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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

October 26, 2001

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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

5 THERMAL-HYDRAULIC PHENOMENA SUBCOMMITTEE MEETING

6 (ACRS)

7 + + + + +

8 FRIDAY

9 OCTOBER 26, 2001

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11 ROCKVILLE, MARYLAND

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13 The ACRS Thermal Phenomena Subcommittee
14 met at the Nuclear Regulatory Commission, Two White
15 Flint North, Room T2B3, 11545 Rockville Pike, at 8:30
16 p.m., Dr. Graham Wallis, Chairman, presiding.

17 COMMITTEE MEMBERS PRESENT:

18 DR. GRAHAM WALLIS, Chairman

19 DR. F. PETER FORD, Member

20 DR. THOMAS S. KRESS, Member

21 DR. WILLIAM SHACK, Member

22 DR. VIRGIL SCHROCK, ACRS Consultant

23 DR. JOHN D. SIEBER, Member

24 ACRS STAFF PRESENT:

25 PAUL A. BOEHNERT, ACRS Staff Engineer

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

(8:30 a.m.)

CHAIRMAN WALLIS: The meeting will now please come to order. This is a continuation of the meeting of the ACRS Subcommittee on Thermal-Hydraulic Phenomena, at which we discussed the proposed extended power uprates for Dresden and Quad Cities.

And we heard yesterday from Exelon, and the licensees, and today we are going to hear from the staff. I would call on John Zalenski to get us started.

MR. ZALENSKI: Thank you so very much. I guess I am a little bit of a bump in the road, in that I wanted to take a couple of minutes to talk to the letter you sent with respect to the Duane Arnold facility, and its marriage or association to Quad Cities and Dresden.

Our staff is fully prepared to get into the details of the review on Dresden and Quad Cities, but I thought it would be worth a couple of minutes to highlight that your letter has made quite an impact on me personally and on the office.

And one of the issues that I thought I had addressed before the full committee had been my keen desire to ensure that we were going to indeed have a

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1 first-rate product before we ever approved that
2 license amendment.

3 The status of that particular safety
4 evaluation is that it is not ready to be served, and
5 using a phrase that I have used many times in the
6 past, we will serve no wine before its time.

7 The technical basis will be robust for
8 each of those given sections, and I would submit that
9 it would be our intent to provide some sort of a
10 highlighted version for your easy review for
11 information purposes once we get to the point where
12 that is rating the issue.

13 In a small way to show what I believe to
14 be a substantive difference between an early draft and
15 the product that actually goes out the door, and
16 hopefully that may be a little bit closer to some of
17 the expectations of some of the members.

18 So to the product itself, I don't want to
19 forecast or say that we are going to have it done next
20 week, or the week after, but we are putting our
21 shoulder down to ensure that the first one out of the
22 shoot is done correctly, and it meets management's
23 expectations, and is indeed robust.

24 As we go forward the staff sometimes
25 relies on previous work and that will be kind of an

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1 example the staff will rely on. So it has got a high
2 mental, and you have helped us in an interesting way
3 to ensure that the mental is put at the right height.

4 There were a couple of other issues in the
5 letter that -- oh, by the way, we will be responding
6 to the letter formally, but, I really wanted to
7 scratch an itch a little bit and if there was
8 discussion, I would be more than happy to take some
9 questions.

10 The staff should develop and improve
11 guidance on the detail in the safety evaluation. I
12 read this as a generic comment to how the staff does
13 licensing work, and we will probably respond in that
14 manner.

15 And some of this is driven by our internal
16 processes. We do have a quality initiative that has
17 been germinating for the past year. It is funded for
18 this fiscal year with a senior management leaving that
19 particular activity, John Hannon in our plant
20 activities branch.

21 I think we will have a lot to say about
22 this issue over the next year, and the criteria on
23 independent assessments, and things of that sort, I
24 think we will probably be talking to you considerably
25 about a lot of the guidance that currently exists, and

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1 a lot of the expectations that currently exist, and
2 probably do a little bit better job in assuring how
3 our reviews are performed.

4 I am struck by the young lady that rose at
5 the full committee and said I reviewed this document,
6 and I reviewed that, and I did a lot of these. But
7 none of that ever made it to the safety evaluation.

8 In so many words, we are going to go back
9 and ask ourselves should we be a little bit more
10 candid to here are the actual things that were done,
11 and so I think in short this has certainly got my
12 attention, and as we go through Duane Arnold, the bar
13 height will be established for what we see for other
14 licensees, and the draft that you received from us on
15 Quad Cities and Dresden is not at that level.

16 But yet I would not anticipate it having
17 not gone through any management reviews. So if there
18 are any questions, I would be more than happy to take
19 those. Otherwise, I would begin turning the meeting
20 over to Mr. Bajwa.

21 I will say that I have asked that a number
22 of our senior management team responsible for
23 oversight of the reviews attend this particular
24 subcommittee meeting.

25 Mr. Hannon is here, and Dr. Barrett and

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1 Mr. Vermeil, and a number of our senior management
2 team out of the two principal divisions in support of
3 this particular meeting.

4 So by elevating our attendance to some of
5 our managers and section chiefs, I am trying to
6 overtly indicate that we have heard what you have
7 said, and we are trying to be responsive.

8 If there are no questions, I would be more
9 than happy to get into the subject at hand at this
10 time.

11 CHAIRMAN WALLIS: Well, no, I just wanted
12 to thank you for what you have said. It is very
13 helpful.

14 MR. ZALENSKI: Okay. Good. Mr. Bajwa was
15 the project director for Region 3 plants. He is also
16 our lead senior SES responsible for power uprates.

17 And I have asked him to provide some
18 opening comments on the work that the staff has done,
19 and then our project management team and our technical
20 review team stand prepared to address a variety of
21 review areas.

22 There is one topic area that we will touch
23 on that we have not come to resolution with Quad
24 Cities and Dresden, and that has to do with integrated
25 testing.

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1 And should these plants be expected to
2 perform testing of the MSIVs, should they be expected
3 to perform other tests, such as suggested in their
4 generic topical report -- and one that comes to mind
5 is the load reject test, today we are simply not in a
6 position to say that we think that those tests are
7 necessary to confirm all the work that has been done
8 by the staff.

9 My own sense of this is that the decision
10 on whether to test or not is independent of can we
11 approve this license amendment. In other words, I
12 don't believe that any of us feel that conducting the
13 test if necessary to move forward with the technical
14 work or not performing the tests.

15 So we have more work to do and we will
16 have that issue resolved before we issue the
17 amendment. We just did not have enough time to take
18 it through the various levels of management to ensure
19 we are aligned within our organization.

20 So with that as kind of an opening
21 comment, why don't you go ahead and get started,
22 Singh.

23 MR. BAJWA: My name is Singh Bajwa, and
24 moving on to Quad Cities and Dresden, I would like to
25 say that we have conducted a thorough review of the

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1 Dresden and Quad Cities plants in all areas
2 potentially affected by the power uprate.

3 We conducted our review from existing
4 practices, including the lessons learned from the
5 Maine Yankee experience, although we reviewed
6 information in many areas of the licensing basis of
7 Dresden and Quad Cities units.

8 And beyond that, we have used this
9 information, and we will focus our representation
10 today on the areas that we believe to be most of
11 interest for our power uprate.

12 We will also address areas that the ACRS
13 has expressed an interest in. So as John mentioned,
14 we have one open issue which we will not be able to
15 speak to it because it is a pre-decisional at this
16 point.

17 But as John indicated, we will inform ACRS
18 at the time we issue the safety evaluation in its
19 final form. With that, I will now turn this to Larry
20 Rossbach, the lead project manager for the Dresden and
21 Quad Cities power uprate reviews.

22 Larry is also the NRR project manager for
23 the Dresden plant. Also at the table is Mr. Stu
24 Bailey, the NRR project manager for the Quad Cities
25 plant.

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1 Larry will give an overview of the review
2 process used for this application and agenda for the
3 meeting. He will also introduce the other presenters
4 at the table.

5 MR. ROSSBACH: Thank you, Singh. My name
6 is Larry Rossbach, and I am a project manager for the
7 NRR, and I am the project manager for Dresden, and
8 also for the power uprate project for Dresden and Quad
9 Cities.

10 Briefly, to go over our review process,
11 the guidelines we use, we use the generic G.E.
12 guidelines, and generic evaluations topical, ELTR-1
13 and ELTR-2.

14 These licensing topical reports have
15 previously been accepted by the NRC as an acceptable
16 guideline for power uprate applications. And the
17 staff uses these topical as guidelines in our review.

18 In addition, we use the existing NRC
19 standard review plan and we rely on previous power
20 uprates. Specifically, the safety evaluation for the
21 Monticello Nuclear Generating Station was used as a
22 guide for the scope and the depth of the review.

23 In addition, Dresden and Quad Cities
24 reviews were really done in parallel with the Duane
25 Arnold review, and in some areas even used the same

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1 reviewers. So it should look familiar to you being
2 done in the same format as the G-topicals, and being
3 reviewed in the same manner in-house.

4 As John Zalenski had said, we are on the
5 Dresden-Quad Cities project of the comments on the
6 Duane Arnold safety evaluation, and we have taken
7 those into account to the extent that we could,
8 although most of the reports that you have was written
9 prior to receiving those comments, and we are
10 continuing to work to improve that safety evaluation.

11 As we progress in our review, we do
12 sometimes identify the need for additional
13 information, and so there was substantial additional
14 information submitted by the licensee in response to
15 our request.

16 The staff also performed three audits
17 during the conduct of this amendment review. The
18 Reactor Systems Branch audited global nuclear fuels
19 analysis at the G.E. facility in Wilmington, North
20 Carolina.

21 the probabilistic safety assessment branch
22 staff audited the licensee's risk assessment process
23 at Exelon's midwest offices, and the plant systems
24 reviewer audited analysis at the Dresden site.

25 The principal areas of our review -- and

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1 again, very similar, and the same as in Duane Arnold,
2 but the staff reviewed the results of the licensee's
3 evaluations in reactor core and fuel performance, and
4 reactor coolant systems, and containment analyses, and
5 emergency core cooling system performance evaluation,
6 and instrumentation and controls.

7 And the suitability of existing ones and
8 the proposed modifications. The electrical power and
9 power conversion systems, and auxiliary systems, and
10 radiological consequences, special events and limiting
11 operational transients.

12 And probabilistic risk assessment review,
13 and we reviewed human performance aspects of the
14 submittal, and there was an environmental assessment
15 done. The environmental assessment will be published
16 separately in the Federal Register.

17 I would like to go over briefly the order
18 of our presentation. The reactor systems review will
19 be gone over by Ralph Caruso just to my left, and the
20 plant systems review will be summarized by Ralph
21 Architzel.

22 Following that, we will respond to ACRS
23 questions in other areas where we had not prepared a
24 full presentation. As time allows, we may get into
25 more detail in those areas.

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1 And they include -- and this is partly in
2 response to questions that we received from the ACRS
3 dealing with material degradation issues, pipe
4 support, pipe and support modifications, the need for
5 electrical modifications, and the PRA analysis and
6 evaluation which we did.

7 With that, I would like to turn it over to
8 Ralph Caruso.

9 MR. ZALENSKI: If I might just jump in for
10 a second. As our staff goes through the presentation,
11 it would strike me that it would certainly be fair to
12 query which code standards, which reg guides, standard
13 review plans, acceptance criteria, specific regulatory
14 requirements, the staff is working against.

15 And the staff should be able to clearly
16 explain what we did to independently determine that
17 something was acceptable. And so seeding your thought
18 a little bit, that would be my expectation to find
19 that kind of information in the final report.

