15 site density of population and other things?
16 MR. JENKINS: Well, there's language in
17 the rule that basically states conditions and
18 limitations as the Commission sets forth. We are in
19 the process of developing the permit language itself,
20 that is, what the form and content of that would be.
21 VICE-CHAIRMAN BONACA: For example, on the
22 seismic issue, I mean, will it establish the
23 requirements of the seismic criteria to be designed,
24 too, given the characteristics of the site?
25 MR. JENKINS: Well, the site

1 characterization studies that would be done by the
2 applicant would identify those sites and
3 characteristics, and that would be part of the permit
4 basis. So, in terms of specifying exactly what kinds
5 of parameters, that would be part of the review.
6 VICE-CHAIRMAN BONACA: Okay.
7 MR. JENKINS: So the last bullet talks
8 about, in the event that there are certain site
9 preparation activities, roads, things like that that
10 they would put in, there has to be a redress plan.
11 MEMBER KRESS: So that means if they
12 decide not to go ahead, they --
13 MR. JENKINS: That's right.
14 MEMBER KRESS: -- have to go back and fix
15 it?
16 MR. JENKINS: That's right. They have to
17 return it.
18 On the alternate sites, because of the
19 rulemaking, petition for rulemaking, we really have
20 not been talking about that. As Jim mentioned, we do
21 have that before the Commission now.
22 The next slide talks about, well, what has
23 occurred recently. Staff has been notified that
24 Exelon and Entergy plan to submit an ESP application
25 in June 2003 for the Clinton and Grand Gulf sites, and

1 Dominion plans to submit an ESP application for the
2 North Anna sites.
3 As we have talked about earlier, we have
4 been engaged with NEI on the generic licensing issues.
5 This leads into my colleague, Mike Scott's, talk on
6 the review standard itself.
7 MR. SCOTT: Good morning. Can everybody
8 hear me okay? Great.
9 As Ronaldo said, I am going to discuss
10 with you the early site permit review standard that
11 the staff is currently in the process of developing.
12 The purpose of the review standard is to provide
13 guidance to the staff on what to be evaluating when an
14 ESP application comes in, and also to provide
15 information to the stakeholders so that they know what
16 the staff's expectations are before they submit an ESP
17 application.
18 The basic premise that the staff has gone
19 through in developing this document is to use existing
20 guidance to the extent that that is feasible, to the
21 extent that the guidance is available and still
22 applies.
23 We have made an effort to have consistency
24 between the review standard that is being developed
25 for the early site permit and the review standard that

1 is being developed concurrently for power uprate.
2 They are, of course, different issues. Different
3 considerations need to be taken. So there's only so
4 far that that goes, but we have attempted, to the
5 extent possible, to be consistent with theirs.
6 The document development approach that we
7 have taken, the staff needs to develop guidance
8 expeditiously. As Ronaldo has said, we are expecting
9 three applications in the middle of next year.
10 Therefore, we need to have the best document we can
11 have out the door for those folks to look at and for
12 the staff to have in reviewing the ESP applications.
13 So we have taken this as a matter of
14 urgency to have an initial cut at this. We are
15 presently finalizing a draft review standard. The
16 plan is to submit that document for approval here by
17 the staff and then to release it for interim use and
18 public comment.
19 As noted here in the bullet, we recognize
20 that there are open licensing issues regarding ESP,
21 and you have heard some of them. We have discussed
22 some of them here in the past few minutes. So there
23 will, undoubtedly, be changes before the final
24 document is issued next year.
25 As part of this process, we have sought

1 and received, we in the New Reactor Licensing Project
2 Office have sought and received input from affected
3 branches in NRR as well as from NSIR on the security
4 issues. We have integrated those inputs and have
5 developed the draft document that we are here today to
6 talk to you about.
7 What we basically asked the staff to look
8 at as part of the development process for the document
9 for the review standard were the documents that you
10 see in front of you on slide No. 11, primarily,
11 NUREG-0800, the Standard Review Plan for Safety
12 Evaluations for Nuclear Power Reactors, and
13 NUREG-1555, which is the Environmental Standard Review
14 Plan, basically a parallel document to the 0800
15 document but applicable to environmental reviews.
16 We also asked the staff to look at various
17 other generic communications that have been issued
18 over the years to determine whether they are
19 applicable. You can see some examples of them in
20 front of you here.
21 We looked at them from the standpoint of,
22 are they already captured in the NUREG-0800 or 1555,
23 the Standard Review Plans? If not, we need to add
24 them to the list of guidance that the staff needs to
25 consider when it performs its review.

We sought and received from the primary review branches positions on which documents are applicable.

We also requested the primary review branches for the different sections of NUREG-0800 and NUREG-1555 to accomplish two things: one, bring the text up-to-date, using a strikeout/redline approach, bring text up-to-date, and also indicate what text is applicable to the ESP itself. The objective here was to clearly show, for the staff's use and for the potential applicant's use, what applies and what does not apply at the time that the staff reviews an ESP.

As you may be aware, the 0800 document is intended to address all stages of licensing and, quite frankly, it was intended to address licensing in 1981. So we have a new rule and we have a new process, and we are just looking at a very small part of that process. So we are using this redline/strikeout method for the draft document, and I will discuss that a little further in a minute, to clearly show what applies and what doesn't apply.

Here's what we found, basically, as a result of the staff markups. You will probably not be surprised to know that most of the sections of 0800 needed some updating. So most of them have been

1 provided to us in the form of redline/strikeout
2 markups.
3 I'm sorry, I got ahead of myself here.
4 Most applicable sections are in Chapter 2. That's the
5 site characteristics sections. There are some
6 additional sections that the staff has indicated are
7 applicable to the review of the ESP review standard,
8 and you see them here on slide 13, such as quality
9 assurance; security, of course; site missiles, and
10 some other sections.
11 The radiation protection has been
12 identified as an applicable area if the new site is
13 co-located with an existing reactor.
14 We have made the review standard in a
15 manner that it is intended to apply to all ESP
16 applications, whether the three that we are expecting
17 next year, which happen to be co-located with an
18 operating reactor or other applications that we might
19 receive that might not be co-located. So this sort of
20 section is an example of one that might or might not
21 apply.
22 MEMBER ROSEN: The site workers you refer
23 to they are construction workers for the new plant?
24 MR. SCOTT: That's correct, yes.
25 MEMBER WALLIS: Again, for the accident

analysis, you have to know quite a lot about what kind of a plant it is going to be.

MR. SCOTT: And that, as we discussed, is an issue that is currently under discussion between the staff and the stakeholders.

Site 14, as I indicated earlier, we have made markups on all of the NUREG-0800 sections. The Chapter 15 section that would be applicable in this case needs a substantial rewrite, and the staff will be planning to do that in the coming year.

We also found very little guidance in the NUREG-0800 document for security determination at the ESP stage. The rule requires that the site not be problematic for development of a security plan, and really the guidance that is there now does not reflect that. As you are also aware, security issues for nuclear power plants are in something of a state of change right now. So the staff is working on guidance to address that issue, which will be provided later.

MEMBER ROSEN: On your second bullet, the rewrite of Chapter 15 guidance --

MR. SCOTT: Yes?

MEMBER ROSEN: Since 1981, there's a new thing on the table also, which is risk analysis.

MR. SCOTT: Right.

1 MEMBER ROSEN: So is that going to be
2 considered as part of the rewrite of this Chapter 15?
3 Is this going to be a risk-informed process or is it
4 intended to be a bounding process that says, it can't
5 be any worse than this; therefore, the site is okay
6 for an additional reactor or reactors?
7 MR. SCOTT: If I might ask Jay Lee, can
8 you address that, Jay? This is Jay Lee with the NRC
9 staff.
10 MR. LEE: My name is Jay Lee in NRR.
11 Currently, we are approaching the bounding
12 process rather than risk approach, asking the
13 applicant to provide bounding sequence of accidents,
14 design basis accidents.
15 MEMBER KRESS: Suppose it turns out to be
16 a gas-coolant, prismatic reactor? What would you
17 envision to be this bounding-type sequence?
18 MR. LEE: Well, that we don't know yet.
19 We are waiting and we are anticipating the applicants
20 to provide that information complete with its
21 associated source terms.
22 MEMBER KRESS: But they don't even have to
23 tell you it is going to be a gas-cooled reactor?
24 MR. LEE: Pardon?
25 MEMBER KRESS: They don't even have to

1 tell you it is going to be a gas-cooled reactor?

2 MR. LEE: I think they will.

3 MEMBER KRESS: They will?

4 MR. LEE: They probably will specify a few

5 types of reactor they are considering.

6 MEMBER KRESS: They might give you three

7 or four options?

8 MR. LEE: Or five or six, yes.

9 MEMBER KRESS: And then of those options,

10 they pick out some sort of a bounding type --

11 MR. LEE: Bounding accident sequences

12 along with its complete source terms associated with

13 it.

14 MR. SCOTT: And that issue, of course,

15 falls under the same heading as what we were talking

16 about a few minutes ago, about how much design

17 information is needed and what type. That is still

18 under active discussion between the staff and the

19 potential applicants. I believe NEI is going to

20 address how they would propose that that be addressed

21 in their presentation.

22 MEMBER KRESS: Well, this bounding

23 sequence, all it would be would be a source term to

24 the environment? Is that what it means?

25 MR. LEE: Yes. We anticipate, we expect

source term to be associated with the sequence.

MEMBER KRESS: And then you would do that, use that source term like it is normally used in environmental assessment documents, the way they do -- is there where it would go? I mean, is that how you would use it?

MR. LEE: You mean the safety -- you mean the environmental side?

MEMBER KRESS: Yes, I am trying to figure out what you would do with this source term once you had it.

MR. LEE: Well, there will be two types of source term, I would think. First, only a safety consideration used from the design basis extent. The other one is for the environmental side.

MEMBER KRESS: The design basis, you know, is not a safety issue. It is just, can your plant keep you below 10 CFR 100?

MR. LEE: Right, right.

MEMBER KRESS: So there's no source terms associated with that because you have to know what the plant looks like and what the containment looks like, and then you have a source term in the containment. I don't know how you get any of that without a specification of what the reactor is.

1 But then there is the environmental
2 assessment report, which uses source terms to make
3 some sort of environmental assessment. They
4 traditionally for lightwater reactors use some sort of
5 a bounding source term, something like the 1465 source
6 terms. I am trying to figure out what we are dealing
7 with.
8 MR. JENKINS: Well, I think the major
9 thrust here is that the ESP will allow the staff to,
10 based on the information that we receive from the
11 applicant, make a finding in regard to Part 100. Now
12 if we do not have enough information to make that
13 finding, then, of course, we couldn't make that.
14 MEMBER KRESS: It seems to me like the
15 applicant would come in and say, "Well, we don't know
16 what kind of a plant we are going to build here yet,
17 and we are not sure what the power is, but we will
18 guarantee you that we are going to meet the Part 100
19 limits."
20 MR. JENKINS: Right.
21 MEMBER KRESS: Now is that all they need
22 to do, is tell you that?
23 MR. JENKINS: Well, they have to provide
24 these plant parameter envelopes consistent with the
25 review guidance that we are developing. In other

words, the review standard --

MEMBER KRESS: Yes, I guess when we hear about the plant parameter envelopes --

MR. JENKINS: Right, when you hear that, then you can see how that fits in. But in the COL stage, the applicant would have to demonstrate that they, in fact, are meeting all of the parameters that they have specified in the ESP.

MEMBER KRESS: Yes. I can see that, yes.

MR. JENKINS: Okay. So the staff's task will be they evaluate, well, what is the impact of those parameters with respect to Part 100.

MEMBER ROSEN: Are we going to get a look at this review standard before it is cast in concrete?

MR. SCOTT: The answer is, yes, we are planning to ask the Committee to look at it next year, after the public comment period, on the draft version that we are developing.

MR. JENKINS: Which is consistent with the expanded power uprate new standard approach. In other words, we would get public comments back and then come to the Committee and seek your endorsement of the review standard prior to final publication.

MEMBER WALLIS: To get back to my colleague's question about risk, now, as far as I

1 know, the design basis accidents don't contribute to
2 risk. They are in a different world, and it is when
3 you get beyond design basis you get risk?
4 MR. JENKINS: The structure of the ESP is
5 not specific to a design. So the best that the staff
6 would be dealing with would be a reactor type, a
7 reactor technology. So a specific risk-based type of
8 analysis such as the SAMAs, you know severe accident
9 mitigation alternatives, would be based on the
10 detailed design information, and that would be in the
11 COL stage.
12 MEMBER WALLIS: That doesn't come until
13 later? So there's no way you are taking risk into
14 account in this early site program?
15 MR. JENKINS: I wouldn't say that at this
16 point, but we are looking whether or not we can, in
17 fact, take into consideration risk.
18 MEMBER WALLIS: See, I don't know about a
19 plant which hasn't been designed and built yet --
20 MR. JENKINS: Right.
21 MEMBER WALLIS: -- and it is a new type,
22 but it might well be that it would meet these bounding
23 design basis accident criteria very nicely --
24 MR. JENKINS: Right.
25 MEMBER WALLIS: -- but it might still be

1 pretty risky on the risk basis.

2 MR. JENKINS: Well, once again, if the

3 staff, the Commission accepts the design parameters as

4 acceptable, and it is consistent with meeting the Part

5 100 requirements, then we would go forward and grant

6 the ESP, with the proviso that these parameters, along

7 with other information, other design information,

8 would have to be acceptable in the COL stage.

9 So in the COL stage the ESP would be

10 referenced, and that would allow the applicant not to

11 deal with issues that have already been dispositioned

12 in the ESP. So that is the main advantage for them,

13 is that in terms of the environmental, emergency

14 preparedness, and the site safety, the

15 characterization of the site, that would be

16 dispositioned. So the site-specific design issues

17 would still be on the table and would be dealt with in

18 the COL stage.

19 MEMBER WALLIS: So you are getting, in a

20 sense, the easy issues out of the way?

21 MR. JENKINS: Well, I wouldn't necessarily

22 say they are easy -- (laughter) -- but you are

23 certainly allowing -- once again, the applicant has

24 the opportunity to propose to disposition these

25 issues, these siting issues, years ahead of any

1 construction. Then once they select a design, then
2 they would have to come back to the staff in the COL
3 stage and go through the proceeding in terms of
4 resolving site-specific design information. There may
5 be some siting issues that are not dispositioned in
6 the ESP that would have to be addressed in addition.
7 So the main message is that not all siting
8 issues may be resolved in a particular ESP, but our
9 expectation is that most of them would be.
10 MEMBER WALLIS: So if they wanted to build
11 on an earthquake fault line, this would be caught
12 where, at what point here?
13 MR. JENKINS: Well, it would be caught in
14 the seismic evaluation, looking at exactly would this
15 meet Part 100.
16 MEMBER WALLIS: Yes.
17 MR. SCOTT: The final bullet on page 14 is
18 where we left off at. Staff determined that very few
19 changes were needed to NUREG-1555, which is a much
20 more recent document, 1999 versus 1981. That is the
21 Environmental Standard Review Plan. It does contain
22 references to the early site permit.
23 Slide 15 pretty much is just a summary of
24 what the review standard consists of. There will be
25 process guidance for the staff on its review. In a

1 lot of cases that will be references to existing NRC
2 staff guidance or requirements for reviewing these
3 documents.
4 There is also a process flowchart for the
5 staff's use on how the process goes. There will be
6 two applicability tables, and I will show you on the
7 next slide what I mean by that, one for the safety
8 evaluation and one for the EIS.
9 There will be a boilerplate safety
10 evaluation template for the staff's use. There will
11 be standard language there that, to the extent it
12 applies, can be directly put into the safety
13 evaluation and then the additional language to be
14 provided by the staff to address the specifics of the
15 item under consideration.
16 Then there are the markups that I referred
17 to and of which I will show you an example.
18 Slide No. 16 is an extract from the
19 applicability tables. There is one of these for
20 NUREG-0800, the Standard Review Plan, and another one
21 for the Environmental Standard Review Plan. I have
22 just pulled one page out of the one for the Standard
23 Review Plan.
24 They are organized by branch for the
25 convenience of the staff to identify which branch has

1 responsibility, primary responsibility, for which
2 sections. The areas of review are generally taken
3 from NUREG-0800. We indicate who is going to do the
4 primary and secondary staff evaluation, is there a
5 markup attached, and, as I have indicated earlier, in
6 most cases there will be markups attached to this
7 review standard, at least a draft version, and the
8 boilerplate safety evaluation section, which will
9 coincide fairly closely with the NUREG-0800 and Reg.
10 Guide 1.70 formats.
11 The next page is an extract from one of
12 the markups. It is used to highlight and strike out,
13 to show changes both to bring the document up-to-date
14 for those areas that apply to the ESP and to delete,
15 for the purposes of this review standard only, the
16 text that does not apply.
17 What you see in front of you here is an
18 example page of that and some language that we are
19 considering, and this is still under discussion among
20 the staff as to how we best deal with the very issue
21 that you all have discussed and raised, which is: How
22 do we talk about the design at this stage?
23 MEMBER ROSEN: Would you go back to 16
24 just for a quick minute?
25 MR. SCOTT: Sure.

1 MEMBER ROSEN: This boilerplate safety
2 evaluation section, I know what you mean, but I am
3 sure you are mindful of the Committee's concerns about
4 the level of description in the safety evaluation
5 reports for the license renewal and the go-rounds that
6 we have had with the staff on that, bringing those
7 safety evaluation reports to a level where the "why is
8 the staff approving, agreeing to this particular
9 feature," having that transparency in the safety
10 evaluation report.
11 It is equally important, though even maybe
12 more important here, that we have that sort of
13 transparency. So I would commend to you the
14 discussions of the Committee with the staff on license
15 renewal as to the content of safety evaluations and
16 the necessity for some degree of transparency, which
17 is not the kind of thing you get from a word like
18 "boilerplate."
19 MR. JENKINS: I think that, because ESP
20 has such a long period between the time that it would
21 be granted, 10 to 20 years, we agree that we
22 definitely need to document what are the assumptions
23 the staff is using and how we arrive at the decision.
24 MR. SCOTT: We have a couple of points to
25 make there. One is that we have incorporated into

1 this format the latest guidance that has been
2 developed in the NRC regarding why are we doing this,
3 what's the basis for it. I think that goes some way
4 towards directing your concern.
5 In most cases, quite frankly, the
6 boilerplate is a reference. It is not a lot of text
7 in the technical -- there is almost no text in the
8 technical evaluation sections. It just says you need
9 to consult the Standard Review Plan for your guidance
10 on how to develop this.
11 So we will definitely do what you are
12 talking about here and take a look at that guidance.
13 I think you will find we don't have a particularly
14 prescriptive review standard.
15 MEMBER WALLIS: Are you putting conditions
16 in this SER? I mean your decision is based on what
17 you know about the site now?
18 MR. SCOTT: Right.
19 MEMBER WALLIS: But 10 years from now,
20 there may be some major industrial facilities built in
21 the vicinity, and so on.
22 MR. JENKINS: Well, the rule allows for
23 considering new and significant information that the
24 applicant would have to address in the COL stage. For
25 example, the population doubles in that period of

1 time. Obviously, there are going to be environmental
2 impact considerations that would have to be revisited.
3 MR. SCOTT: Moving on to Slide 18, next
4 steps for the review standard, as I mentioned to you
5 earlier, that document is in staff concurrence. Our
6 plan or objective is to issue it for interim use and
7 public comment by the end of December of this year.
8 As we mentioned earlier, we would plan to
9 provide the Committee the review standard for your
10 review after we address the public comments that we
11 will seek next year. And after receiving those
12 comments from all sides, our goal is to issue the
13 final review standard by the end of next year.
14 MR. JENKINS: The next steps basically
15 involve, as far as the process is concerned, issuing
16 the review standard so that we can inform all of the
17 stakeholders regarding what the staff will be doing
18 when we receive an application.
19 Currently, we have pre-application
20 activities ongoing, a series of public meetings at
21 each of the sites, site visits to observe the seismic
22 investigation, efforts that the applicants are engaged
23 in, and a QA review to look at their program for
24 documenting the information that they are going to
25 submit.

1 We are, as we said before, engaged with
2 the NEI ESP Task Force on the plant parameter
3 envelopes. There's a host of issues, but these three
4 are the main ones that we are engaged with talking
5 with them about: the seismic evaluation methodology.
6 The industry has developed a pilot demonstration of
7 their proposed approach for the staff to look at. We
8 plan to complete internal preparations in order to
9 enable our review when they are scheduled to come in.
10 DR. FORD: I have a question. In the
11 researcher's infrastructure assessment for the
12 advanced reactors, there is no mention at all made of
13 early site permits. The presumption, therefore, is
14 that new research is needed.
15 Yet, today we have heard various comments
16 about what types of reactor will be put onto these new
17 sites and we have been told that, yes, they could
18 propose five or six different designs, and yet those
19 designs have got very different source term
20 characteristics, have got very different geometrical
21 aspects in terms of blocks of water on top of the
22 containment, et cetera, all of which must impact some
23 way on the safety of the public outside in terms of
24 seismic response, et cetera.
25 On that basis, do you not think that there

1 is some need for research as it pertains to the ESP
2 process?
3 MR. JENKINS: Unless we identify a
4 particular issue that requires the research --
5 remember that the site safety reviews, the staff has
6 performed those kind of reviews in the past. The one
7 that comes to mind is the Blue Hills site. This is
8 NUREG-0131, in which the applicant asked for the staff
9 to look at and disposition siting issues before the
10 construction permit was finished, before initiating or
11 completing the construction permit.
12 On their Appendix Q, which is the
13 predecessor for the ESP process, the staff was able to
14 look at that site and say, okay, does the site meet
15 Part 100? The differences are that, of course, at the
16 time we knew that there would be a lightwater reactor
17 and, therefore, some of the questions that non-
18 lightwater reactors would come up would not be an
19 issue.
20 The one thing we are going to look at very
21 closely is the design parameters that are going to be
22 offered, the idea being that those design parameters,
23 that we would be assessing the impacts from a safety
24 and environmental impact. There is no guarantee that
25 that particular set of design parameters will actually