20 MR. CARUSO: Good morning. My name is
21 Ralph Caruso, and I am chief of the BWR nuclear
22 performance section and reactor systems in NRR, and I
23 am going to talk about the nuclear reactor and fuel
24 systems review that was done as part of the
25 Dresden/Quad EPU review.

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1 I am going this with the slides being a
2 little bit out of order, the package that you have,
3 and so I am going to do my presentation the old
4 fashioned way here, and I think I have a crib sheet
5 here that tells me where you should be turning as I go
6 along, and I will call out the slide numbers that you
7 have got.

8 The first one is slide 10, and that has
9 got my name on it. The second slide is slide 11, and
10 this is the background. This is a power uprate of
11 approximately 18 percent from the original rated
12 normal power level.

13 It involved implementation of MELLILA and
14 ARTS, reactor trip system. It also involved the
15 introduction of GE14 fuel into a core that is
16 currently supplied by Siemens.

17 The staff, as part of its review, in
18 addition to the review in-house that we normally do,
19 performed an on-site audit at GNF-Wilmington. This
20 looked at compliance with the analytical methods that
21 we have approved and that are being applied by GE to
22 analyze this reactor's behavior.

23 And this includes something called G-STAR
24 Amendment 22, which is the process that they used to
25 develop and approve the GE-14 fuel design. We

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1 performed audits of the Dresden and Quad Cities EPU
2 system performance, and a design basis safety
3 analysis. And we reviewed as it says here the safety
4 analysis reports.

5 DR. SCHROCK: Ralph, before you leave
6 that, I have a question on the first item. One of the
7 problems that I mentioned yesterday in connection with
8 the review of this large quantity of paper that was
9 received is the fact that we essentially had two sets
10 of things that were verbatim to a major extent.

11 And it was very difficult to sort out the
12 things that were different for the different plants,
13 and I pointed out in the beginning that as I tried to
14 do that, I found that in the SARs that the MELLLA
15 graphs are not the same for the two plants.

16 And the response to that was initially
17 that, yes, they thought that they were the same and
18 they should not be different. But subsequently I got
19 the two reports side-by-side, and indeed they are
20 different.

21 So what is then confusing is why are they
22 different? What is the explanation for why the MELLLA
23 is different for the different plants, and why is the
24 response from the plant owners that, yes, they should
25 be the same, when in fact they are not the same?

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1 MR. CARUSO: It is not clear to me. What
2 do you mean by they are different, and in what sense?

3 DR. SCHROCK: They are different in the
4 sense that different points have different valves.
5 The slope of the main MELLLA line is different on the
6 different graphs.

7 The full power, full flow point, is the
8 same. Everywhere else on the graph, the lines are not
9 the same.

10 CHAIRMAN WALLIS: And on the left-hand
11 side the boundaries are very different I think.

12 MR. CARUSO: Well, I can't speak to the
13 specifics of exactly where the points are. I am not
14 surprised that they are different, because the plants
15 are different, because the fuel designs are different,
16 and because the fuel management schemes will be
17 different, because they are implementing different
18 fuels at different points in life, and there is a lot
19 of core design that gets done, which will change those
20 curves.

21 So I am not surprised, and so are you
22 looking for an explanation of exactly why the points
23 are slightly different?

24 DR. SCHROCK: Well, there are two parts to
25 the point that I am trying to make, and the question

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1 that I am trying to raise; and the first one is the
2 detail of what is correct about the SARs. Should
3 those things be different, and should they be the
4 same.

5 I am confident that I heard pretty clearly
6 yesterday from representatives of the industry that
7 they ought to be the same. Now, you are saying that
8 they ought to be different, and I am not surprised
9 that they are different.

10 MR. CARUSO: I am not surprised that they
11 are different.

12 DR. SCHROCK: So there is a point to be
13 resolved there. But the overall point that I am
14 trying to get across is that it makes for a very
15 inefficient process to be put in the position of
16 having to sort out differences between two plants that
17 are being resolved simultaneously when these
18 differences are not highlighted in the documentation
19 that is presented.

20 And where you get two stacks of paper
21 which you ought to expect to have to digest in some
22 detail, and what you find is that they are essentially
23 verbatim, like 95 percent plus.

24 And then you have to discover what is the
25 reason for numbers to be different in the two plants

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1 when there is no explanation in the documentation,
2 either in the SARs or in the SERs. That is the problem
3 that I am trying to get across to you.

4 DR. KRESS: Your MELLLA line is not a
5 fixed thing. It ought to vary throughout the whole
6 life of the core actually.

7 MR. CARUSO: I would expect it to vary
8 from reload to reload.

9 DR. KRESS: Yes, and from reload to
10 reload, and so I guess it depends on what they choose
11 to analyze when they put the thing together.

12 MR. CARUSO: Right. That's why I am
13 saying that I am not surprised that they are
14 different, and I can't speak to the particular details
15 of each curve. Let me ask my staff if they have any
16 insights as to why they might be different?

17 MR. KENDRICK: This is Edward Kendrick,
18 reactor systems branch. First of all, the Quad and
19 Dresden plants, the pre-EPU are different power
20 levels. The post-EPU is the same thermal power.

21 So the post-EPU MELLLA lines I believe
22 should be virtually identical. And since they started
23 from a different one and they used in many cases a
24 bounding Unit 5, there could be some differences.

25 The staff, in preparation for the audit,

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1 looked first at Dresden, and then specifically at
2 Dresden-2, which is the lead unit. And we identified
3 the differences, first of all, between Dresden and
4 Quad, and then the differences between Dresden-2 and
5 Dresden-3.

6 Now, we did not include a table in the
7 SER. We could do that because for our information we
8 had to go through and look at Dresden, and then go
9 through and look at Quad. So I think in the SER we
10 can tabulate the differences, and why there are
11 differences.

12 MR. CARUSO: And a great deal of our
13 review did not necessarily look at and verify each
14 individual point on those curves, because the way we
15 do the reviews is to do a sampling to ensure that the
16 methodologies that are being applied are being applied
17 correctly.

18 So we don't necessarily review every
19 individual number and verify each and every individual
20 number.

21 CHAIRMAN WALLIS: Well, I was going to ask
22 the question that my colleague asked in a different
23 way. I was going to ask did the staff realize that
24 these figures, which are key, the power versus flow
25 maps, are different for the two plants?

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1 And did they then ask why.

2 MR. CARUSO: I don't believe that question
3 was explicitly asked, because as I said, I am not
4 surprised at all that they are different.

5 CHAIRMAN WALLIS: I know, and you can say
6 that, but the thing is were you aware until my
7 colleague mentioned that they were different that they
8 were different, and that is the thing that --

9 MR. CARUSO: I don't think that I
10 explicitly had -- that it crossed -- well, I don't
11 know. Ed, did that cross your mind? He is nodding
12 yes. He did notice that.

13 CHAIRMAN WALLIS: I think the natural
14 circulation line is significantly different, for
15 instance, and I don't know why it is different.
16 Anyway, we should probably get off of this point. We
17 have now started asking questions.

18 MR. CARUSO: Okay. Review Scope, and this
19 is Slide 12. As part of the review, as I said, we
20 have looked at fuel design and operation, and this was
21 Amendment 22, and something that we audited at the GE-
22 Wilmington facility.

23 Thermal limits, and reactor coolant
24 system, and connected systems, ECCS performance, the
25 capability of the standby liquid control system, and

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1 design basis and safety analysis, and ATWS and ATWS
2 instability. This is the scope.

3 And Slide 14 will be next. As Larry
4 Rossbach said, we followed the scope of the ELTR-1 and
5 ELTR-2, and the Supplement-1 to ELTR-2, to guide us in
6 our review. And once again in the reactor systems
7 area -- and that's what I am here to focus on -- all
8 of these analyses were done in accordance with NRC
9 approved methodologies, analytical codes, and they are
10 all met NRC approved analytical limits.

11 And those limits would range from the
12 numbers in the regulations, such as 2200 degrees and
13 17 percent oxidation in 50-46, to the general design
14 criteria requirements that 99.9 percent of fuel rods
15 not experience boiling transition during a transient
16 event.

17 CHAIRMAN WALLIS: I'm sorry, but I am
18 going to go back to the previous question. You said
19 that specific points weren't calculated or checked on
20 the power versus flow map. I'm sorry, but my mind is
21 following a train of thought here.

22 MR. CARUSO: Okay.

23 CHAIRMAN WALLIS: How did you satisfy
24 yourselves that the MELLLA upper boundary was in fact
25 in the right place?

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1 MR. CARUSO: Well, as part of the audits
2 that were done, the staff reviewed the calculations
3 that were done for linear heat generation rate for the
4 LOCA analyses, and for the transients.

5 And the MELLLA line will be developed as
6 part of that process. So we reviewed particular
7 points in the process to ensure that the process was
8 being followed, and the MELLLA line was therefore
9 appropriate.

10 DR. KRESS: You reviewed the process
11 instead of the product.

12 CHAIRMAN WALLIS: Did you make any
13 independent calculational checks or anything?

14 MR. CARUSO: No, we did not.

15 CHAIRMAN WALLIS: So you checked off that
16 they went through the right process?

17 MR. CARUSO: No, we didn't check it off.
18 What we did was that we sent people to the GE-
19 Wilmington facility to look at detailed calculations,
20 to look at the inputs and to look at the outputs.

21 And to determine whether the assumptions
22 that were made were appropriate and within the stated
23 limits and the approved methodologies. And that the
24 outputs were in accordance with the acceptance
25 criteria.

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1 CHAIRMAN WALLIS: Well, the reason for
2 asking the question is because this is a very key
3 point, because you are saying that they are arguing
4 that it is now possible to go up to this limit, this
5 boundary.

6 It is now possible to operate in a region
7 where we have not operated in before, and this is the
8 boundary of the new region. So you have to be really
9 sure that you are on good ground if you approve that
10 boundary or the methods that led to that boundary.

11 MR. CARUSO: In the reactor systems area,
12 we are -- I don't want to say we are unique, but I
13 think we are probably ahead of other organizations,
14 other parts of NRR, other disciplines, in that we have
15 a well-founded base of analytical methods that have
16 been reviewed and approved, and that we have a lot of
17 experience with.

18 These methodologies have been reviewed and
19 we have -- we do have our own analytical tools that
20 have been used to verify these methodologies, and we
21 feel that as long as licensees and vendors use those
22 methodologies within the acceptance criteria, and
23 within the limits of application, we do not feel a need
24 to do additional independent assessment unless we have
25 specific credible information which would cause us to

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1 doubt those codes are being applied inappropriately.

2 And in the case of these power uprates,
3 because the peak bundles are not changing, and because
4 the flow rates are all within current methodological
5 limits, we didn't feel that there was any need to do
6 any independent assessment.

7 DR. KRESS: If you did want to do an
8 independent assessment would you use RELAP and NAMONA,
9 or is --

10 MR. CARUSO: It would depend entirely upon
11 the area. If it were a LOCA case, we could use TRAC-
12 B, and we could use RELAP. In the area of stability,
13 we could use ROMANA. Well, ROMANA is the one that
14 comes to mind. I think there may be some other codes.

15 But we have contractors available to us,
16 and Jose Marsh Luba, the expert on instability, and we
17 would call on him if we felt that there was something
18 about the operation of this plant that placed it
19 outside the appropriate methodology.

20 But because of the way that they did this
21 power uprate, everything stayed within the appropriate
22 limits, and therefore there was no credible reason for
23 us to doubt that the methodologies were not being
24 applied correctly.

25 We do occasionally -- I mean, the reason

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1 that we do these audits is because these power uprates
2 called into question whether the methods were being
3 applied correctly.

4 That was a prima facie case for doing an
5 audit, and that's why we started doing the audits at
6 Duane Arnold, and that's why we continued doing them
7 for Dresden and Quad Cities.

8 And that's why we continued for Clinton,
9 and that was done, I believe, in September, and I
10 believe that we are planning going out and doing a
11 Brunswick audit sometime later on this winter.

12 So we are looking at these things to check
13 to make sure that the methodologies are being applied
14 appropriately, but without some credible specific
15 issue. We don't believe that we have the resources to
16 go do an independent assessment.

17 CHAIRMAN WALLIS: Well, an issue might
18 arise -- and I haven't done this yet, as my colleagues
19 have been looking at these curves in more detail, but
20 if we started to compare them and we found that there
21 were really big differences between this MELLLA
22 boundary in one reference than another, then I think
23 we might ask at the full committee meeting again why
24 this is so -- and it might indicate that someone
25 perhaps needed to check into it.

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1 And you are saying that you didn't have a
2 good reason to want to make an independent assessment
3 of the question, and that may well be true.

4 We began to question it because we noticed
5 that there were these differences, that's all.

6 MR. CARUSO: I understand that, but as I
7 said, realize that these changes occur from cycle to
8 cycle, and the staff normally doesn't even do reload
9 reviews. They can make changes to these parameters
10 without our knowledge when they change fuel designs,
11 and when they change core designs.

12 And we would not even see them except as
13 a report after they start off. That could cause --

14 DR. KRESS: They basically develop a new
15 MELLLA line for every reload don't they?

16 MR. CARUSO: That's correct. That has to
17 be reevaluated every reload. All of these analyses
18 have to be done every reload. And they are done in
19 accordance with these approved methods, and we feel
20 comfortable enough with those methods that we didn't
21 think that we needed to do independent assessments.

22 DR. KRESS: Did your audit go to the
23 extent of checking the input to the codes to these
24 methods?

25 MR. CARUSO: Yes.

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1 DR. KRESS: So you really did look at the
2 inputs?

3 MR. CARUSO: As I described I think to
4 this committee, or maybe it was to the full committee,
5 we had four people that went to the plant, and they
6 asked for what are called the design record files, and
7 these are the detailed calculations that support
8 operation.

9 And they sat down in a room and they read
10 them. They went through them page by page looking at
11 the inputs, and looking at the outputs, and looking at
12 the assumptions.

13 And then they asked questions, and they
14 sat down with people like Jason Post, who is standing
15 up and he wants to say something.

16 MR. POST: Yes. This is Jason Post. I
17 have a couple of things. One is that the differences
18 that you see in the power flow maps between the two
19 units are mostly in the natural circulation line, and
20 the minimum pump speed line.

21 And those were not -- those are historical
22 differences between the two sites, and we did not try
23 to reconcile those differences for this, because that
24 really was not pertinent to the change that was being
25 made.

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1 CHAIRMAN WALLIS: I don't understand the
2 term historical. I mean are they meaningfully
3 different, or is it some mysterious history?

4 MR. POST: It has to do with the
5 instrumentation and the analysis that was done at the
6 time that those plants were first built. And the
7 difference is not as great as it is shown.

8 CHAIRMAN WALLIS: Well, if they are
9 similar plants, you would expect natural circulation
10 characteristics to be pretty well the same wouldn't
11 you?

12 MR. POST: Yes, you would.

13 CHAIRMAN WALLIS: So why are they so
14 different on a map?

15 MR. POST: As a result of the improved
16 methodology over the years, some of the plants have
17 gone back and redefined their natural circulation
18 lines. My guess is that one of the units has done
19 that a little more accurately than the other unit.

20 But again that wasn't something that was
21 pertinent to this design change to MELLLA and EPU. So
22 that was not addressed in this license amendment that
23 historical difference was maintained.

24 CHAIRMAN WALLIS: Well, maybe if we asked
25 the question again at the next meeting, you will have

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1 an explanation other than history?

2 MR. POST: Certainly.

3 CHAIRMAN WALLIS: Can you have an
4 explanation other than that?

5 MR. POST: Certainly. The other statement
6 that I wanted to make was that while the actual power
7 flow relationship can change from a cycle to cycle
8 basis, the MELLLA line itself is a licensed limit, and
9 that as a licensed boundary does not change.

10 And that licensed boundary is drawn to be
11 bounding over the actual power flow relationship that
12 can change slightly from cycle to cycle. And Israel
13 is just coaching me here. It is also common to both
14 plants, and so the MELLLA boundary itself is identical
15 between the two sites.

16 It's just extended to a lower core flow in
17 one to match the natural circulation line, which is
18 lower.

19 CHAIRMAN WALLIS: Thank you.

20 DR. KRESS: So Virgil's observation that
21 the slope is different is not true? The slope is
22 actually the same?

23 MR. POST: That is correct.

24 MR. CARUSO: It is not the same on the
25 graphs.

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1 MR. POST: Excuse me. I believe the slope
2 is the same on the two SARs. It's just that the lower
3 point, the lower left-hand point, is different. So it
4 might appear that the slope is different.

5 CHAIRMAN WALLIS: This is something that
6 we can easily verify since we have two different
7 points of view, and we can do a test at the break and
8 see who is right.

9 MR. CARUSO: My next slide is actually
10 Slide 21 in your package. And it is the reactor core
11 and fuel performance slide. And one of the questions
12 that often comes up is a question about margin, and
13 who owns the margin.

14 And as I stated earlier, we have a number
15 of different cycles specific, and licensing thermal
16 limits. And the licensing limits, like the 2200
17 degrees, and the 86 gallons per minute for the
18 standpoint liquid control system, and the 99.9 percent
19 limit for the transient, those are the fixed limits.

20 And licensees are free to work within that
21 boundary as much as they want. They own that margin.

22 CHAIRMAN WALLIS: And they did in this
23 case.

24 MR. CARUSO: And they do.

25 CHAIRMAN WALLIS: And 1600 became 1600

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1 exactly, for instance.

2 MR. CARUSO: That's acceptable.

3 CHAIRMAN WALLIS: And 1500 psi became
4 1499.

5 MR. CARUSO: And I will be honest, as the
6 first question that I asked when I saw the number was
7 how many times did you have to run it to get results.

8 CHAIRMAN WALLIS: We asked the same thing.
9 We asked about do loops and things.

10 MR. CARUSO: And I got a very indignant
11 response. He said that the first time that we ran it,
12 it was 1499 and that is what it was.

13 DR. SHACK: I wouldn't run it again
14 either.

15 DR. KRESS: Your statement that the
16 margins are available to the licensee, does that have
17 qualifications to it? Like it is available if they
18 are using the same approved codes that they used
19 before?

20 MR. CARUSO: Absolutely. They have to use
21 the methodologies within the limits that are defined
22 in the SER, and they have to meet the appropriate
23 acceptance criteria.

24 DR. KRESS: So if I go in and change my
25 code, and improve the code, do I still --

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1 MR. CARUSO: We could spend all day
2 talking about changes to the codes.

3 DR. KRESS: Yes, I understand.

4 MR. CARUSO: There are rules about this,
5 some of which are better defined than others, about
6 when changes have to be re-reviewed, and it depends on
7 whether it is a LOCA code, or a transient code, or a
8 stability code.

9 And we have disagreements about that now
10 and again. But generally as long as they stay within
11 the acceptance limits, then they can wander within the
12 box. And occasionally we see people do very creative
13 things, and we try to convince them of the error of
14 their ways when they do that.

15 Once again, as I said here, this is an
16 unusual power uprate because it was based not on any
17 one particular plant. Most of the analyses were done
18 for what was called Unit 5, and it was a bounding
19 analysis of some plant that doesn't actually exist and
20 that had parameters that bounded all of the four
21 Dresden and Quad Cities units.

22 But our determination was that this
23 equilibrium bounding unit -- the analysis of this
24 equilibrium bounding unit demonstrated that the
25 thermal limits are acceptable, and that the cores that

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1 will be designed eventually in the future to be used
2 in these plants can be appropriately designed, and can
3 be appropriately operated.

4 CHAIRMAN WALLIS: Could you say what the
5 thermal limits are again, and what you mean by it?

6 MR. CARUSO: Up here on top, we have a
7 safety limit minimum, minimum critical power ratio,
8 MCPR.

9 CHAIRMAN WALLIS: Those are things like
10 the 2200 degrees and things like that?

11 MR. CARUSO: Some of these are 2200, like
12 the LOCA limit to the right is there, and the safety
13 limit, MCPR, and its derivative, the operating limit
14 MCPR, are there to show that you meet the 99.9 percent
15 boiling transition.

16 CHAIRMAN WALLIS: Were these evaluated
17 for -- I don't quite understand, but for some typical
18 cores, which is a bounding -- some typical bounding
19 unit?

20 MR. CARUSO: Yes.

21 CHAIRMAN WALLIS: Well, then you are sure
22 that this is somehow outside all the possibilities of
23 the various limitations of cause or whatever?

24 MR. CARUSO: For the purposes of doing the
25 power uprate, they did a bounding calculation, but

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1 then for each individual plant, for each actual core
2 design, they will verify that that core design meets
3 those limits.

4 CHAIRMAN WALLIS: The numbers that we were
5 presented with, the 1600 degrees, and things like
6 that, are the actual specific calculations for
7 specific plants aren't they?

8 MR. CARUSO: I think it depends on the
9 analysis. In some cases, they were plant specific,
10 but in some cases they were bounding. I seem to
11 remember some were plant specific, but some were also
12 bounding.

13 CHAIRMAN WALLIS: It would seem that
14 eventually they all have to be plant specific.

15 MR. CARUSO: That's correct.

16 CHAIRMAN WALLIS: And one would expect the
17 number to go down when it becomes plant specific if
18 the previous one were bounding.

19 MR. CARUSO: Yes, that's correct.

20 CHAIRMAN WALLIS: Is that always the case?

21 MR. CARUSO: I believe so.

22 CHAIRMAN WALLIS: Does it go down by much?
23 Is it exactly 1600 in the bounding case, and 1599 for
24 the plant, or something like that?

25 MR. CARUSO: I don't think that they are

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1 going to go down to something like 700.

2 CHAIRMAN WALLIS: I guess if we saw 1600
3 for the plant, then the bounding unit must have been
4 somewhere above the limit.

5 MR. CARUSO: Let's see if I can get
6 someone from the licensee to answer that.

7 MR. FREEMAN: This is John Freeman with
8 Exelon. The 1600 degree was for the upper bound
9 calculation on the LOCA analysis.

10 MR. CARUSO: Oh, you are talking about the
11 LOCA number. Okay.

12 MR. FREEMAN: I think that is what you
13 were driving at, and that was a bounding number based
14 on the Unit 5 approach, which covered all of the fuel
15 types which were going to be in the reactor.

16 As far as whether some of them are cycle
17 specific, or bounding, LOCA -- well, actually, all the
18 thermal limits get reevaluated on a cycle specific
19 basis. However, most of them don't change. The ones
20 that we expect to change are the safety limit MCPR,
21 the operating limit MCPR. To a lesser extent, the
22 LHGR, depending on how the center line melt and
23 plastic strain limits are met.

24 So that is all done on a cycle specific
25 basis. However, I think the big issue was the LOCA

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1 analysis, and that is bounding. The ATWS analysis was
2 bounding.

3 So we don't expect to see any changes in
4 those results without changes to the reactor system
5 design.

6 CHAIRMAN WALLIS: So this 1600 degree
7 example that we have here is specific to each cycle.
8 So it is a variable. It changes all the time?