1 result in a reactor. That burden is on the applicant
2 going forward in the COL stage to say, okay, I have
3 the following set of parameters; staff has looked at
4 those parameters, and we can meet those parameters in
5 a given design going forward.
6 That is the position that the applicants
7 have proposed to us, that they are going to take that
8 burden to ensure that those design parameters will, in
9 fact, result in a reactor. Our task is to look at not
10 only the plant parameter envelope that they are
11 proposing those parameters associated with that, but
12 also the other application information that they would
13 be providing.
14 The purpose of the review standard is to
15 lay out: Here are the applicable sections in terms of
16 the review guidance that's applicable to an ESP. So
17 if there are any gaps that are missing, then we are
18 going to have to address those gaps before we can make
19 a finding.
20 MEMBER LEITCH: I guess I see a whole lot
21 of value in this process as far as a new site is
22 concerned, but I am still left with a very unclear
23 picture of what we are actually approving at an
24 existing site. It sounds like what we are saying is
25 you can build any kind of reactor so long as,

1 obviously, the design is certified, any number of them
2 -- we are not specifying a number -- any power level
3 we want so long as it meets Part 100.
4 MR. JENKINS: The other part that has to
5 be --
6 MEMBER LEITCH: Can't we say that right
7 now? I mean, what are we doing here? I don't
8 understand what we are approving here.
9 VICE-CHAIRMAN BONACA: I think the NEI
10 document they are looking at has a lot of information
11 that relates to that. Does it? I think that would
12 help because it could bring some description of --
13 MR. WILSON: This is Jerry Wilson with
14 NRR. Let me try to answer that question.
15 What we are approving here is
16 acceptability of siting a particular plant at a
17 particular location. Just the fact that there is an
18 existing operating plant doesn't necessarily mean that
19 this other location that is nearby is acceptable. It
20 may be that there is a groundwater problem or a soil
21 problem or other sorts of things.
22 Also, you have to look at, in terms of
23 power level, what your cooling capability is. So
24 let's assume for a moment that that site you are
25 talking about is on a lake. There is not an unlimited

1 amount of power you could put and have cooled by that
2 lake. So there's a lot of factors like that you have
3 to consider in terms of the acceptability of adding on
4 another unit or units.
5 So that is why the application needs to
6 specify numbers, types, power levels, or, in the case
7 of what you are going to hear later, some
8 alternatives, so that there is sufficient information
9 for the staff to evaluate the acceptability of that
10 site for a future power plant.
11 MEMBER KRESS: Since some of the sites
12 have already been approved for power plants, haven't
13 those things already been addressed?
14 MR. WILSON: No. I mean, they were
15 approved -- remember, in a construction permit you are
16 looking at a specific design at that point in time.
17 It wasn't for an unlimited number of power plants, but
18 it was for the particular plants that they were
19 applying for. Now the question is, can you build an
20 additional plant or plants there, and what power level
21 and what kinds of releases you are going to see from
22 those plants.
23 MEMBER KRESS: Well, take, for example,
24 the restrictions on site on population density and
25 distance to a population center.

1 MR. WILSON: Yes, exclusion areas in low
2 population zones, we are going to have to make those
3 calculations now for this new location. That is why
4 you are going to need your releases, both normal and
5 accidental.
6 MEMBER KRESS: But I thought the siting
7 rule just said put limits; there's a limit on the
8 population density and how far away you can have a
9 population center. There is no calculation of
10 releases and that.
11 MR. WILSON: Well, you use releases to
12 determine the low population zone because you have to
13 calculate a dosage at the boundary.
14 MEMBER KRESS: Originally, we did.
15 MR. WILSON: Yes, but that was for that
16 plant. Now we have a new application for a new plant
17 at a new location that is nearby. So you have to do
18 a new calculation. It is going to be a different
19 exclusionary boundary, a slightly different low
20 population zone.
21 MEMBER KRESS: And different limits on the
22 population?
23 MR. WILSON: Could be. I mean, those
24 earlier determinations were made 30-40 years ago.
25 MEMBER KRESS: That is why I was saying I

1 haven't seen any of that in the slides we talked about
2 yet though.
3 MR. WILSON: But it is in there.
4 MEMBER KRESS: It's in there?
5 MR. WILSON: Yes, we are going to have to
6 do that.
7 MEMBER KRESS: Okay. I guess it is time
8 for what, NEI?
9 MR. JENKINS: Yes, NEI is going to give a
10 presentation.
11 MEMBER KRESS: Yes, I'm looking forward to
12 it.
13 (Laughter.)
14 MR. BELL: Good morning. I've got
15 something very important, the overheads.
16 MEMBER KRESS: Oh, yes, that would be
17 important.
18 MR. BELL: They match the hard copies
19 that, hopefully, you have in front of you.
20 Good morning. My name is Russell Bell.
21 I'm from NEI.
22 On the ESP project, I am fortunate to have
23 a very dedicated group of individuals on the Task
24 Force. The core of the Task Force is the pilot
25 applicants themselves. On my left is Joe Hegner from

1 Dominion. This is George Zinke from Entergy and Eddie
2 Grant from Exelon. While I drew the short straw in
3 terms of handling the presentation materials, they are
4 here to answer the really tough questions and
5 otherwise correct me as I go.
6 The staff did an excellent job of
7 outlining the context of our Part 52 and some of the
8 activities that are going on. That is going to save
9 us some time, save the Committee some time.
10 I think we can get to some of the answers
11 to your very valid and good questions. In fact, I can
12 skip slide 3. You know very well about the parts of
13 the Part 52 process. They got exactly right the plans
14 and schedules of the three applicants in terms of what
15 we expect to happen next year.
16 MEMBER RANSOM: Excuse me. Before you go
17 on --
18 MR. BELL: Yes?
19 MEMBER RANSOM: -- what is meant by "first
20 ever"?
21 MR. BELL: Certain parts of the Part 52
22 process have not been tried or tested yet. The only
23 thing we have accomplished so far are three design
24 certifications.
25 The early site permit portion of the

1 process is the one we are talking about today. It has
2 never been --
3 MEMBER RANSOM: Okay. I just wanted to
4 know whether it meant first time you were putting a
5 nuclear power plant there or what.
6 MR. BELL: First early site permit.
7 As with the design certifications before
8 and the COL to come, there's a number of common
9 issues. Just before we get into the details of how we
10 are approaching the early site permit, just a little
11 bit on how we are organized.
12 Again, I mentioned we have an NEI Task
13 Force. We've got a number of generic issues on a list
14 that is also in your package.
15 The most efficient way for the industry
16 and, frankly, for the staff to deal with these issues
17 is to deal with them one time generically upfront, and
18 NEI's provides the mechanism for doing that.
19 Obviously, the benefits are avoiding duplication of
20 efforts.
21 Since this hasn't been done before, there
22 is an opportunity to standardize on how to do it from
23 the start. So you will see three applications that
24 look very much alike, of course with exceptions for
25 site-specific information. Again, our goal is to

1 resolve as many of these common issues early, as early
2 as we can.
3 It is not unlike the process that has been
4 successfully used in the license renewal context. I
5 am not going to spend a lot of time, but there's a
6 two-page chart that looks like this in your package,
7 just to give you a sense for the number of so-called
8 common or generic issues that we have identified and
9 are working to.
10 We have highlighted in gray -- we
11 certainly could have used a color -- but we have
12 highlighted issues that are really more equal than
13 others. We've got a higher priority on those, and you
14 can see from the dates of meetings, and so forth, that
15 discussions on those priority issues are well
16 underway.
17 In several cases there's an "X" indicating
18 that the issue has a resolution pending. That means
19 we have had some discussions with the staff and we are
20 ready to move to the next phase or the end-game phase
21 on that issue, which is an exchange of letters between
22 NEI and the NRC which would document resolution of
23 that issue. That is the mechanism that we have set up
24 with the NRC and, again, following the precedent used
25 at license renewal.

1 The very first exchange of letters has
2 occurred. The NRC responded in a letter dated
3 Tuesday, this past Tuesday, November 5th, to our
4 letter regarding the very mechanism we want to use for
5 tracking and documenting resolution of issues. So
6 that should be the first of many such exchanges of
7 letters in each of these areas that document the
8 discussions and the solutions we have come up to.
9 The second-from-the-far-right column
10 reflects that some issues might potentially require
11 senior management attention. In fact, we discussed
12 the so-called plant parameter envelope issue, the PPE
13 issue, with the senior management on Tuesday. So that
14 is the nature of the "X's" over there in that column,
15 issues on which there are differing opinions or some
16 challenges needed to be highlighted to senior
17 management attention.
18 That is another mechanism we have going.
19 We periodically meet, the industry senior managers and
20 the NRC's, to assess the status and progress on the
21 early site permit.
22 One of the things I want to get into is
23 the plant parameter envelope approach. That is one of
24 the more challenging issues. It came up a couple of
25 times already this morning.

1 Before I do, it is worth just highlighting
2 again I think something the staff mentioned, that the
3 objectives of the early site permit are pre-approval
4 of sites -- it is a separate matter from design -- and
5 resolution of just as many issues as possible
6 associated with site suitability at this ESP stage.
7 That is both safety issues and the environmental.
8 What the slide shows is that these
9 objectives for ESP really flow from overarching
10 objectives that the NRC has had for some time, the
11 notion to decouple siting issues from design. Of
12 course, in Part 52 the mantra is "early resolution of
13 issues" there, early resolution of design issues
14 through design certification, early resolution of
15 siting issues through ESP, and, frankly, resolution of
16 just about every other issue before you turn to pour
17 concrete and begin to build a plant.
18 So back on ESP, there are two scenarios.
19 I guess there's a number of subscenarios. But
20 generally an applicant could come in knowing what
21 plant he wanted to build at that site. He might have
22 a lot of the design information, the kind of
23 information that the Committee was asking about
24 earlier.
25 The scenario of each of the pilot ESP

applicants is not that scenario. The scenario we foresee for most ESP applications in the future is the one where an ESP applicant does not know what type of plant is to be built on that site.

ESPs have a duration of between 10 and 20 years. They are renewable. It is very difficult, perhaps imprudent even, to select, try to select a technology at the time of ESP.

Certainly in the case of these applicants the intent is to use this bounding or plant parameters envelope approach to allow for sort of flexibility later to select the best technology at the time. Fortunately, the intent and the letter of the regulations allow for this. I will get into a bit more how that --

MEMBER RANSOM: Excuse me. On No. 9, does the applicant have to control or own the site? I mean, is it possible to propose a site that is public land, for example?

MR. BELL: It is an issue we haven't turned to yet, but the applicants need to have control of the site.