9 MR. CARUSO: Well, in this case, I think
10 as the GE -- I think Dan Pappone did that presentation
11 yesterday. And he explained that they have a 1600
12 degree limit in the GE methodology. So they may --

13 CHAIRMAN WALLIS: But the 1600 is the
14 actual as well.

15 MR. CARUSO: And they calculate 1600 as
16 the actual number, but they may vary the MAPLHGR
17 limit, the linear regeneration rate, to stay below
18 that number.

19 So they will use 1600 as the limit, and
20 they will vary the heat generation rate to make sure
21 that they stay within it. The number may stay the
22 same, and --

23 CHAIRMAN WALLIS: And part of your
24 licensing procedure is not just to say they have
25 calculated a number which you approved of, but to say

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1 that you trust them to keep calculating it and to keep
2 it below your limit?

3 MR. CARUSO: Yes, that's very important.

4 CHAIRMAN WALLIS: And you trust them to
5 keep calculating it all the time because it is cycle
6 specific?

7 MR. CARUSO: That's a very important
8 point.

9 CHAIRMAN WALLIS: And not to let it go
10 over the limit.

11 MR. CARUSO: That is a very important
12 point, yes. We trust them to do these calculations
13 appropriately. But we also verify from time to time
14 that they are.

15 CHAIRMAN WALLIS: So when they show us a
16 number which is exactly on the border, 1600 calculated
17 equals 1600 allowable, then this is for a particular
18 calculation at a particular time that is implied with
19 sort of our approval of that if we approve it, and
20 they are going to keep doing this, and they are not
21 going to allow themselves to go over that?

22 MR. CARUSO: That's correct.

23 CHAIRMAN WALLIS: And that they didn't
24 understand at the time?

25 MR. CARUSO: That's correct.

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1 CHAIRMAN WALLIS: And presumably they
2 found that they were going over it? What would they
3 do, shut down the plant until they corrected something
4 or what?

5 MR. CARUSO: No, they have to revise some
6 aspect of either plant operation or core design to
7 make sure they stay below it.

8 CHAIRMAN WALLIS: So they might then
9 operate at a reduced power?

10 MR. CARUSO: Exactly.

11 DR. KRESS: They can only go over it on a
12 hypothetical basis.

13 CHAIRMAN WALLIS: Of course, it is a
14 calculation.

15 DR. KRESS: It is a calculation.

16 CHAIRMAN WALLIS: Okay. Thank you.

17 MR. CARUSO: Let's see. My next slide is
18 Slide 28. Let's see. I have a general discussion
19 here about system performance. We looked at the
20 systems.

21 For example, the RCI system, the high
22 pressure injection systems, and the low pressure
23 injection systems, to see whether they would perform
24 their design functions at the higher power, higher
25 rated power.

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1 And because this was a constant pressure
2 uprate, those reviews were not very difficult to
3 determine that those components would operate
4 appropriately, because they see the same steam
5 pressure, and they see the same reactor pressure. Most
6 of the bounding parameters remain the same for these
7 systems.

8 DR. KRESS: How did you decide that the
9 isolation valves would perform their function just as
10 well at the new uprate?

11 MR. CARUSO: The isolation valves.
12 Actually, they have to be able to close on critical
13 flow. If you have a pipe break outside the MSIV --

14 DR. KRESS: I understand, and the heat
15 didn't change?

16 MR. CARUSO: The pressure didn't change.

17 DR. KRESS: Yes, but T did.

18 MR. CARUSO: T? Temperature?

19 DR. KRESS: Critical flow is squared over
20 KGRT. It is steam. It is close enough.

21 MR. CARUSO: I don't think it matters.
22 Why did the heat change?

23 DR. KRESS: Well, I thought you changed
24 the outlet temperature.

25 MR. CARUSO: No.

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1 DR. KRESS: Just the amount of steam flow?

2 MR. CARUSO: The steam flow rate changed,
3 but the steam pressure stays the same.

4 DR. KRESS: So your blow down rates are
5 about the same.

6 MR. CARUSO: They would be about the same.

7 DR. KRESS: And your pressure is about the
8 same.

9 MR. CARUSO: Right.

10 DR. KRESS: So the loads on the valves, if
11 they could close before, they can close now is what
12 you are saying?

13 MR. CARUSO: Exactly.

14 DR. KRESS: Okay.

15 MR. CARUSO: Let's see. My next slide is
16 Slide 29. As I said, they performed the LOCA analyses
17 for the bounding unit using an equilibrium GE-core.

18 This is the core that they eventually
19 expect to get to once they replace all the Siemens'
20 fuel in about 2, 3, or 4 cycles with GE-14 fuel.

21 And we looked at the -- as part of our audit, we
22 looked at the pre-EPU and the EPU analyses for LOCA.

23 These were done with the SAFER/GESTR
24 methodology that was described yesterday, and as we
25 have discussed in the past, the peak limiting bundle

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1 for these analyses doesn't really change.

2 So there was not much to look at in terms
3 of changes to the methodology, and changes to the
4 inputs to reflect the fact that it was a mixed core,
5 Siemens fuel and GE-14 fuel, and it changes because it
6 is GE-14 fuel which is going in for the first time.

7 But other than that, the methodology was
8 applied appropriately, and the LOCA analyses
9 demonstrated compliance with 50.46.

10 DR. KRESS: This particular ECCS, to deal
11 with LOCA, is it a head spray, or where does that come
12 in at?

13 MR. CARUSO: I need assistance. This says
14 -- well, Dresden has high pressure coolant injection.
15 How many high coolant injection pumps? One high
16 pressure coolant injection pump.

17 DR. KRESS: And that is in the head coming
18 down on top?

19 CHAIRMAN WALLIS: It is a ring spray, a
20 ring with a lot of nozzles on it.

21 MR. CARUSO: It is a low pressure core
22 spray.

23 CHAIRMAN WALLIS: We are asking the staff
24 if they know or if they understand the system, I
25 guess.

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1 MR. CARUSO: Well, you are asking me off
2 the top of my head, and I don't have all 37 BWRs in my
3 head.

4 CHAIRMAN WALLIS: I know. I understand
5 that.

6 DR. KRESS: Well, part of my question is
7 to see what you guys looked at, and the other part is
8 if you flatten out the core profile, and you have got
9 more steam coming up around the edges, and less in the
10 middle.

11 And you are basing your validation of your
12 code for these ECCS based on something like the old
13 tests in Germany and Japan, which didn't have a core
14 profile. It had a different one.

15 And does this put into question the
16 validation of the codes that are used to calculate
17 these peak clad temperatures?

18 MR. CARUSO: Interestingly enough, this is
19 one thing that we did actually talk to them about,
20 spray distribution.

21 DR. KRESS: Yeah, carry over and the spray
22 distribution. Right.

23 MR. CARUSO: And it came up in a
24 relationship to an issue involving license renewal of
25 the BWR, and we were concerned about spray

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1 distribution over extended -- of a plant at the end of
2 60 years, and would it still have the same spray
3 distribution.

4 And in talking to G.E. about it, we
5 learned that spray distribution is not important for
6 the early part of the LOCA because of the assumptions
7 that are made as part of the analysis. They don't
8 assume a particular distribution, but for the long
9 term cooling portion of the LOCA analysis, spray
10 distribution does become important.

11 And let me see if I remember the logic
12 here, because this gets very convoluted. Late in the
13 LOCA sequence, the distribution is acceptable. I am
14 trying to remember the reason why we discussed this
15 with them.

16 CHAIRMAN WALLIS: Early in the sequence,
17 you have got a pool don't you?

18 MR. CARUSO: Exactly, and that's why --

19 DR. KRESS: The pool is up on the top.

20 CHAIRMAN WALLIS: But then how the pool
21 drains will depend upon the amount of steam coming out
22 of all of these channels, which is now different
23 because you have gotten more heat source on the
24 outside from the decay heat.

25 DR. KRESS: And the question was how much

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1 of that drained and how much got carried out.

2 CHAIRMAN WALLIS: Well, there is a
3 different pattern of drainage, too, because of the
4 flux distribution.

5 MR. CARUSO: This was discussed. We had
6 a real long discussion with them about this.

7 CHAIRMAN WALLIS: It was discussed, and so
8 you are really sure that you are on good technical
9 grounds?

10 MR. CARUSO: Yes.

11 CHAIRMAN WALLIS: And you looked at the
12 effect of the new distribution of heat source across
13 the core on the draining of that pool during a LOCA?

14 MR. CARUSO: Yes. The explanations are
15 very reasonable. I was going to suggest at some point
16 that it might be a good idea -- well, I won't talk
17 about that now.

18 CHAIRMAN WALLIS: Well, you didn't find it
19 necessary to do any independent verification
20 calculations or anything on those phenomena?

21 MR. CARUSO: No.

22 CHAIRMAN WALLIS: Because I guess one of
23 the generic questions that ACRS raised before was when
24 do you decide to do your independent verification
25 calculations, and when do you accept what you see from

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1 the applicant.

2 MR. CARUSO: And as I said earlier, if we
3 -- when we are using these approved methods within
4 their acceptance criteria, we would do independent
5 calculations if we had some specific and credible
6 reason to believe that they were not appropriately
7 being applied.

8 If we had some issue that had been raised
9 by staff members, by the Office of Research, by the
10 ACRS, by outside interested parties, that said they
11 didn't consider this particular aspect.

12 And there is no way you can tell that from
13 their analysis, and then we might do an independent
14 analysis in that case. But realize that the
15 methodologies have been validated in many instances
16 against the NRC codes already.

17 CHAIRMAN WALLIS: We have no way of
18 independently checking this. We just have to ask you
19 and sort of believe that you have done the job.

20 MR. CARUSO: You would have to dig through
21 piles, and piles, and piles of topical reports.

22 CHAIRMAN WALLIS: That's correct.

23 MR. ZALENSKI: For closure on this issue
24 did I hear a comment or a question raised regarding
25 the validity of our codes based on new data becoming

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1 available from Japan?

2 DR. KRESS: No, the comment was that the
3 codes -- that their validation was based on old data
4 mostly, I think, and those used actual flux
5 distributions that were not as flat as these.

6 And the question is does that put into
7 question the validity of them, because it is based on
8 old data with the wrong flux distribution.

9 MR. CARUSO: Our question really had to do
10 with the spray distribution, and to make sure that
11 there was the spray distribution that was assumed as
12 part of the analysis.

13 DR. KRESS: Yes, it is the same issue. Is
14 the flux distribution going to maybe affect the spray
15 distribution.

16 MR. BOEHNERT: And whether the tests are
17 still applicable.

18 DR. KRESS: So that was the nature of the
19 question.

20 DR. SCHROCK: I guess I wonder how
21 confident a particular analysis is bounding.

22 MR. CARUSO: Generally, you mean?

23 DR. SCHROCK: Yes, in general. Do you
24 scratch your head and say now why is this one bounding
25 when I am going to make some changes?

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1 MR. CARUSO: Well, that is one of the
2 reasons that we did the audits. We sent people down
3 to actually look at the inputs that were used, and the
4 people that did the audits, like Ed Kendrick here, are
5 experienced in core design and analysis methods.

6 And they know which parameters are
7 sensitive, or which parameters can affect those
8 analyses, and they looked at the bounding analyses and
9 determined that G.E. had used the appropriate
10 conservative values as inputs. And they ran a number
11 of sensitivity cases to verify that.

12 CHAIRMAN WALLIS: Oh, G.E. ran them?

13 MR. CARUSO: G.E. ran them. That takes me
14 to my next slide, which is Number 30, which is what we
15 did as part of the audit reviews. Fuel thermal
16 limits, which is transients; and reactivity
17 characteristics, and stability.