MR. ZINKE: Yes, there has to be a level of control. Then even after the ESP is issued, if something happens on that land that basically changes

1 the assumptions of the permit, then the Commission has
2 to be notified and potentially --
3 MEMBER RANSOM: But, for example, does
4 control mean a lease or own it?
5 MR. HEGNER: Both of those would be
6 possible, yes.
7 MEMBER ROSEN: How about an option to buy?
8 Would that be possible?
9 MR. ZINKE: I think there's a lot of
10 options we haven't pursued, like the legal channels,
11 what options we would necessarily propose.
12 VICE-CHAIRMAN BONACA: You cannot make it
13 too hypothetical. I mean, you are asking the NRC to
14 spend resources in reviewing and approval. There has
15 to be some level of -- you can't just say, "We hope to
16 or may be interested in buying some land somewhere."
17 I don't think --
18 (Laughter.)
19 MR. ZINKE: I mean, yes, obviously, you
20 have to have some control. The easiest, our first
21 goal is to only use land that we already own and have
22 total control over.
23 MR. BELL: Certainly control, but how that
24 control is assured, there may be options for dealing
25 with that. Certainly we are talking about existing

1 nuclear plant sites now that are well under our
2 control.
3 MEMBER RANSOM: It is like a private party
4 can propose to put a ski area on national forest land
5 and get permission to do that, and eventually does it,
6 and has a period of time that they are assured they
7 can operate that facility. I am just curious whether
8 a nuclear power plant could be treated in the same
9 way.
10 MR. BELL: Your reference to No. 9 threw
11 me for a minute, but that is our issue No. 9 on our
12 list. That is certainly one of the ones we don't
13 expect to have a difficult time with, but something
14 that clearly needs to be understood. As with any
15 other issue, we will write that resolution down and it
16 will be clear what the nature of control is.
17 MEMBER WALLIS: Presumably, you are
18 approving the site, not the company. So that if
19 Exelon gets approval for a site, that increases the
20 value of the site. They could then sell it to
21 somebody else?
22 MR. BELL: I think that's true. Certainly
23 it is an asset.
24 When you first mentioned 9, I thought
25 slide 9. I quickly put up slide 9, which is this one.

1 I mentioned the objectives of ESP. The
2 objectives of the industry, and these applicants are
3 certainly in line with that, pre-approval of sites,
4 but in a way that maximizes the resolution of those
5 issues associated with site suitability and preserves
6 the essential flexibility for the selection of the
7 best technology at a later time, when it is time to
8 build a plant.
9 MEMBER KRESS: Suppose you have an
10 approved early site permit, and you now come in and
11 say, "I'm going to build a certified plant, an AP600.
12 It's already certified on there." Then you can just
13 go ahead and start building it? What do you have to
14 do? What else do you have to do?
15 MR. HEGNER: The Part 52 process has three
16 main elements. We just mentioned two of them. Part
17 52 has three major components, one of which is the
18 early site permit, which basically is, I think of it
19 as, zoning approval for the site.
20 The second part is design certification
21 for an approved design, in your example, AP600. The
22 regulation then says you then have to go forward and
23 get a combined construction permit and operating
24 license drawing in both the early site permit and the
25 design certification.

1 MEMBER KRESS: But that just consists of
2 sort of an ITAAC-type thing that shows the commitments
3 made in the Part 52 certification are met. What's the
4 COL?
5 MR. BELL: The COL would include a number
6 of things. There's certainly some site-specific
7 design information that needs to be brought forward at
8 that time, ITAAC, that might be associated with that;
9 complete emergency plans, if not satisfied earlier;
10 operational programs, programs in terms of how you are
11 going to operate radiation protection for security
12 programs. A number of these are design-dependent and
13 would be addressed at the COL stage.
14 MR. HEGNER: And you have to do a cross-
15 reference in the sense that you have to demonstrate
16 that your specific site or design falls within the
17 limitations of your site.
18 MEMBER KRESS: Of your certification.
19 MR. HEGNER: You have to demonstrate
20 that --
21 MEMBER KRESS: When we certify a plant,
22 they generally have some site data and characteristics
23 in there.
24 MR. HEGNER: They make some assumptions
25 about the site in order to issue a certified design.

1 MEMBER KRESS: You have to verify that
2 those are met.
3 MR. HEGNER: You have to verify that you
4 are within those assumptions that supported the
5 certified design. We see a corollary there in terms
6 of proceeding with early site permit, that there are
7 certain assumptions we have to make about design in
8 order to support early site permitting.
9 MR. BELL: Which is the point of this
10 slide, which I won't spend more time on. But if you
11 have the image that we need to do for ESP what we had
12 to, we had to assume some things for ESP, as we had to
13 assume some things to complete design certification,
14 you have the right image.
15 MEMBER WALLIS: Presumably, these aren't
16 assumptions. These are based on knowledge.
17 MR. BELL: Certainly. Certainly.
18 Briefly, in fact, the NRC did an excellent
19 job in terms of the contents and the parts of an ESP
20 application. There is an emergency plan. There is an
21 environmental report, and there is a site safety
22 analysis.
23 I will move off this slide by saying we
24 intend that the PPE approach address all aspects and
25 be used to support all aspects of ESP application and

1 NRC review.

2 We have talked about what is a plant

3 parameters envelope. We have a working definition,

4 and it is here. It is a set of bounding, postulated

5 design parameters that are expected to bound the

6 characteristics of reactor or reactors that may be

7 deployed at a site. So we have a working definition

8 of this envelope.

9 Ronaldo has used the word that we have

10 used, "surrogate information."

11 MEMBER KRESS: What is the set of

12 parameters? Are you going to tell us what they are?

13 MR. BELL: I am going to tell you a little

14 bit about that.

15 MEMBER KRESS: Okay.

16 MR. BELL: Of course, this PPE -- we call

17 it "approach" -- is used under the scenario we are

18 talking about, where applicants have not decided what

19 it is that will be built at that site.

20 This picture kind of describes the entire

21 process. The parameters envelope is surrogate

22 information that the NRC needs to conduct their safety

23 and environmental reviews. In fact, it is incumbent

24 upon the applicants to provide a sufficient amount of

25 this parametric or bounding design parameter

1 information so that they can perform the reviews.

2 MEMBER KRESS: Tell us what that middle

3 bullet is.

4 MR. BELL: The middle bullet is --

5 MEMBER KRESS: No, no, no. There.

6 MR. BELL: Release?

7 MEMBER KRESS: Yes.

8 MR. BELL: Yes. In this case, it is a

9 subject we are continuing to work on -- it is a

10 challenge -- to address certain parts of the

11 requirements in a PPE approach.

12 The bottom line, as the NRC mentioned, is

13 meeting Part 100. I might, for purposes of today, try

14 to answer it this way: My understanding is that

15 meeting Part 100 depends --

16 MEMBER KRESS: So you could take your site

17 that you are looking at for a permit and back-

18 calculate, given this site, the Part 100 releases that

19 you said, and that is what would go in there?

20 MR. BELL: That's an option. What I was

21 about to say, there is a chi-over-Q element of the

22 parameter and of course the source term --

23 MEMBER KRESS: The population -- well,

24 actually, it is the boundary that you calculate?

25 MR. BELL: Yes, yes. The chi over Q will

1 be a site characteristic that is firmly established as
2 part of this early site permit, but we do not have the
3 design. So we are looking at different options for
4 demonstrating, in compliance with Part 100, to meet
5 the requirements, in the absence of an actual design,
6 that we can do that -- it was mentioned earlier -- a
7 bounding source term, a sample calculation using one
8 of the approved analyses from one of the design
9 certifications.
10 MEMBER KRESS: Well, you could almost just
11 put a chi over Q there, saying that it has to meet
12 this chi over Q.
13 MR. BELL: As a practical matter, I am
14 very seduced by that because that is the
15 characteristic of the site, and this is an early site
16 permit. It is not a design approval mechanism.
17 MEMBER KRESS: Yes, it is not in the
18 design. It is a characteristic --
19 MR. BELL: There are some words in the
20 rule that we must try to meet, and that is to describe
21 how the facility meets the Part 100 requirements. So
22 this is something we need to talk through with the
23 staff.
24 MEMBER KRESS: Does that come in at the
25 combined license phase? Would that be addressed at

1 the COL?

2 MR. BELL: Exactly. We are considering

3 options for doing that, but under any option we

4 choose, at COL the applicant, of course, will be

5 required to secure -- well, first of all, you will

6 need approved accident analyses and an NRC-approved

7 source term to go with the plant that he is planning

8 to put there.

9 MEMBER WALLIS: Yes, how do they do that?

10 Suppose I come in and say I want to build, I think I

11 am going to build a pebble bed reactor on this pond,

12 and I claim that my bounding source term is very

13 small.

14 MR. BELL: Well, let's separate it for a

15 minute. I am at COL now and I know what plant I want

16 to build. It will either be a certified design, in

17 which case these issues are resolved, or if it is a

18 design like a PBMR or another custom plant, the

19 applicant will need to go through the design review

20 process and gain approval of the NRC in terms of, what

21 are the accidents associated with that design and what

22 is the source term? So that would occur at COL.

23 The second thing that would occur, if he

24 wants to reference an early site permit, is a

25 verification or a demonstration that that plant fits

1 within the bounds established at ESP. That, under any
2 option we propose, be it the chi over Q focus, that
3 must occur at COL.
4 MEMBER KRESS: Let me ask you a question.
5 Suppose I have a site with four units on it already,
6 four 1,000-megawatt electric. Where is that entered
7 into this process as a consideration or is it?
8 MR. BELL: And the proposal is to add five
9 and six?
10 MEMBER KRESS: The proposal is to add some
11 more, an unspecified number.
12 MR. BELL: There would need to be a
13 determination that that site is capable of
14 accommodating additional nuclear units.
15 MEMBER KRESS: In terms of size --
16 MR. BELL: Certainly.
17 MEMBER KRESS: -- footprint, in terms of
18 its cooling water capacity --
19 MR. BELL: Certainly. Environmental.
20 MEMBER KRESS: -- and then its
21 environmental impact?
22 MR. BELL: I think Jerry Wilson has
23 mentioned some of the safety issues involved. But
24 because your footprint is not exactly where the plants
25 -- if they are over here, there may be different --

1 MEMBER KRESS: Yes, you have to physically
2 locate it somewhere. Geological issues --
3 MR. BELL: Even though you have an
4 existing site with units on it, we recognize that is
5 a further review to be performed. It is not a simple
6 matter. It is not a simple matter to just say, "Well,
7 then I can put additional units here."
8 What I would add to that is to say that we
9 would expect that perhaps a significant matter, the
10 previous information used to characterize the site and
11 approve it for those four units that are existing may
12 continue to be valid and usable to demonstrate the
13 acceptability of the addition. That is something the
14 staff has acknowledged, that valid existing
15 information can and should be brought forward into a
16 new application.
17 MEMBER SIEBER: It seems to me there's a
18 couple of things that I am confused about a little
19 bit. It seems to me you actually have to know what
20 the plant is in order to look at the distribution of
21 radionuclides which you write down and place in ESP 6.
22 That's the table, and there's corresponding additional
23 tables that give you the profile of what the nuclides
24 are under normal operation, which ones are considered
25 rad waste, which ones are accident emissions.