18 And we looked at detailed calculations in
19 each of these areas to verify that they were done
20 appropriately.

21 CHAIRMAN WALLIS: This is a check of
22 paperwork?

23 MR. CARUSO: It is a check of the
24 calculations.

25 CHAIRMAN WALLIS: It is not an interactive

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1 thing, where you look over someone's shoulder and say,
2 well, how about trying this and that, and let's see if
3 it is really bounding.

4 MR. CARUSO: No, but because it was done
5 at the vendor site, and when people had questions
6 about what was in the paperwork, they could
7 immediately ask the people who did the work and get an
8 answer. They are interactive in that sense.

9 CHAIRMAN WALLIS: And that wasn't actually
10 sort of together running the code to see what happened
11 under certain circumstances or that you were curious
12 about?

13 MR. CARUSO: No.

14 CHAIRMAN WALLIS: It would be interesting
15 if you could do that sort of thing.

16 MR. CARUSO: We are about to do that for
17 one of the advanced reactor reviews. In this case, we
18 didn't feel that it was necessary. Are there any
19 questions about the audits? If not, my last slide is
20 Slide Number 33, Conclusions.

21 CHAIRMAN WALLIS: I guess it is hard to
22 know, and I guess what I am thinking about here is how
23 do we satisfy you did a good audit? Well, I guess an
24 example would be if you had a case history where you
25 found something, and if the audit found nothing, it is

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1 a kind of evidence-free situation.

2 And we don't know if it is good or bad as
3 you didn't find anything, maybe because you didn't try
4 hard enough or maybe there is nothing there to find.
5 It is hard to know what to say.

6 But if you had a case history where you
7 were actually curious about something, and you
8 wondered about it, and when you probed deeper, yes,
9 you indeed found that they really knew what they were
10 doing, and they convinced you that everything was
11 good.

12 That might be a little bit more harder to
13 convince some independent person that the audit was a
14 useful exercise.

15 MR. CARUSO: I will go back to the Duane
16 Arnold review and something that I said last time.
17 None of these audits should be looked at in isolation.
18 It is a series of audits, and we started with the
19 Duane Arnold review, looking at areas that we had the
20 most interest in.

21 And I am going to admit that we had an
22 anterior motives besides doing the power uprates. We
23 wanted to understand how the vendors were doing their
24 reviews.

25 So we were looking in places that we

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1 really didn't think we would find anything related to
2 power uprates, but we wanted to just check how they
3 had done the calculations.

4 And during the Duane Arnold review, we
5 found a couple of significant issues. We found one
6 that led to a Part 21 report, and the next audit that
7 we did, we decided that we would look at something
8 different, because we only have a certain limited
9 amount of time.

10 So we focused on things where we think we
11 will find something, and in this case we came up with
12 a dry hole so to speak. But that's not bad. The next
13 time we did the Clinton audit. I don't know what to
14 say about the Clinton audit. I think
15 -- well, I don't want to talk about it. That is pre-
16 decisional.

17 But then we will do another one for
18 Brunswick, and we will do another one for the plant
19 after that, and at some point we will get tired, and
20 we will stop.

21 DR. KRESS: From the reactor safety
22 evaluations, your previous slide, I sort of have a
23 two-part question. For the site calculations, 10 CFR
24 100, did they redo an origin calculation to get a new
25 inventory, or did they just scale up the previous

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1 inventory in some way, like using the power ratio

2 MR. BAILEY: What the did -- this is
3 Stewart Bailey, and I am the project manager for Quad
4 Cities. They did run origin for the new core loadings
5 and for the 24 cycle, and they used that to develop
6 scaling factors on the critical isotopes.

7 And they combined that with some of their
8 previous analysis to evaluate the changes in the off-
9 site dose.

10 DR. KRESS: And I have a question to ask
11 G.E. or that I asked the applicant people yesterday
12 about the PRA, and the use of LERF. With a different
13 core inventory, with different power and a different
14 amount of products in the core, should the definition
15 of what constitutes an acceptable LERF be the same or
16 should it change?

17 MR. BAILEY: I am not going to touch that.
18 Mark Rubin will.

19 MR. RUBIN: Good morning. I am Mark Rubin
20 from the PRA branch. I think we have kicked this
21 around with the committee a couple of times. It is
22 certainly a very valid point as we have mentioned
23 before.

24 Generally, we see a large variety of power
25 levels in currently operating plants, and when we are

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1 developing the guidance for Reg Guide 1.174, it was
2 thought that we should try to be design independent,
3 and site independent, and go with a LERF that would
4 certainly be confirmatory on the Commission safety
5 goals.

6 We have plants at higher power levels
7 operating now, and clearly have higher inventory,
8 given a LERF. We are sticking with the 1.174 criteria
9 at this time. I believe if we were to start the
10 licensing plants at significantly higher power levels
11 than currently operating, we certainly would want to
12 reconfirm the LERF definitions, but at this time we
13 think that this is appropriate.

14 DR. KRESS: Because the power levels are
15 generally within the mean of the distribution?

16 MR. RUBIN: Yes, sir.

17 DR. KRESS: I think that is a good answer.

18 DR. SCHROCK: How about the way in which
19 origin is used? And one of the difficulties that I
20 have in hearing that everything is done with
21 previously approved codes, the codes can be used in a
22 variety of ways, and Origin is an example, as it is
23 designed it is a point reactor.

24 And so it doesn't do for you any spacial
25 evaluation of different compositions in different

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1 parts of the core. If you are going to use it to do
2 that, then you have got to apply it in a particular
3 way.

4 Another limitation that it has is that the
5 composition of the core is constant during a time
6 step, and so the limitation that you may place on the
7 time step will have an impact on the accuracy of
8 results that you get from the application of the code.

9 So what I am asking is do you look at how
10 Origin is employed in different parts of the analyses
11 that are necessary on these evaluations? It comes up
12 in a number of ways; for the radiological consequence,
13 for the activities, for a wide range of things.

14 In a sense, it is a more general question.
15 It is how do you assure yourself that what you regard
16 as an adequate previously approved code, which you
17 then have confidence in the results for a new
18 application, is being applied in a way that you should
19 still have that confidence.

20 MR. CARUSO: Well, for the -- I can't
21 speak to Origin, because I was not involved in
22 reviewing the origin code. We don't have the
23 individual here.

24 But I think the question is probably also
25 applicable to the other codes that we deal with, and

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1 I guess you could say, well, how do we know that they
2 are not doing and creating a notalization, for
3 example, or creative time steps control.

4 And the answer is that we when we do the
5 review of the LOCA codes, for example, we approve
6 explicit notalizations, and they are required to do
7 time step studies to verify that the time steps that
8 are used demonstrate convergence.

9 There are lots of criteria that go into
10 approving a method to make sure that people don't use
11 it too creatively. And if you go look at the way the
12 vendors have set up their calculational systems, they
13 are very rigid because they can't afford to have to
14 defend lots of creative solutions.

15 And so they do things in rather rigid
16 ways, and we found this of all the vendors. They all
17 proceed this way. So it is our experience that with
18 codes like the LOCA codes, they are rather set in
19 their ways.

20 So they don't do things very creatively
21 with those codes, because it is not worth it to them
22 from an economic basis, and we try in approving the
23 methodologies to define the box so that they can't be
24 too creative.

25 I can't answer with regard to the origin

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1 calculation, but I understand the question that you
2 are asking.

3 DR. SCHROCK: And another question
4 regarding the approved codes. According to the SAR
5 and I believe also your draft SER, one of the ECCS
6 LOCA codes that is in the table of approved codes is
7 said not to have been previously approved, but to be
8 currently under review and that is TASK.

9 MR. CARUSO: Yes.

10 DR. SCHROCK: Can you tell us the status
11 of that?

12 MR. CARUSO: I can give you some history
13 behind this. This is actually -- this is one of those
14 examples of something of a change that might not be
15 considered to be a change.

16 G.E. had previously been using a code
17 called SKAT. The same four letters rearranged
18 slightly different. That was the code that was
19 explicitly approved in the methodology for -- I
20 believe it is a LOCA methodology.

21 And along the line they are allowed to
22 make changes to the LOCA methods to a certain extent
23 without our approval. And in this case, they made a
24 change that involved a change in the name of the code,
25 and they didn't think it was a change that required

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1 our review.

2 During an industry audit of their
3 methodologies, the industry found this change and said
4 we think you should send this to the NRC for review.
5 And the staff, when they found out about it, said,
6 yes, we agree.

7 So G.E. submitted the code to us for
8 review, and I just go the draft SER from Tony Ulyses
9 this morning, and he believes that it is acceptable.
10 He thinks it is a relatively minor change, and we will
11 be approving that.

12 So the change from SCAT to TASC is one of
13 these changes that they are allowed to do, but we
14 always do have disagreements about when is a change
15 significant and when is it not. And those are things
16 that we can work out with them.

17 DR. SCHROCK: I guess if my experience is
18 relevant to what the committee knows about these
19 codes, there is a large question mark as to what
20 really the codes contain.

21 So what you have just described as a
22 process of approval of a new code, which isn't going
23 to come to the committee for review, it is one of
24 about six things that are indicated as being a part of
25 the ECCS LOCA evaluation, I don't know what they do.

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1 And so I don't know how I can say yes, I
2 think the ACRS ought to agree that NRR has a sound
3 basis for saying that they have reviewed all of this,
4 and it is in fact well accepted. There is something
5 missing in here as I see it, and I may not be seeing
6 it the way as members of the committee.

7 I don't see how you can expect to have
8 people look at what you have said and accept what you
9 have said if you don't show them what it is that you
10 are talking about.

11 MR. CARUSO: Well, the LOCA codes are an
12 unusual case, in the sense that 50.46 explicitly
13 allows licensees and vendors to make changes to LOCA
14 codes without approval of the staff. It is written in
15 the regulation.

16 They are required to report to us
17 periodically, at least on an annual basis, when they
18 do make those changes. And the effect of those
19 changes on PCT limits. But this is in the regulation.

20 And so it gets -- well, the difficulty is
21 that it is not spelled out very well in the regulation
22 what exactly is -- well, I shouldn't say that, because
23 the regulation does have a criteria. It has a 50
24 degree criteria when the accumulation of temperature
25 changes reaches 50 degrees, licensees are required to

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1 make a report to us, and they are required to redo
2 their analyses.

3 But when you talk about whether those
4 changes have to be approved by the staff, the staff
5 has an opportunity to discuss them with the vendors,
6 and decide whether they should be reviewed.

7 But we do approve minor changes to
8 methodologies all the time without coming in to ACRS.
9 I am not sure though that you wouldn't want to see
10 every one of them.

11 So we make a judgment as to whether
12 something is major or significant, and we consult with
13 the ACRS staff to see whether you would like to review
14 it, and most of the time the answer is no.

15 MR. ZALENSKI: In fact, there is another
16 provision in there, in 50.46, when the licensee trips
17 50 degrees, that is a 30 day report. When they trip
18 20 degrees, that goes into their annual report as to
19 changes that they have looked at and anticipated, and
20 maybe adopted, or maybe not adopted.

21 DR. SCHROCK: But these are the results of
22 calculations and the ability to judge that the
23 calculation is an adequate calculation that I am
24 really questioning.

25 CHAIRMAN WALLIS: What you are saying is

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1 that they could put complete nonsense into the physics
2 and get 10 degrees.

3 DR. SCHROCK: Yes.

4 MR. CARUSO: And that's why I said we
5 tried to write the acceptance of the methodologies in
6 such a way that they can't be too creative. And we
7 try to do that, and that's why we like to do these
8 audits, because these audits give us an opportunity to
9 go see how creative they are. That's why we thought
10 that this was a nice opportunity for us.