1 If I were doing this, I would look at Part
2 100 and say, "I'm not going to try to describe what
3 the plant will put out in various accident scenarios.
4 I will find out how much room I have, and then when I
5 describe later on at the COL stage the plant and what
6 happens to it under accident conditions, I will see if
7 I fit in there."
8 The problem is that is always a judgment
9 call because there's various combinations of
10 radionuclides. Depending on the plant type, how do
11 you know what those ratios are and what the overall
12 contribution is?
13 I don't know if my question is clear or
14 not, but it seems to me that, once you give those
15 ratios, you are basically committing yourself to a
16 certain type of plant.
17 MR. BELL: Which would not meet the
18 objective of the applicants. So the Committee has
19 zeroed in on what we consider one of our more
20 challenging examples of how to apply the approach. In
21 fact, I wasn't prepared to get into that because we
22 are continuing to select our best way through that
23 wicket.
24 MEMBER SIEBER: Well, let me ask you, is
25 my thought process as to how an applicant would do

1 this correct? Is that the way you interpret these
2 tables and how to fill them out and disclose what the
3 bounding parameters for the ESP are?
4 MR. BELL: If you think in terms of a
5 bounding approach, yes, we think that the bounding
6 approach is the one we want to use to answer any of
7 these questions, cooling water, effluents.
8 Now in the case of radiological accident
9 releases, there are just a number of variables in
10 there. What type of plant is it? What are the
11 credible accident scenarios? What are the source
12 terms and radionuclides and the various
13 concentrations?
14 MEMBER SIEBER: That's right, source term
15 is a key thing.
16 MR. BELL: So it becomes a
17 multidimensional problem when you try to find a
18 bounding number for each of those parameters. We are
19 looking for other ways, other than that, to accomplish
20 this objective and still meet the requirements of the
21 rules.
22 MEMBER SIEBER: You haven't found or
23 discussed or negotiated what those other ways are yet,
24 right? Because I am curious as to what they would be.
25 MR. HEGNER: No, we are still trying to

1 work through it. One of the approaches we thought on
2 early on was, well, let's identify all the isotopes,
3 identify the maximum amount from each of the various
4 technologies that we are considering, identify at what
5 time they appear during an accident sequence, and we
6 build that source term.
7 MEMBER SIEBER: That's what we did in the
8 old days, right, Bill?
9 MR. HEGNER: That's a big source term.
10 MEMBER SIEBER: Yes.
11 MR. HEGNER: We said, well, okay, maybe we
12 could come up with a technology that appears to be the
13 bounding technology that probably has the greatest
14 contribution, has the greatest likelihood of meeting
15 as close as it can the Part 100 dose limits. Then
16 perhaps if we can get that bounding technology
17 acknowledged, that you could site that at the
18 particular site. Well, then everything else, maybe if
19 we chose another technology at COL, we could
20 demonstrate that that other technology fit within the
21 envelope. We are still playing with that a little
22 bit.
23 But this is the single hardest challenge
24 in front of us: How do we meet the current words in
25 the regulation that say, "Demonstrate that you meet

1 the dose consequence limits of Part 100." We're
2 struggling.
3 MEMBER SIEBER: I can appreciate that.
4 MEMBER LEITCH: I have some similar
5 questions, perhaps similar, about cooling water. I
6 mean, what do you do there? Do you say, "We're going
7 to reject so many million Btu's per hour to the
8 river," and that's the bounding analysis?
9 But that presupposes the present river.
10 I mean, perhaps as the design evolves, there could be
11 impounding basins, dams, river diversion schemes, all
12 sorts of things to modify that. That many Btu's per
13 hour may not be acceptable with your present river.
14 MEMBER SIEBER: Yes, but that has happened
15 in the past, and then you are back to the cooling
16 tower or in certain times of the year you don't run at
17 full capacity because of the discharge temperatures.
18 You can deal with that.
19 MEMBER LEITCH: Yes, but in order to
20 bracket that, you may have to -- I mean the site may
21 be right now at the maximum capacity.
22 MR. HEGNER: Right. The site might be
23 suitable for an additional 1,000 megawatts but it
24 can't handle 2,000 megawatts. That is part of the
25 siting management that we are going through.

1 MEMBER LEITCH: Or maybe there are some
2 design things that could be done to make it suitable
3 for 2,000 megawatts.
4 MR. HEGNER: And you might be able to
5 mitigate some of that by cooling towers or other water
6 sources. Yes, so you can look at that and see what is
7 reasonable and economical.
8 MEMBER LEITCH: But those thoughts are not
9 going to be in the early site permitting process,
10 right?
11 MR. ZINKE: Some of that actually is in
12 the early site permitting process.
13 MEMBER LEITCH: Oh, it is? Okay.
14 MR. ZINKE: Yes. And in the cooling
15 water, it ends up not near so difficult to do all of
16 those things as the source term problem. Source term
17 is the real complex one.
18 MEMBER SIEBER: Well, you assume a certain
19 thermal efficiency. You've either got it or you don't
20 have it. So you size your pond or you look at the
21 current river flows and maxs and mins. I don't see
22 that as -- if you use a sea-grade engineer, he would
23 come out with the right answer.
24 MEMBER ROSEN: Is the number of reactors
25 specified or number of units as part of this process

1 or is that left to a variable also?

2 MR. ZINKE: The number of reactors is

3 variable, but it is bounded --

4 MEMBER SIEBER: By megawatts.

5 MR. ZINKE: -- by megawatts.

6 MEMBER SIEBER: Right.

7 MR. ZINKE: Right, and there are some

8 other parameters that could bound it, yes.

9 MEMBER ROSEN: Those are the cooling water

10 limitations?

11 MEMBER SIEBER: And effluents.

12 MEMBER ROSEN: So then if you could figure

13 out, find a very efficient reactor, you could put more

14 of them on the site?

15 MR. ZINKE: Yes. In our putting together

16 the ESP example, we looked at our site may be able to

17 hold two AP1000s but it could only hold one ABWR; it

18 could handle four of some other kind.

19 MEMBER ROSEN: It could handle 10 PWRs?

20 MR. ZINKE: Right. So there is always a

21 limit. So the number isn't the same, depending upon

22 what technology you are using. But we look at each

23 and then say, well, if I was building 10 of this, what

24 are these parameters and what do I have to evaluate

25 the site for, so I can bound as much as I could?

1 MEMBER KRESS: We are running short on
2 time. Some of us have another meeting we have to go
3 to. I wonder if you could go to the slides that give
4 us the main message that you would like for us to go
5 away with and maybe skip some of the ones that you
6 feel like we might be able to read on our own.
7 MR. BELL: Certainly, you have some
8 reading material there. The Committee was asking,
9 what is the NRC going to be asked to approve or what
10 is the NRC going to be asked to find? We expect that
11 the NRC will find that the site has been properly
12 characterized, that the site characteristics are
13 accurate and complete.
14 In the case of the design parameters, if
15 you flipped ahead, I think, to the next slide, you see
16 this chart. This is just the first page of 20-30
17 pages of hundreds of design parameters.
18 The NRC will need to find that that set of
19 information is sufficient to support the required
20 reviews and support the third finding back on this
21 slide. This is the bottom line: that this site is
22 acceptable for construction and operation.
23 MEMBER SIEBER: So you would use this
24 chart, the applicant would use that to fill out the
25 tables? There are several tables in ESP 6. Okay?

1 MR. BELL: You would use this chart. This
2 is what we call a worksheet.
3 MEMBER SIEBER: Right.
4 MR. BELL: It's got six technologies here.
5 For the technologies a particular applicant is
6 considering, he chooses the bounding parameter. That
7 becomes, the term that was used earlier, the permit
8 basis or the number that NRC would use in its review
9 of the application. The million-gallons-of-water-per-
10 day kind of thing, is that environmentally acceptable?
11 So find acceptability of that bounding value.
12 It is both different but similar to, if it
13 was an actual plant that had a million gallons, they
14 would perform the same review and come to the same
15 conclusion.
16 MEMBER ROSEN: Doesn't this sort of
17 transfer the burden to the staff, the NRC staff,
18 rather than the applicant, in the sense that, if
19 there's no plant parameter for a given -- I mean in
20 your 30 pages, which I haven't seen, but let's say
21 there's some X over Y, or something else that is not
22 listed here in the 30 pages. It can be anything?
23 In other words, if it is not on this list,
24 the applicant can come in and propose a concept that
25 has that parameter that is not on the list at any

level? That, to me, is the opposite of the way licensing works.

MR. BELL: We think the burden is actually here to describe this, provide the complete set of design parameters, to choose parameters that will do what they want to do, and that is bound the technology to be chosen later.

If we do a poor job of that or if a design comes along where there is an important parameter that was not considered at ESP, that design would not fit within the envelope, and at COL you would have to address that issue, if it is tritium for a heavy water reactor, and that type of reactor wasn't considered or that parameter was not considered in the PPE.

MEMBER ROSEN: So this is viewed as permissive? If you get within these limits, these bounding values, it is okay? But if you don't have a bounding value for something, then all bets are off and it has to be --

MR. HEGNER: You deal with it at COL. If you don't have it or you are outside the bounding value, you have to deal with it at COL.

MR. BELL: This is something we intend to share with the NRC and, thus, the ACRS, the entire PPE worksheet. The objective there is to make sure the

1 staff understands where these values are coming from,
2 that they are based in reality, how the bounding
3 values will be selected. We expect to do that by the
4 end of the year.
5 In the interest of time, we have one more
6 discussion planned with the NRC staff to cover
7 remaining aspects of this issue; for instance, the one
8 that we confessed that we are still working on, the
9 meeting Part 100 and the dose consequences. That is
10 in early December.
11 At some time, at the Committee's
12 convenience, we would be happy to come back with or
13 without the staff and would give you an update.
14 On the subject of the review standard
15 which the staff talked about, I think in the interest
16 of time I would just like to summarize our perspective
17 on that. We think it is going to be very important to
18 ensure smooth and efficient ESP reviews. We certainly
19 support the use of existing guidance, where
20 applicable.
21 But our review of both 0800 and the
22 NUREG-1555 indicates there's just a significant amount
23 of design-dependent information and reviews woven
24 throughout there. So we are very interested to see
25 how the staff will parse that. We got some insight

1 this morning on that. We will be interested to see
2 how they parse that for ESP purposes.
3 Of course, ESP does not involve approval
4 of any design information. So we expect design-
5 dependent reviews to be excised from the reviewer
6 guidance for purposes of ESP.
7 The staff intends to publish that for, I
8 think, trial use and comment, also perhaps by the end
9 of the year. We will be very interested to comment on
10 that.
11 There were some examples back here. I
12 would just indicate that we think there is a mixed
13 bag. Some of the guidance seems readily applicable
14 because it is strictly site-related; other guidance,
15 strictly design-related -- we don't see how that
16 really applies -- and then a middle ground, where
17 there is both a site component and a design component
18 to the review.
19 In the interest of time, I might just stop
20 there and thank the Committee for your time and your
21 attention. Your questions were very good.
22 MEMBER KRESS: Well, thank you. We
23 appreciate it.
24 I guess we will discuss among ourselves
25 whether there is a need for a letter about any

1 concerns. We could air those now. We have a little
2 bit of time, if there are members who want to make any
3 comments about this.
4 MEMBER POWERS: I guess I am a little
5 perplexed about what you call the "source term
6 problem." Staff would like you to show that you can
7 satisfy the requirements of 10 CFR Part 100. Why
8 don't they just say you will and whatever plant you
9 put up there will?
10 MR. BELL: We shall.
11 MEMBER POWERS: Yes.
12 MR. BELL: Or at COL you won't get a
13 license.
14 MEMBER POWERS: Yes. Why agonize over it?
15 Just say you will.
16 MEMBER KRESS: Yes, what's wrong with that
17 approach?
18 MR. BELL: My take is that there is an
19 element here where the prescriptive -- where the
20 language in the regulation as it exists talks about
21 describing the SSCs that bear significantly on the
22 ability of the facility to meet the Part 100
23 requirement. Those words are in there now.
24 Our sense is that, like any regulation, it
25 is subject to some interpretation. We think there are

1 ways to work within those words and that framework to
2 meet the intent of the regulations, to meet the
3 objectives of the ESP and the PPE approach. But that
4 is certainly one reason we are struggling.
5 MEMBER POWERS: I think I would offer,
6 then, an exposition on natural and engineered aerosol
7 removal and say, "I'm going to meet Part 100 whenever
8 the plant gets designed." I mean it doesn't strike me
9 there is a huge problem here.
10 MEMBER KRESS: As a matter of fact, when
11 we certify something like the AP600, any design, we
12 actually certify it on the basis it meets the
13 regulations, the design does.
14 MR. BELL: Right.
15 MEMBER KRESS: And that doesn't have much
16 to do with site except chi over Q. If you say, "Well,
17 this meets the chi over Q; we now need the
18 certification about it," then you know it is going to
19 be Part 100.
20 And if for some reason it doesn't, when
21 they get to the COL step, you just are not allowed to
22 build that plant. I don't quite understand what the
23 issue is.
24 It looks to me like when you are looking
25 at early site permitting, you are looking at mostly

1 environmental issues. Is this site suitable for
2 another plant, given its characteristics? The plant
3 that you are going to put there has to meet
4 regulations. So, therefore, safety is not a real
5 issue because you already know it's got to meet the
6 regulations or else you aren't going to be allowed to
7 build it.
8 So it seems to me like the early site
9 permitting part just deals with the environmental
10 aspects of this siting, but I am not sure if that is
11 the correct view or not.
12 MR. HEGNER: I would like to pursue Dr.
13 Powers' approach and even expand it and send in a one-
14 page application that says, "We'll meet all the NRC
15 requirements. Give us the permit."
16 (Laughter.)
17 MEMBER KRESS: I think there are
18 environmental issues.
19 MR. LYONS: Well, this is Jim Lyons again.
20 The staff still has to do a review of the
21 information that is provided to us. One of the things
22 that is part of this process, these design parameters,
23 which probably if you look at slide 14 of their
24 packages, I think there is a real good description of
25 the difference between parameters and characteristics,

where parameters are things that are assumed to be and characteristics are what actually are.

In the early site permit we are assuming a design where we know the actual characteristics of the site. So we need, obviously, to review those characteristics of the site. Then, for this assumed design, would it fit, would this site be acceptable?

In the design certification process we did the opposite. We assumed a site. Remember it covered 80 percent of the sites in the U.S. There was some assumption that it would be able to fit on most of the sites, but we knew the actual design. We knew the characteristics of the design.

So, as part of the COL, you marry those two. You make sure that the design parameters assumed in the early site permit are met by the characteristics of the design, and vice versa. I think that is a key point to remember of how these two fit together at the end.

The other thing is that, as Mr. Hegner was saying, if you just came in and said, "Well, we'll meet all your regulations," we would want to know how. So that is where you get into more discussions of how they are going to do that and how we can assure ourselves that it is reasonable that they will be able

1 to meet the regulations, because we want this early
2 site permit at the end, when it comes up at the
3 combined license stage, if at all possible, not to
4 have to reopen any of those issues, that they are
5 going to fit within that bound. So that is why we are
6 trying to keep it reasonable areas and not build the
7 box so big that it gets unreasonable.
8 MEMBER SIEBER: Jim, I presume that one of
9 the products of the early site permit was the
10 Environmental Impact Statement. That is the reason
11 why the detail, because NEPA requires a certain amount
12 of detail to write that statement.
13 MR. LYONS: That's correct.
14 MEMBER SIEBER: And you need the statement
15 before you start digging holes in the ground. You
16 can't issue the COL until the EIS is approved.
17 MR. LYONS: Right, and an Environmental
18 Impact Statement will be issued as part of the early
19 site permit. Then it would be updated as needed as
20 part of the combined license.
21 MEMBER SIEBER: If I look at these tables
22 in here, they look like the kinds of things you find
23 in an EIS. So I just presumed that's what they were
24 going to do when you get them.
25 MR. LYONS: The other thing I would like

1 to make the point of is, at this point the staff is
2 not asking for a letter from the Committee.
3 Obviously, when we come back with our review guidance
4 and we have a well-defined process, then we would be
5 seeking a letter. But at this point we just wanted to
6 come in and inform you of where we were, where we are
7 headed on this, give you an idea of how the industry
8 is moving forward.
9 A lot of this, similar to the certified
10 designs, we will be working through these issues as we
11 do our reviews, and the final product will be
12 reflective of the lessons we have learned as we do
13 those reviews, as any first-time process usually is.
14 MEMBER LEITCH: I have a question still
15 back on the cooling water issue. Suppose the licensee
16 comes in and says, "We want to reject this many
17 million Btu's to the river." Say that is reflective
18 of a 2,000-megawatt plant. You wouldn't say it is a
19 2,000-megawatt plant because, as I understand it,
20 within this envelope you would say we want to reject
21 this many Btu's to the river, and you look at that and
22 that's ridiculous. There's not that much capacity in
23 the river. You could maybe only handle a 300-megawatt
24 heat rejection to that river.
25 MR. LYONS: And that is where we would not

1 issue an early site permit.

2 MEMBER LEITCH: But now the licensee has

3 in the back of his mind, "Well, we are going to make

4 major changes here. We are going to install a dam, a

5 river diversion scheme, cooling towers," all sorts of

6 things like that that are going to make this

7 acceptable. But their design hasn't progressed that

8 far. So they are not prepared to show you a design of

9 exactly what they are planning to do to make this

10 2,000-megawatt plant acceptable on that site.

11 So what do you do about that? You reject

12 the whole early site permit or do you say --

13 MR. LYONS: Yes, yes.

14 MEMBER LEITCH: -- it's okay, but we're

15 not approving this Btu consideration at the moment?

16 MR. LYONS: I think at that point --

17 because that's, obviously, one of the major

18 considerations -- we wouldn't be able to find it

19 acceptable. They would have to either present us

20 plans of how they would be able to accommodate that

21 type of heat rejection or we wouldn't be able to find

22 that.

23 MEMBER LEITCH: So they have to come in,

24 then, with at least a conceptual design of how to

25 accommodate --

1 MR. LYONS: Yes.

2 MEMBER LEITCH: -- the Btu, in my example

3 the heat rejection from the 2,000-megawatt plant?

4 MR. LYONS: Yes. I think from industry's

5 standpoint, you would view that the same way, I

6 assume?

7 MR. ZINKE: Yes, because whatever you

8 would be proposing would also have some environmental

9 effects.

10 MEMBER LEITCH: You mean the cooling tower

11 itself?

12 MR. ZINKE: Yes. So you do have to get

13 into some level of detail on those kinds of things.

14 MEMBER ROSEN: And, also, clearly, you

15 wouldn't be proposing to build a power plant on a site

16 that had limited cooling capacity unless you had some

17 idea in mind of how you are going to handle the heat

18 loads.

19 MR. ZINKE: That's correct.

20 MEMBER ROSEN: That's right.

21 MR. BELL: Of course, that's what an ESP

22 effort is going to present, the applicant's evaluation

23 of the suitability of the site and the ability to

24 handle that much heat rejection. Then it is for the

25 staff to approve or not that evaluation.

1 MEMBER LEITCH: So with this at least
2 comes a conceptual design of how you might do that?
3 MR. ZINKE: Yes. I mean, like for ours
4 specifically, we evaluate, do we think we could get
5 water if we had pumps or if we had an intake
6 structure, or are there several options? We evaluate
7 those and present those options.
8 MEMBER LEITCH: Okay.
9 MEMBER KRESS: Mr. Chairman, we will have
10 to close the meeting. I will turn it back to you now
11 because several of us have another place to go. So
12 thank you.
13 VICE-CHAIRMAN BONACA: We thank you very
14 much. We appreciate the presentation.
15 We have one last item on the agenda we
16 would like to hold before lunch. That is a brief
17 report from the License Renewal Subcommittee Chairman
18 on the Peach Bottom license renewal application. I
19 think that it is going to be brief. Mr. Graham
20 Leitch.
21 MEMBER KRESS: Would you please tell the
22 committee why you are qualified --
23 MEMBER ROSEN: And speak with sufficient
24 clarity and volume.
25 (Laughter.)

1 MEMBER LEITCH: All right. Well, let's
2 see, PT, David, come up and sit.
3 We had a License Renewal Subcommittee
4 meeting on October 30th, where we discussed the Peach
5 Bottom license renewal application. This is for Peach
6 Bottom II and III.
7 What we wanted to do today was give you
8 just a quick synopsis of what transpired at that
9 License Renewal Subcommittee meeting. Many of you
10 were there, and we just want to quickly review it.
11 I passed out this paper which is just some
12 of my remarks here, and I will go through this
13 quickly. You can read it for yourself.
14 Peach Bottom is the second BWR to seek
15 license renewal. Hatch was the first plant, and Hatch
16 used the functional approach to license renewal.
17 Peach Bottom used the system approach. So, in that
18 sense, it was the first BWR using the system approach.
19 As is usually the case, they are seeking
20 a license renewal for 20 years beyond the original
21 operating dates, which are listed there. Those dates
22 include construction period recapture.
23 Peach Bottom II and III is on the same
24 site as Peach Bottom I, which is a high-temperature,
25 gas-cooled reactor that has been decommissioned years

1 ago and is in safe store. There are no common systems
2 between units II and III and unit I. Unit I is
3 entirely out of the picture now.
4 Peach Bottom sits on the Susquehanna River
5 on a large pond created by the Conowingo Dam, which is
6 also owned by Exelon. Peach Bottom relies on this dam
7 for operation, that is, the cooling water, but does
8 not depend on the dam for emergency service water.
9 There are onsite ponds, pumps, and supplies that make
10 that not dependent upon the dam.
11 It does, however, depend upon the dam for
12 station blackout purposes. They do not have a station
13 blackout diesel, but they do have a submergible
14 electrical cable coming up from the dam. To that
15 extent, the Conowingo Dam is a part of the aging
16 management program for blackout consideration.
17 The license on the dam -- dams are
18 licensed for 50 years. Conowingo was built in about
19 1926, or something like that, and its license has been
20 renewed once. So it, presumably, will come up for
21 renewal of that license before the period of extended
22 operation. Exelon intends to apply for expansion of
23 the license on the dam.
24 The SER with open items, which is what we
25 reviewed, had at the time we reviewed it 15 open items

1 and 18 confirmatory items. All but a few of these
2 appeared to be at least informally resolved at the
3 time of the Subcommittee meeting.
4 The final presentation to the full
5 Committee will probably be in March. We have every
6 expectation that the open items and confirmatory items
7 will be resolved by that time.
8 The license will be issued with several
9 license conditions. I am not sure of the exact number
10 yet, probably someplace between one and three.
11 Peach Bottom references some BWRVIPs, 15
12 in number, and credits their compliance with those
13 VIPs in their license renewal application. There are
14 three that may be of interest; 78 and 86 have NRC
15 approval for 40 years and not for the period of
16 extended operation, but that extension, the approval
17 for that extension period is presently being
18 considered. That may or may not result in a license
19 condition, dependent upon the status of that approval
20 at the time the renewed license is issued.
21 There's also another one, BWR-76, which is
22 pending, not yet approved. Approval is expected by
23 December 31st, 2002. If that approval is granted,
24 fine. If it is not granted, that will likely yield
25 another license condition.