11 CHAIRMAN WALLIS: Are we breaking this up
12 and trying to do --

13 MR. CARUSO: No, I'm done.

14 CHAIRMAN WALLIS: You're done?

15 MR. CARUSO: I'm done.

16 CHAIRMAN WALLIS: So how many of these
17 have you covered? I have lost track.

18 MR. CARUSO: The last one was number --
19 well, page 30.

20 CHAIRMAN WALLIS: And all these other
21 numbers before that you have covered in some other
22 sort of order?

23 MR. CARUSO: Actually, a lot of those were
24 backup slides. I was going to offer those up if you
25 had questions about particular issues, such as

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1 stability of thermal limits, or fuel design, and I
2 could give you details.

3 CHAIRMAN WALLIS: So your bottom line one
4 of all these numbers here is?

5 MR. CARUSO: Is Number 33, which says that
6 they used appropriate methods.

7 CHAIRMAN WALLIS: And they got appropriate
8 answers?

9 MR. CARUSO: And they got appropriate
10 answers. And we looked at them, and we looked at how
11 they did it specifically as part of the audit, and we
12 didn't find anything unusual.

13 And we have not heard any credible
14 specific evidence raised that the methods are not
15 appropriate.

16 DR. SHACK: Just following up on Virgil's
17 question. What kind of changes are they making when
18 they are making these changes all the time? I mean,
19 can you think of some examples? Are they changing
20 correlations, or they are not changing numerical
21 methods?

22 MR. CARUSO: Well, no, they don't change
23 numerical methods. They might change a correlation.
24 I mean, very frequently, they will -- well, for
25 example, they will come up with a new fuel design.

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1 So they have got to put a new correlation
2 into the model to account for the new fuel design, and
3 I have had some people doing a bunch of those. A lot
4 of times they find errors.

5 DR. SHACK: Right.

6 MR. CARUSO: But they are usually minor.
7 They are minor errors, and a lot of what gets reported
8 to us is that we have identified that we made a non-
9 conservative assumption about the start of the ISI
10 pump, and instead of starting at 28 seconds, it starts
11 at 32 seconds. Something like that.

12 DR. SHACK: Okay. A lot of these affect
13 input assumptions?

14 MR. CARUSO: Right. A lot of them affect
15 input assumptions. I can't think of any off the top
16 of my head that affected internal workings of the
17 codes.

18 CHAIRMAN WALLIS: So you said you were
19 done. What is the next move?

20 MR. CARUSO: Plant systems.

21 CHAIRMAN WALLIS: Thank you very much,
22 Ralph.

23 MR. BAILEY: Starting on 35.

24 MR. CARUSO: Oh, let me ask one other
25 question. Is there anything that I need to take away

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1 from this session as a testing or a query, or
2 something that you would like us to talk about
3 specifically at the next session in front of the full
4 committee that I have not covered?

5 CHAIRMAN WALLIS: Well, it is hard to say
6 exactly what will happen at the full committee
7 meeting. It is a fresh game, you know, and then our
8 mines will be working between now and then.

9 MR. CARUSO: But nothing that you can
10 think of right now?

11 CHAIRMAN WALLIS: I think you ought to
12 read the transcript. Does any member have anything
13 that they wish to add at this time? If not, let's
14 move on then.

15 MR. ARCHITZEL: My name is Ralph
16 Architzel, and I am the lead reviewer for the plant
17 systems branch review for the extended power uprates
18 for Dresden and Quad Cities. There were additional
19 reviewers that looked at various areas during this
20 review, and they were Ron Young, and he is not with us
21 today, but other members are here that looked at the
22 HVAC control room features.

23 Steve Jones looked at some of the spent
24 fuel pool issues, and Rob Elliott looked at the
25 strainer delta-P calculation aspects of it, and it's

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1 not really related to EPU, but it got resolved during
2 the course of the EPU.

3 And in addition, Rich LaBelle assisted
4 with the containment performance reviews, along with
5 Ben Gitnick, who is our ISL contractor, during the
6 Duane Arnold audit.

7 Basically, the plant systems branch -- if
8 you could go on to the next slide, and the slides are
9 a little bit changed from what I saw last night.

10 Basically, the plant systems branch has a
11 wide breadth of responsibilities. The way that we
12 performed our review is that it is somewhat different
13 than reactor systems, but I will go over it right now.

14 We reviewed the design operation
15 requirements for the systems, using the UFSAR. We did
16 examine application for conformance with the approved
17 topical report, and the statements in the topical
18 report safety evaluation, and that was quite an
19 extensive review just to get that information and
20 digest it, because I was not one of the original
21 reviewers for the EPU.

22 We assured Agency regulations and reg
23 guides are met under EPU conditions, and that is the
24 reg guide standards, and in this context, you have to
25 go back to the licensing basis for the plant as well.

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1 So it is not always a straight correlation
2 for a standard review plan, or for the regulatory
3 guides. We held telephone conferences, quite a few,
4 to clarify the applications, and to systems design and
5 operation, and the responses.

6 And in that context, these applications
7 aren't sometimes quite as extensive as what you see on
8 the FSAR. So there is -- where we search for
9 additional clarifications are in areas where there
10 wasn't quite the detail that we felt was necessary to
11 make the safety decision.

12 We issued RAIs to resolve questions
13 regarding the licensee's EPU evaluation results, and
14 the supplement to documented information. In our
15 review, we did coordinate with different branches
16 because we do have a wide breadth of responsibility,
17 and where others might have the lead.

18 This included working with the PRA branch
19 on the impacts on our affected systems, and we worked
20 with the inspection programs branch on start-up test
21 issues, and station blackout input with the electrical
22 branch.

23 And the radiological source term with
24 Steve Levine when we are doing the control room HVAC
25 reviews. Our conclusion was that the EPU did not

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1 adversely affect the operational basis of the
2 responsible areas that we had under our review. Go to
3 the next slide.

4 The next series of slides basically is a
5 tabulation of the areas where we provided input into
6 the EPU safety evaluation report. I assume you have
7 it and that you have read it.

8 I don't know that I want to go over all
9 these unless you really had questions. There were
10 certain areas where we had significant review items,
11 and I have asked Rick for those, and they are on the
12 last page, but right now I will just flip through
13 these areas, unless the committee has any questions.

14 DR. KRESS: I have a question about the
15 containment performance, and it has to do with source
16 term.

17 MR. ARCHITZEL: All right.

18 DR. KRESS: There is this alternate source
19 term that is in 10 CFR 100 to show compliance with the
20 thing, and there is one for BWRs and one for PWRs.

21 The question that I have is whether that
22 is the source term that they used to show that they
23 meet 10 CFR 100? And does the fact that you have a
24 different power, should it influence the design basis
25 source term from the standpoint of bypass around the

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1 suppression pool, and the temperature and
2 effectiveness of the suppression pool in removing
3 source terms?

4 MR. BAILEY: This is Stewart Bailey, the
5 PM for Quad Cities. The licensee did not go to the
6 alternate source term as a part of this update.

7 DR. KRESS: They used the old source term?

8 MR. BAILEY: They were originally a TAD
9 14844 source term, and they ran the origin runs to get
10 appropriate scaling factors, and usually just scaling
11 up the critical isotopes. They have not gone to
12 alternate source term yet.

13 DR. KRESS: Did they take credit for
14 sprays, containment sprays? I understand that this
15 particular --

16 MR. BAILEY: My understanding is that they
17 did not. They would have to clarify that. Our
18 reviewer, or the person who reviewed all of the dose
19 analysis in detail is not here today. But my
20 understanding is that they did not credit the spray
21 for iodine scrubbing.

22 DR. KRESS: But do you know what they used
23 for a suppression pool decontamination factor?

24 MR. BAILEY: I don't know that offhand.

25 DR. KRESS: I guess I would have to ask

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1 the people --

2 MR. ARCHITZEL: Yes, as that was not
3 within my review.

4 DR. FORD: Could I ask a question of the
5 previous graph about radiological source terms? In
6 that analysis that you did, you referred to Hydrogen
7 16. A case has been made that because you are using
8 Noble Chem that Hydrogen 16 would be reduced.

9 Was there any analysis that was done as to
10 how well the Noble Chem is going to stand up to the
11 high flow rates, in terms of this adherence?

12 MR. ARCHITZEL: Let me just explain that
13 my part of that review was basically asking or had
14 some questions about the use of Noble Chem, and
15 whether they wanted to credit it for reduced hydrogen
16 usage, or excuse me, when they came to the limit on
17 the recombiners.

18 So there are different aspects that have
19 been involved on whether they were going to use or
20 credit Noble Chem, and they stated in their response
21 to the RAI that that was not their licensing basis.
22 But they planned to use it.

23 As far as the aspect that you are talking
24 about, the degradation of Nobel Chem, I did not look
25 at that area, and I am not --

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1 MR. BARRETT: This is Rich Barrett with
2 the NRR staff. A number of questions this morning do
3 seem to relate to the way in which the radiological
4 consequences -- the source term, et cetera -- were
5 calculated, and we do not have our reviewer here
6 today.

7 If the Committee would be interested in
8 having someone here, we could probably arrange to do
9 that this morning.

10 CHAIRMAN WALLIS: Maybe you could arrange
11 for someone to come after the break, since there have
12 been several questions, and that would be helpful.
13 Can you do that, Rich?

14 MR. BARRETT: Yes, we will look into that.

15 CHAIRMAN WALLIS: Thank you.

16 MR. ARCHITZEL: At this point, I would
17 just like to return to the list of areas and quickly
18 go over them, and then if there are questions, I do
19 have backups for some of the areas of review.

20 Main steam isolation valves, residual heat
21 removal/LPCI/containment cooling and shutdown cooling
22 systems, are basically the modes that reflect on the
23 containment response, and not to the heat portion of
24 that.

25 DR. FORD: Will the discussion on the

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1 steam separator performance, will that come in later
2 on in materials degradation?

3 MR. ARCHITZEL: The discussion is a
4 limited discussion, and the limited review that I did
5 on the steam separator performance is strictly to
6 verify that they were going to test the moisture
7 carryover and you heard a discussion yesterday, but
8 that was the response that they got in the REI.

9 As far as the structural part of the
10 separators, and what the staff reviewed, that would be
11 the mechanical engineer --

12 MR. BAILEY: Dr. Ford, you are interested
13 in hearing from mechanical engineering on the
14 structural integrity of the dryer?

15 DR. FORD: Yes.

16 MR. BAILEY: I think we can arrange that.

17 DR. FORD: Well, it is really just the
18 process that you went through to assess their analysis
19 that there would not be a big impact of fluence use
20 vibration, for instance.

21 CHAIRMAN WALLIS: The loss of parts or
22 whatever.

23 DR. FORD: Loose parts analysis, and just
24 the process that you went through.

25 CHAIRMAN WALLIS: So you will have

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1 somebody on after the break then?

2 MR. BAILEY: Yes.

3 MR. ARCHITZEL: If there are no questions
4 on this slide, we will go on to the next slide. In
5 the containment systems performance area, we did
6 review the containment pressure temperature response,
7 and this is one of the areas where you may have
8 additional questions.

9 CHAIRMAN WALLIS: Did you do an
10 independent calculations of any of these things?

11 MR. ARCHITZEL: What we did in the
12 containment systems area is that we coordinated with
13 the Duane Arnold review, and the independent review
14 that was done for Duane Arnold.

15 I participated in that review and those
16 calculations, and it contained code that was used
17 there as the same containment code that was used for
18 Duane Arnold and Dresden.