1 A couple of interesting things about the
2 Peach Bottom application: Certain systems were not in
3 scope, but have portions that satisfy the safety
4 function. These portions were realigned to be
5 considered as part of the scope of the safety system.
6 They talk about five cases. I think these
7 can be best understood by referring to some of these
8 viewgraphs. In the interest of time, there's
9 basically five different configurations. These are
10 basically systems that were not classified, or
11 portions of systems that were not classified, as
12 safety-related, but they went through this realignment
13 process, primarily as a response to an RAI, and
14 subsequently reclassified portions of these systems as
15 in the scope of license renewal.
16 For example, this system here is
17 illustrative of a system, say, for example, service
18 water, which penetrates the containment. The service
19 water has no safety-related function and was not
20 originally within the scope of license renewal.
21 But, obviously, from a pressure-boundary
22 function, a portion between those two valves is in the
23 scope. When that situation was pointed out to Peach
24 Bottom, they included the portion between the two
25 valves and the scope. Even though service water per

1 se is not safety-related or not within scope, the
2 portion between those two valves was added to the
3 scope.
4 There are several other examples of this.
5 I don't need to go through them all, in the interest
6 of time. But here is the same kind of a situation
7 where there is a piping system that the whole system
8 is not in scope, but the portion out to the first
9 isolation valve is. If there are questions about
10 that, we can discuss that more thoroughly. But, I
11 mean, basically, that's what they did, was classify
12 those pieces into the scope. That is a process that
13 they called realignment.
14 There were other systems that were
15 originally not in scope but, as a result of RAIs, they
16 were added, primarily because a rupture of those
17 systems could spray fluid onto a safety-related
18 system.
19 An important example of that was service
20 water, for example, which Peach Bottom has no safety-
21 related function, but yet its rupture could spray
22 water on systems which are important.
23 So, as a result of the RAI, they went back
24 and classified certain portions of service water
25 within the scope. Now they didn't necessarily

1 classify the whole service water system as being
2 within scope, but they took big chunks of it, like,
3 for example, all the service water in the reactor
4 building was classified as being in scope. They
5 didn't discriminate between over in this corner the
6 reactor building is not and over in this corner the
7 reactor building is. They classified the whole
8 service water system and the reactor building as being
9 in scope.
10 MEMBER SIEBER: I've got the feeling that
11 everything in the reactor building was in scope.
12 MEMBER LEITCH: Everything related to
13 service water, Jack?
14 MEMBER SIEBER: No, everything.
15 VICE-CHAIRMAN BONACA: Yes, I had the same
16 feeling, that --
17 MEMBER SIEBER: Everything. They just
18 said, if it is in the reactor building, it is in
19 scope.
20 VICE-CHAIRMAN BONACA: Yes.
21 MEMBER LEITCH: I didn't quite hear it as
22 being that all-encompassing.
23 MEMBER ROSEN: That's not my impression.
24 MEMBER LEITCH: No, it's not my
25 impression, either.

1 VICE-CHAIRMAN BONACA: I had the same
2 impression, but it may be the communication on this
3 issue, anyway, was --
4 MEMBER LEITCH: I don't know, David, do
5 you have --
6 MR. SOLORIO: Hi. My name is Dave
7 Solorio. I'm the Project Manager from the staff for
8 the Peach Bottom SER.
9 Actually, I am not sure I remember that
10 the way you did, Dr. Sieber, but in a conversation
11 with the applicant just two days ago I had on another
12 issue they actually said that to me, that essentially,
13 because of this non-safety-related issue, essentially
14 all the piping within the reactor building that was
15 non-safety-related was within scope, because they
16 didn't want to get into the situation that Dr. Leitch
17 just described of trying to pick out corners that were
18 and corners that weren't.
19 MEMBER ROSEN: All the piping in the
20 service water system or all the piping?
21 MEMBER LEITCH: Yes, I know all the piping
22 in the service water system is --
23 MR. SOLORIO: Well, they did say other
24 non-safety-related systems like the service water
25 system were within scope. But I will take it just a

1 little bit farther and get back to Ramin if there is
2 any change from what I said now.
3 MEMBER LEITCH: I wouldn't be surprised if
4 there's some miscellaneous systems in the reactor
5 building that we haven't thought about that aren't in
6 scope, like auxiliary steam or --
7 MEMBER SIEBER: Like instrument air --
8 MEMBER ROSEN: Potable water.
9 MEMBER SIEBER: Instrument air, service
10 air, those would be the ones that don't have fluids in
11 them. On the other hand, it seems to me I remember
12 them saying that.
13 MR. SOLORIO: The applicant wanted me
14 to --
15 MEMBER LEITCH: Well, we will verify that.
16 MR. SOLORIO: The applicant wanted me to
17 apologize; they couldn't be here. They are having an
18 EP drill today.
19 MEMBER SIEBER: That's okay. Thanks.
20 MEMBER LEITCH: Because of the above two
21 issues, that is, this realignment and the
22 reclassification of some of these systems in scope,
23 you can't really get the full picture of what is in
24 and out of scope unless you read the license renewal
25 application, the SER, the RAIs, and the response to

1 the RAIs. So, I mean, there's no one document that
2 gives you the total comprehensive picture of the
3 situation. I don't know that that is necessarily
4 Peach Bottom unique, but it is interesting.
5 VICE-CHAIRMAN BONACA: Well, actually, we
6 have raised this issue with the staff, because that I
7 think has been a recurring concern of, where do you
8 have the documented scope? But that is an issue that
9 I know the staff is exploring, is looking at.
10 MEMBER LEITCH: And we have an SRM to
11 discuss improving this process mid-year. I think we
12 are thinking about the May timeframe next year. This
13 may be one of the issues that we may want to address
14 in that particular letter, because I think this is
15 just a generic complication.
16 MEMBER SIEBER: A missing element is
17 always marked-up drawings. However, they aren't
18 required to supply marked-up drawings as part of the
19 application. That is why we never get them.
20 MEMBER LEITCH: Right.
21 MEMBER SIEBER: Okay, but they do submit
22 them, and every plant has done that who has done a
23 system review as opposed to a functional review. Once
24 you have those, it makes it pretty easy.
25 MEMBER ROSEN: Actually, saying that we

never get them is a little too strong, I think, Jack. We have seen some of them.

MEMBER SIEBER: We've seen them, but they are not --

MEMBER ROSEN: When they give it to them on a CD-ROM, I have seen several applications that have had marked-up drawings on them.

MEMBER SIEBER: Yes, including Peach Bottom, but they aren't complete. They don't have all the drawings, and they aren't required to submit them as part of the application, which is what I said. Every plant has allowed the staff to look at them, but it is not on the docket.

MR. KUO: This is PT Kuo, the Program Director for License Renewal and Environmental Impact.

Dr. Sieber, you are correct, the applicants are not required to submit the drawings. However, for the efficiency of a review, they have all volunteered to submit the drawings.

MEMBER SIEBER: Right.

MEMBER LEITCH: A couple of specific issues here: The cables, Peach Bottom has had a history of cable failure from moisture, resulting in cable treeing. Many cables have been replaced with moisture-resistant cables over the past eight to ten

1 years.

2 But, according to a recent NRC inspection

3 that is one of the inspections associated with this

4 program, there is still moisture, water in manholes,

5 and things of that nature. So this is an open item,

6 and the ACRS is interested in the resolution of this

7 item.

8 Another item that came up was related to

9 Hilti bolts, that is, whether the aging of concrete

10 would result in the relaxation of -- Hilti bolts are

11 just a tradename for concrete anchors, basically. It

12 was agreed that this was not particularly a Peach

13 Bottom issue, but really a current licensing issue.

14 The staff agreed to look into this matter.

15 MR. KUO: And after the ACRS meeting last

16 week I have talked to our technical staff, and

17 sometime later we will get back to the Committee.

18 MEMBER LEITCH: Another issue was with

19 respect to the standby gas treatment system ductwork.

20 The Subcommittee questioned the fact that there was no

21 aging management program for standby gas treatment

22 system ductwork. The licensee said that the ductwork

23 was either at high temperature or insulated and,

24 therefore, no program was required.

25 That is an issue that we still want to

1 hear some more back about, because Peach Bottom has a
2 considerable run of underground ductwork. The
3 discharge for the standby gas treatment system runs
4 underground on its way up to the off-gas stack.
5 The inspection of the RWST and CST, we
6 talked about that quite a little bit. These tanks are
7 similar in construction, but Peach Bottom proposes to
8 look at the refueling water storage tank and credit
9 that for looking at the condensate storage tank.
10 The issue there is that the condensate
11 storage tank is difficult to get empty, and so we have
12 to just look at the refueling water storage tank. We
13 did discuss that quite a bit. The tanks are built on
14 an engineered backfill. It is not just they scrape up
15 the ground. I mean it was an engineering fill. The
16 tanks are similar construction. The fluid is reactor
17 grade water in both cases. So we kind of got
18 ourselves convinced that was okay.
19 The licensee also responded at the meeting
20 to our concern about corrosion in the diesel generator
21 tank. They said the tank was inspected in 1995, and
22 part of the tech. spec. requirements is that it be
23 inspected every ten years thereafter, and we were
24 satisfied with that.
25 There was a good discussion about the

1 condition of the torus. Peach Bottom is a Mark I
2 containment with a torus. There were detailed
3 questions about the torus inspection program, the
4 material condition and coating of the torus, depth of
5 pits, future inspection. These questions were
6 answered to our satisfaction by the licensee.
7 There were 29 --
8 MEMBER POWERS: How about the bellows on
9 the torus?
10 MEMBER LEITCH: The bellows, that was not
11 specifically discussed, as I recall. Do you recall
12 any discussion about bellows?
13 MR. SOLORIO: This is Dave Solorio.
14 I believe they are within the scope, but
15 I am going to have to get back to you, Doctor, and
16 look that up. Probably today I can get back to you,
17 in just a few minutes.
18 MEMBER LEITCH: I'm pretty sure they are
19 in scope, but I don't know that that was exactly
20 Dana's question. I think your question related to the
21 inspection of the bellows, was it?
22 MEMBER POWERS: The inspection on how they
23 are corroding because they do corrode.
24 MEMBER LEITCH: Yes.
25 MEMBER ROSEN: I don't think we

1 specifically addressed that.

2 MEMBER LEITCH: I don't recall any

3 discussion about that, but that is certainly a good

4 question.

5 MR. KUO: You're correct, I don't recall,

6 either, that we ever touched upon the issue.

7 MEMBER LEITCH: There were 29 existing

8 programs or augmenting aging management programs and

9 five new programs. Some of these programs depend upon

10 future experience and NRC and industry positions in

11 the future. As with all licensees, these future

12 programs will require a significant NRC inspection

13 activity at some future time.

14 We have been concerned in the last couple

15 of discussions we have had regarding license renewal

16 with this fairly major NRC inspection activity coming

17 at us, not now but 15 years into the future maybe. So

18 the staff is preparing a document, which is now in the

19 draft form, to attempt to manage and track these

20 commitments.

21 I think, again, this is not a Peach Bottom

22 generic issue, but it is one of these things that we

23 may want to consider putting in this May letter that

24 we are going to write in response to the SRM.

25 The TLAAs were addressed. They are listed

1 there. I don't think there was anything particularly
2 unique about those TLAAs.
3 The ROP status, there was some interest
4 expressed in what is the current ROP status of the
5 plant. The staff agreed to provide this information.
6 I think it has been handed out to you just a few
7 minutes ago outlining the current ROP status, which in
8 a word I think is all green. It is in the licensee
9 response column, but there are some other details
10 there that might be of interest to some.
11 MEMBER ROSEN: I think it is all green, as
12 you suggest, but the Committee should note what the
13 ROP status is as a routine matter, in my opinion.
14 That seems to me something for the May letter as well.
15 There are two white findings, preliminary
16 white findings, in the emergency preparedness
17 cornerstones.
18 MEMBER LEITCH: Right, yes.
19 MEMBER ROSEN: You can factor that into
20 your thinking on whether that is a license renewal
21 issue.
22 MEMBER LEITCH: Yes, I think this is easy
23 to do. There is some internal disagreement, I think,
24 as far as whether it is relevant or not to 20 years
25 down the road, but yet it is easy to do. My own

1 feeling is that we would be remiss if we didn't at
2 least spend two minutes saying what's the current
3 status of things. It is easy to do. Why not do it?
4 MEMBER SIEBER: The other side of the
5 argument is, if it isn't very good, what are you going
6 to do?
7 MEMBER LEITCH: We are probably not going
8 to do anything about it, Jack.
9 MEMBER SIEBER: Okay.
10 MEMBER LEITCH: But, I mean, I would think
11 we would all be rather embarrassed if there were some
12 red bullets there, and somebody whom we just approved
13 license renewal, and somebody said, "Well, what about
14 that issue?"
15 MEMBER SIEBER: Agreed. You can look at
16 anything you want.
17 VICE-CHAIRMAN BONACA: The only question,
18 what are you suggesting, that we put a note in every
19 letter that we write for license renewal? No?
20 MEMBER LEITCH: No.
21 VICE-CHAIRMAN BONACA: This is good that
22 we talk about it, absolutely. Just the question is,
23 you know, should we document -- I don't think we
24 should document anything about --
25 MEMBER ROSEN: I think if there are things

1 in the letter, I mean in the ROP, that impact on
2 license renewal, we have a chance to assess it.
3 I think the example here, given we have
4 one in front of us, which is there are two preliminary
5 white findings on emergency preparedness involving
6 inadequate critique of an emergency preparedness
7 exercise, I think they could probably remedy that
8 problem through the license renewal term.
9 MEMBER LEITCH: Given 20 years, I think
10 they will straighten that out.
11 (Laughter.)
12 MEMBER ROSEN: And a timely classification
13 of an alert, of an actual event. I think these are
14 problems that don't bear on license renewal.
15 MEMBER LEITCH: I agree, yes.
16 MEMBER ROSEN: So that's all a judgment.
17 Now there could be almost anything written on this
18 piece of paper, and that is why I think I, for one
19 ACRS member, would like to know what the status of the
20 current plant before I would agree to a letter that
21 said grant their extension of the license. I think it
22 is like putting blinders on not to look at it.
23 MEMBER LEITCH: Yes. I don't see any
24 problem looking at it.
25 So we went around the room at the

1 Subcommittee meeting. I believe that no one felt that
2 an interim letter was required at this time. The full
3 Committee should hear a presentation at an appropriate
4 time, which is now expected to be about March of 2003.
5 PT, David, any additional comments?
6 MR. KUO: No, I have no further comment.
7 Just one thing, I just want to point out that the EP
8 in general is not in the scope of license renewal.
9 Dr. Rosen, you just mentioned that there are two white
10 items on EP, but that is generally not in the scope of
11 license renewal.
12 MEMBER ROSEN: Well, I think that is fair
13 enough for the staff to say, but the ACRS has broader
14 discretion.
15 VICE-CHAIRMAN BONACA: Yes, I was just
16 questioning whether we should, in the letter that we
17 write to the Commission recommending that the license
18 will be granted, make a statement about the current
19 status of --
20 MEMBER ROSEN: No, I don't think so.
21 VICE-CHAIRMAN BONACA: No? Okay. That
22 was the whole issue.
23 MEMBER ROSEN: I think if a license
24 renewal plant came in that had all red findings --
25 VICE-CHAIRMAN BONACA: Oh, of course.

1 MEMBER ROSEN: -- but we recommended its
2 license be renewed, I might have additional comments.
3 VICE-CHAIRMAN BONACA: I don't think it
4 would come to us. But, anyway, you're right.
5 MEMBER LEITCH: That's it.
6 (Whereupon, the foregoing matter went off
7 the record for lunch at 12:38 p.m. and went back on
8 the record at 1:39 p.m.)
9 VICE-CHAIRMAN BONACA: Okay. The meeting
10 is back in session.
11 Now, we are going to review the AP1000
12 design certification review by Westinghouse, and Dr.
13 Kress is the lead person on this.
14 MEMBER KRESS: Yes. Well, you know, this
15 is just Westinghouse wants to be sure we don't forget
16 about them, and we're back keeping up to date on this
17 before, you know. So eventually it's going to come to
18 us to write some sort of letter on. So this is more
19 of less filling us in on what's gone on up to date and
20 getting us up to speed.
21 MR. BURKHART: Yes. Good afternoon. I'm
22 Larry Burkhart, NRR's project manager for the review
23 of the AP1000 standard design.
24 And, yes, the purpose of this discussion
25 is primarily to give Westinghouse the opportunity to

1 present the AP1000 design to you. To start that off,
2 I'm just going to spend about five to ten minutes
3 going over what we've accomplished and what's happened
4 sine we last talked to you in March.
5 The last time we talked to you in March,
6 we gave you an assessment of our preapplication
7 review, which was limited to assessing applicability
8 of the AP600 test program and analysis codes to the
9 AP1000; acceptability of using design acceptance
10 criteria in several design areas. I'll get a little
11 more into that in a minute, and the feasibility of
12 requesting three exemptions.
13 Since we last talked to you, Westinghouse
14 has submitted its design certification application for
15 the AP1000, and that was in March of 2002. They
16 provided supplemental information over the next couple
17 of months.
18 We performed an acceptance review and
19 accepted the application for docketing on June 25th,
20 and in accordance with the schedule, which I'll show
21 you in a second, we issued 700 RAIs on all of the
22 information.
23 To put that in perspective, we issued over
24 7000 for the AP600, and these numbers are a little
25 different than what you may have. I updated them as

1 of today.

2 As of today Westinghouse has responded to

3 approximately 439 of those RAIs, and we are evaluating

4 those right now.

5 Jim Lyons mentioned the schedule

6 yesterday. These dates should reflect that schedule

7 with a few more details. Westinghouse has committed

8 to respond to the RAIs in nine weeks or by December

9 2nd of this year, and based on that, our plan is to

10 issue draft safety evaluation report with open items

11 by June 16th, 2003.

12 And let me just back up a second. The

13 RAIs did not include any concerning the security

14 aspects of the design certification application

15 because we are reviewing if we need any new

16 requirements. So the security portion of this review

17 is on a different schedule. We're still working out

18 these issues. So we may see, we probably will see

19 some RAIs on the security portion of the review at

20 some time. Hopefully it will still meet the schedule,

21 but we're still working on that.

22 So draft safety evaluation report in June

23 of 2003. Westinghouse addresses any open items,

24 again, in nine weeks or August of 2003. We would plan

25 to meet with the ACRS full committee shortly after the

1 draft safety evaluation report is issued in June.
2 We'll have some subcommittee meetings before that, and
3 again, we would meet with the ACRS shortly before we
4 issue the final safety evaluation report, which is
5 scheduled for issuance no later than September 2004.
6 And that would be followed quickly by the
7 final design approval, and the rulemaking would be
8 completed no later than December 2005, and all of
9 these dates were documented in a letter to
10 Westinghouse in July, and we did commit to looking at
11 the schedule to see, to explore any opportunities to
12 shorten the schedule, if appropriate, and that would
13 be based on the significance of the open items, how
14 far we are from resolving the security requirements.
15 So what we have committed to is to review
16 the schedule at the DSER stage.
17 MEMBER KRESS: If you come up with some
18 security requirements, what would you do about AP600,
19 which we've already certified? Would they have to
20 meet the same security requirement?
21 MR. BURKHART: There are some options.
22 Jerry, do you want to talk to that?
23 MR. WILSON: Jerry Wilson, NRR.
24 All of the certified designs have specific
25 change requirements associated with them, and so if

1 there was a new regulation that the Commission decided
2 it wanted to backfit on those previous design
3 certifications, we'd have to demonstrate that the new
4 requirements met the appropriate backfit standards.
5 MEMBER KRESS: So it would be like a
6 backfit.
7 MR. WILSON: Yes. Practically speaking,
8 we probably wouldn't deal with it unless somebody
9 referenced the design.
10 MEMBER KRESS: A security backfit is
11 almost a sure thing though, isn't it?
12 MR. WILSON: Well, I'll make a note that
13 you said that.
14 (Laughter.)
15 MR. BURKHART: So just a quick review.
16 ACRS involvement, we're required by regulation to get
17 a report from the ACRS for the final design approval,
18 and we do plan on having several issue specific
19 subcommittee meetings and probably two full committee
20 meetings at the draft safety evaluation stage and
21 final safety evaluation report stage.
22 So moving on, just to recap what we
23 accomplished in the pre-application review, and again,
24 the three topics as I've discussed before, in general
25 we found that the AP600 test program and analysis

1 codes are applicable to the AP1000 design
2 certification.
3 A possible exception we identified is the
4 issue of liquid entrainment, which I know you heard
5 about yesterday and you'll probably hear more about
6 today, and we are exploring that issue by RAIs and
7 responses, and we will evaluate that.
8 We found acceptable the use of the DAC
9 approach, design and acceptance criteria approach, for
10 instrumentation and controls, control room, and piping
11 design areas. And we believe that if sufficient
12 justification is given, the three proposed exemptions
13 should be justifiable.
14 In this slide, basically what I want to
15 say is that we're not starting from scratch on the
16 AP1000 review. Since the AP1000 design is based
17 closely on the AP600, which we certified a few years
18 ago, you know, we're not starting from zero.
19 We've done a thorough review of the AP600.
20 We have the final safety evaluation report and the
21 rulemaking that was completed for the AP600, and we'll
22 use that as we can.
23 If certain portions of that evaluation are
24 applicable, we will use it for the AP1000. We're
25 really focusing on the changes here.