19 We also had those reviewers, Rich LaBelle
20 and ISL, look over the containment response portions
21 of the application, and they participated in the
22 review of the additional questions and the details
23 that we searched for, in terms of being able to make
24 our safety decision.

25 We did not do independent calculations for

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1 the containment response for Duane Arnold and Dresden,
2 but we relied on that containment response. We may in
3 the future do additional independent calculations, and
4 mass energy release is an area that we may look at,
5 but at the moment it was to compare it to the codes
6 that G.E. used for this evaluation.

7 MR. BAILEY: And I guess another part of
8 that is that we took a look at their inputs and
9 methodologies. We had done confirmatory analysis of
10 their containment response within the last 3 years.
11 So we have looked at what they are doing recently.

12 MR. ARCHITZEL: And that was more in the
13 MPSH area, which is a different slide. We did have
14 those calculations. This may go fairly quickly,
15 because if there aren't any questions, we can on --

16 DR. KRESS: Well, the containment dynamic
17 loads, does that include the loads on the suppression
18 pool --

19 MR. ARCHITZEL: Yes, it does, but
20 basically those loads were bounded as per the EPU, and
21 aspects like whether or not the -- you know, with the
22 same pressure as the driving source initially, EPU is
23 a second order effect sort of on the containment
24 response.

25 So there wasn't a tremendous amount of .

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1 difference impacted by the EPU except in the long
2 term. Now, the TORUS temperature went up for two
3 reasons. One, the analysis methods changed. They
4 used a more realistic blow down.

5 That gets the energy into the suppression
6 pool faster, and they also no assumed thermal
7 equilibrium between the TORUS air space temperature
8 and the water and the TORUS, and the higher
9 suppression pool temperatures, and the MPSH needs were
10 increased because of the EPU.

11 And those are the types of things that we
12 looked at, and we asked for curbs, and we have curbs
13 for the containment pressure response, and trying to
14 understand what was happening at different points.
15 But we did not do any analyses.

16 The safety relief valve discharge loads
17 and things like that were not affected, because there
18 is a time when it affects the drain down, and we also
19 looked at aspects like with the increased temperature,
20 and with the squenchers, and the steam that was coming
21 out of the squenchers intersect with the suction of
22 the ECCS pumps.

23 And they provide discussions and envelopes
24 for that would not be in the phenomena, and so
25 therefore they didn't have a local pool temperature

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1 effect addressed or limit addressed.

2 On the very last page, I happen to have a
3 list of the ones that are on 46, are the areas where
4 we had additional input, and one of them was the
5 4.2.5, and there is no more information there than the
6 net positive suction head.

7 And I guess I would like to say on the net
8 positive suction head that that was one of these cases
9 where it was an existing open issue before the EPU
10 started.

11 Most or a lot of our review items or
12 aspects, the EPU has a negative effect on net positive
13 suction head by raising that pressure, and therefore
14 there was an increased demand, and it was addressed in
15 the ELTR about the potential need for plants to take
16 credit for net positive suction head, and there will
17 be an additional need for net positive suction head.

18 And in this instance, that effect is
19 there, and we have looked at it. I could show you the
20 credit they have requested, versus the existing
21 credit. There is no additional credit requested in
22 the very beginning of the transient for either Dresden
23 or Quad Cities.

24 But with time that credit does go up for
25 periods of time and it hangs in there longer. So if

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1 I could take a curve and show you how it is affected
2 if you are interested.

3 CHAIRMAN WALLIS: Is this still acceptable
4 to you, that we take this credit?

5 MR. ARCHITZEL: Right. We tried to
6 minimize the credit that we allow them to receive. So
7 the questions were along the lines of did you examine
8 and replace the pumps, or some type of other mechanism
9 to reduce the pressure, and of course that was not
10 economically feasible was the answer that we got back.

11 So in that instance would the EPU have any
12 approval for the potential additional over credit. We
13 looked at it, and it was not a major increase in over
14 credit over what has currently been granted.

15 CHAIRMAN WALLIS: And there is no basis
16 for saying that the pump performance is likely to be
17 degraded?

18 MR. ARCHITZEL: Well, the cavitation, they
19 do have cavitation at Dresden and Quad Cities after
20 the peak as you heard yesterday. When I went to the
21 audit, I did see the testing that was done, and it was
22 like about an hour-and-a-half testing at cavitation
23 conditions.

24 And so there is cavitation, and even
25 though we have granted that credit, they still don't

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1 have enough credit for 290 until about the 10 minute
2 point, where they take credit for operator action.

3 The procedures are in place to reduce the
4 flow for the operators, and so there is no reason to
5 really believe that it would necessarily go that long,
6 the cavitation route.

7 And part of the questions that I was
8 asking was also to make sure that the operators
9 actually weren't going to throttle back those flows
10 and leave the extra pumps running if they did have
11 sufficient MPSH.

12 So I guess if the question is if we are
13 comfortable with the net positive suction head credit
14 that we are granting, the open issue that existed did
15 deal with strainer differential pressure.

16 And it has taken a long time to get that
17 resolved, and there have been open issues. Actually,
18 Quad Cities did not have credit for containment over
19 pressure.

20 They had an application in-house which we
21 had not approved. We rejected it because the methods
22 that they had used were not in accordance with the
23 URG. Very lately, we have gotten the submittal that
24 does follow the URG recommendations and SER.

25 We have looked at it, and we have not

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1 written the SER yet, but that should not be a problem
2 for this uprate then. But as for the strainer and
3 differential pressure, and the unique strainers they
4 have got, they developed a head loss.

5 CHAIRMAN WALLIS: So the final SER will
6 explain why you feel comfortable in some detail?

7 MR. ARCHITZEL: Well, actually the
8 strainer differential pressure influence in this EPU
9 was in the conservative or the effect of raising the
10 temperature actually results in a lowered differential
11 pressure.

12 So in that aspect, it is not a concern,
13 but we will explain that in the SC.

14 MR. BOEHNERT: What was the issue with the
15 fuel pool cooling?

16 MR. ARCHITZEL: The issue for the fuel
17 pool cooling is strictly the increased decay heat and
18 how you handle increased decay heat. We are taking
19 new looks at fuel pool coolants these days, and what
20 single failure exists, and it turns out that with
21 Dresden there is a difference between Dresden and Quad
22 Cities.

23 And that they use and credit the RHR fuel
24 pool system, and they have a dedicated RHR -- well,
25 excuse me, a dedicated shut down cooling system at

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1 Dresden, and Quad Cities has the residual heat removal
2 mode.

3 But basically it is the single failure.
4 We examined the single failure that they are talking
5 about, and with the RHR pump, it is just identifying
6 the single failure, and we got into discussions about
7 do you really have an RHR backup or you don't you,
8 administratively, and things like that.

9 And what temperature are you going to go
10 to, and what are your makeup rates, and do you exceed
11 the design of 150 degrees or not. You get a little
12 more detail, and there is very short sentences in the
13 application.

14 So finding out all the details of how that
15 worked, and what administrative controls were in place
16 to assure that you had a backup, and assumed the right
17 single failure.

18 The make-up rates were not really stated
19 correctly in the application, and so we got an
20 understanding of it really has significantly more
21 makeup, and they provided us the boil off rate, and
22 those types of issues.

23 CHAIRMAN WALLIS: There is no ultimate
24 heat sink?

25 MR. ARCHITZEL: The ultimate heat sink

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1 -- and if you are on to that page.

2 CHAIRMAN WALLIS: I am looking at the
3 slide behind you there that says that was an area --

4 MR. ARCHITZEL: Well, you are one ahead of
5 my slide, but okay. In the area of ultimate heat
6 sink, the staff review is not complete on the ultimate
7 heat site. This is another area -- well, the EPU
8 effect just for Dresden.

9 At Quad Cities another fairly short
10 discourse provided by the licensee, but the basic
11 bottom line is that with dam failure at Quad Cities,
12 the pool behind that dam separates from the plant
13 after a defined amount of time, and that defined
14 amount of time is what they currently need to provide
15 portable pumps for their ultimate heat sink.

16 Dresden is the area where we have not
17 completed our review at this point, and one of the
18 principal reasons that I did go to the site to do an
19 audit on their calculation of the situation.

20 This is another existing open issue. The
21 licensee discovered problems with their design basis
22 reconstitution several years ago, and after they
23 discovered those problems -- they are dealing
24 basically with which volumes are available in the
25 seismic aspects of the system and the timing of the

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1 operator actions.

2 And we evaluated those conditions before
3 the EPU, and we provided the region a TIAA response to
4 what areas to look at, and basically the EPU effect is
5 to shorten the time period for manual actions go get
6 portable pumps, and make up into the canal, which they
7 consider their seismic -- if you will, a seismic
8 source.

9 There still is no seismic source from that
10 point into the isolation condenser. So that is part
11 of the staff approvals that is really part of the
12 issue that is still open, but basically the new
13 information came out fairly late, and the EPU effect
14 is not significant from a safety standpoint.

15 We have looked at that, the 4.5 days to
16 the 4 days is the latest information that we have
17 received, there is other information, for example,
18 that with EPU that you need 2.9 million gallons in the
19 intake canal, versus 2.5 million before.

20 That is just boiling water, and it is not
21 really what you really need, and so the 30 days is not
22 -- and whether that was in their licensing basis is
23 questionable. So it is not clear if there ever were
24 a 30 day type of a plant.

25 And these are just discussions in the

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1 history that we are evaluating. And there are also
2 aspects that are currently under review, like proposed
3 modifications to add a seismic Class One capability
4 within several years for the IPEEE.

5 CHAIRMAN WALLIS: I was going to ask you
6 about seismic. Are you the right person to ask?

7 MR. ARCHITZEL: I can describe my
8 understanding of what is seismic and what is not
9 seismic with the Dresden plant.

10 CHAIRMAN WALLIS: Well, we were given this
11 IPEEE part of the draft on the SER, and it talks about
12 that it is an inadequate seismic margin at some point.

13 MR. ARCHITZEL: Well, I guess that is
14 where you consider, and Donnie maybe could talk a
15 little bit to those numbers that you heard some about
16 yesterday, and the impact is not tremendously safety
17 significant of those future modifications.

18 CHAIRMAN WALLIS: It may not be safety
19 significant, but are they meeting the regulations
20 then, in terms of --

21 MR. ARCHITZEL: Well, let me just say that
22 for the current regulations -- and Donnie can talk
23 about the safety aspects of it, but for the current
24 regulations and with the seismic makeup that they
25 have, the isolation condenser, which would last now

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1 and which would last before, 20 minutes approximately.

2 They are keeping that power level just
3 like the bypass valves, and they have got a set power
4 level, and it is a fraction of the existing power
5 level when it uprates, and so for 20 minutes they have
6 a make-up capacity that is seismic.

7 In addition to that, they have the
8 containment, and they have got the ability for a day
9 of containment. But the remainder of the seismic
10 capability to make up to the isolation condenser, they
11 have diverse sources.

12 And the diverse sources have some seismic
13 rigidity, but they are not safety related. You
14 wouldn't credit them an existing plant today. And we
15 have looked at some of the seismic statements. There
16 is one statement in the SEP that the far water system
17 was qualifiable.

18 MR. BAILEY: I think we are talking two
19 different things here, in terms of the low rigidity
20 that is discussed in the safety evaluation, and I
21 don't believe that that applies here. Can you give an
22 --

23 CHAIRMAN WALLIS: I am referring to this
24 .909G.24G.

25 MR. BAILEY: That is not really the issue

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1 we are talking about for the ultimate heat sink.

2 CHAIRMAN WALLIS: No, it's not.

3 MR. BAILEY: For the ultimate heat sink
4 that the staff review is still ongoing, we are trying
5 to make sure that we understand all of the scenarios,
6 and all of the available water, and --

7 CHAIRMAN WALLIS: And that is a different
8 issue.

9 MR. HARRISON: This is Donnie Harrison
10 from the PRA branch, and the reference you are making
11 to the .09G HCLPF value is a reference out of the
12 IPEEE for Quad Cities.

13 CHAIRMAN WALLIS: Right.

14 MR. HARRISON: And it was recognizing that
15 that was, if you will, an unacceptably low seismic
16 capacity for a plant. At that time the licensee was
17 still in the process of making modifications, and most
18 of that was I believe Cable Tray and Anchorage.

19 And since that time I think at Quad
20 Cities, they are going to complete all their
21 modifications by the next outage, the completion of
22 the next outage for each of those two plants.

23 At that time the concern that the staff
24 was raising was there is not going to be a
25 reevaluation to see where the plant is. So the staff

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1 used some numbers from Dresden, partly because the
2 Dresden -- well, we had the information on Dresden,
3 and the seismic hazard at Dresden is actually a little
4 higher than Quad.

5 So we felt comfortable as just being a
6 perspective of where the risk was for the .09G plant,
7 as opposed to going up to, let's say, your design
8 basis at 1202.4 from a HCLFP value.

9 And that was provided mainly to raise the
10 issue and to get a risk perspective of where the plant
11 was.

12 CHAIRMAN WALLIS: Is there going to be a
13 presentation from the staff on the risk perspectives?

14 MR. HARRISON: We can at any time you
15 want, yeah.

16 CHAIRMAN WALLIS: And that is where we
17 could revisit this seismic margin issue then perhaps.

18 MR. HARRISON: Sure.

19 CHAIRMAN WALLIS: So we will have that
20 again later in the morning, or timing willing, I
21 guess.

22 MR. ARCHITZEL: We will do that after the
23 break. And we can work out the order of presentation
24 after the break.

25 CHAIRMAN WALLIS: And we are approaching

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1 the break as we approach the end of this presentation.

2 MR. ARCHITZEL: Well, I think that is
3 about it for ultimate heat sink. Part of the issue
4 also is whether the calculations were conservative or
5 not, or formalized, and those issues are still being
6 considered.

7 DR. SCHROCK: And that issue is limited to
8 the Dresden?

9 MR. ARCHITZEL: That's correct.

10 DR. FORD: And the feed water issues and
11 corrosion, that will come in later?

12 MR. ARCHITZEL: Yes. There is something
13 there on feed water, and about flushing out and how
14 the system changed, which was not in the application.
15 And getting additional information on the logic behind
16 running the pumps and saving the plan, and the plant
17 availability on how you run it, and where the suction
18 trips come in.

19 And actually trying to maintain the plant
20 on line was the focus of my review in the feed water
21 area. And the next slide.

22 CHAIRMAN WALLIS: This is the last one.

23 MR. ARCHITZEL: That's it. And the last
24 one was just going over the -- well, it is sort of an
25 open listing of areas that we reviewed, and if you had

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1 questions, I could go into more. But if you don't
2 have questions, then -- you know.

3 CHAIRMAN WALLIS: Are we ready for a break
4 now? Are there any questions from members of the
5 committee?

6 MR. HANNON: Excuse me, but this is John
7 Hannon. I wanted to make sure that one of the points
8 that Ralph made is clear, because it relates back to
9 one of your concerns on the Duane Arnold review, and
10 John Zalinski asked me to follow up on that.

11 One of your points was that the staff
12 should develop criteria for when independent
13 assessments should be performed to compliment our
14 reviews of the applicant's submittal.

15 And this is one case where we did it on an
16 ad hoc basis. We sent Ralph to the site to do some
17 independent verification of the calculations that they
18 had done for the ultimate heat sink.

19 And the point that I wanted to make is
20 that we do do that on an ad hoc basis when it appears
21 to be appropriate. And this is a case where we
22 thought it would be appropriate for us to do it.

23 MR. ARCHITZEL: And also when I went to
24 the site also, you looked at the calculations for the
25 net positive suction head that the licensee had done.

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1 So it was two different areas where we examined,
2 including that.

3 CHAIRMAN WALLIS: Thank you. So are we
4 ready for a break? So we will take a break until 25
5 until 11:00, a 15 minute break; and after the break my
6 colleague, Jack Sieber, is going to Chair, and I am
7 going to turn the Chair over to him.

8 I would ask my colleagues to send me
9 comments on this whole issue so I can prepare a letter
10 for the full committee.

11 (Whereupon, the meeting was recessed at
12 10:19 a.m., and resumed at 10:36 a.m.)

13 MR. SIEBER: I would like to call the
14 meeting to order. In looking at the agenda, we have
15 on the last page a response to ACRS questions, which
16 I think we should go through at this time.

17 And then we had some additional questions
18 on source term in the PRA, and so we can deal with
19 those at the staff's convenience. You can arrange
20 however you want to give the remaining presentations.

21 MR. BAILEY: We wanted to make a small
22 change in the agenda to address your request for a PRA
23 presentation.

24 MR. SIEBER: Okay.

25 MR. BAILEY: Donnie Harrison will present

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1 his PRA analysis, and if this is all right with you,
2 then we would return to the responses to ACRS
3 questions portion.

4 MR. SIEBER: Okay. That's fine.

5 MR. BAILEY: And for clarification, we did
6 not get somebody or we were not able to get somebody
7 here to answer the questions related to the
8 radiological analysis.

9 MR. SIEBER: Okay.

10 MR. BAILEY: So if there are questions or
11 information you would like us to bring to the full
12 committee, we can offer you that.

13 DR. KRESS: I think those were mostly
14 clarification questions that I had, and I can dig in
15 to the stuff we have and get them out.

16 MR. BOEHNERT: So why don't you stand by
17 and we will let you know if we want something in
18 follow-up on that.

19 MR. BAILEY: All right. Very well.

20 MR. SIEBER: Okay. Why don't we begin.

21 MR. HARRISON: Good morning. My name is
22 Donnie Harrison, and I did the PRA portion of the
23 review of the power uprate. And these slides are just
24 back up information in response to your questions.

25 MR. BOEHNERT: We will need copies of

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1 these.

2 MR. HARRISON: We will walk you through
3 it. If we could just move on to the next slide.
4 Basically, the information that we received from the
5 licensee is provided on this slide, as well as what
6 the staff used in its review.

7 We have the original submittal by the
8 licensee, which was just a couple of paragraphs if I
9 remember correctly. That was supplemented in about
10 the February time frame to address the key areas of
11 review that the staff typically looks at in the risk
12 area.

13 We then had a series of -- one major round
14 of RAIs with a series of clarifications and meetings
15 and such, and conversations on, and again this covers
16 the areas of internal events, external events,
17 shutdown operations, and then also just an area of PRA
18 quality, and does the plant reflect the as-built as
19 operated facilities.

20 The staff review looked at the licensee
21 provided information. We also looked at other areas.
22 For example, much of the external events questions
23 from the staff were derived from the Ses that were
24 written on the IPEEEs. We also pursued areas that
25 maybe the SE called out on the IPE.

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1 DR. KRESS: And how exactly did you assess
2 the quality of the PRA?

3 MR. HARRISON: The quality of the PRA was
4 done in a couple of different ways. One is in July,
5 at the end of July, we actually -- two members of the
6 staff took a trip down to the Exelon facility to look
7 at their maintenance procedures and processes, to see
8 how Exelon actually ensures for themselves that their
9 models are up to date to ensure that the models
10 actually reflect significant changes to the facilities
11 that go on throughout a period of time.

12 They did -- and I will return Dr.
13 Burchill's compliment. They did an excellent job of
14 providing us information, and providing us a whole
15 series of their PRA materials, their procedures. We
16 understand that it is an evolving process, and it is
17 getting better all the time.

18 DR. KRESS: Has their PRA undergone the
19 industry peer review process?

20 MR. HARRISON: Both PRAs have undergone
21 that. Dresden went through it twice, and if you talk
22 to Dr. Burchill, he will say the first time was
23 probably premature for them to go through.

24 And they learned a lot of lessons and
25 reflected that in the Quad Cities and in the revision

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1 to the Dresden PRA. So both events were both received
2 by March, and with their evaluation criteria, all of
3 them were -- all of the elements were at a high level
4 that could be used in a risk informed submittal
5 supporting deterministic information.

6 DR. SHACK: Was that the owners' group one
7 or the NEI? I mean, could we assign a Level-3 to this
8 thing? I mean, was there a number? I am not sure
9 whether the owner's group gives you that.

10 MR. SIEBER: The BWR owners group.

11 MR. HARRISON: They assign a number for
12 each of the 11 elements. For 10 of the elements, they
13 received a three; and for the 11th one they received
14 a four. So, higher is better than lower. So it was
15 a 3-4.

16 MR. BOEHNERT: Out of what?

17 MR. HARRISON: Out of four. That is a
18 good question. So, yes, the staff actually spent some
19 time, a few days, at the facility just to look at the
20 process. We looked at their -- they have a software
21 program that is kind of like an XL spreadsheet that
22 they track the modifications going on at the plant.

23 They evaluate those modifications to see
24 if they need to do an update immediately of the PRA,
25 or if it is something that they can wait until their

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1 next periodic update.

2 Today, they have never had anything rise
3 to the level that requires that immediate update. One
4 of the things that the staff noted in its draft SE
5 write-up was given all of the changes going on with
6 the plant with this power uprate, and things in
7 parallel with this power uprate, the staff would
8 probably recommend doing an update on these
9 PRAs just to make sure that everyone is reading from
10 the same sheet of music.

11 But again that is more of a statement of
12 what the staff would recommend, and it is not a
13 required thing.

14 MR. SIEBER: If I look at the Section 10
15 of the safety evaluation, I see a lot of places -- and
16 I guess I have both Dresden and Quad Cities here --
17 where a statement was made that the delta-risk was
18 insignificant.

19 Does that mean that they actually modeled
20 the changes in the PRA and then looked at the numbers,
21 or does it mean that in the PRA the issue wasn't even
22 modeled at all?

23 MR. HARRISON: What I would say is that
24 there is a couple of things that the licensee did.
25 There were places where they put something in the

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1 model and recalculated, and reran the model.

2 There is places where they used a
3 simplified model, where they were making the design of
4 the -- let's say the recirc run back circuit, and that
5 was in design at the same time they were doing their
6 PRA evaluation.

7 So they put in a simple model and ran that
8 through and saw what the impact was. Other cases --
9 and typically in response to the staff's RAIs, they
10 may provide us a calculation that says that the loss
11 of off-site power fast transfer is a new event that we
12 are going to evaluate.

13 And that we will just give you the
14 calculation to show you that the number is 10 to the
15 minus 10, or that the loss of off-site power
16 initiating event frequency would have been increased
17 by 2 times 10 to the minus 6, but it is a very simple
18 calculation.

19 So there is a smattering of different
20 approaches, depending on what the issue was, and how
21 we are dealing with it.

22 MR. SIEBER: Is it possible to pick that
23 out of the safety evaluation report on which method
24 they used when they were rerunning the model, or --

25 MR. HARRISON: I think I pointed out in

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1 the write-up where they used simplified models or
2 simplistic calculations. I tried to make it clear
3 -- and that is where after going into each of those
4 sections the staff made a conclusion that it was using
5 a simplistic model.

6 If it had been a risk-informed submittal,
7 we might have sought for the licensee to confirm that
8 the design and the simple model either match, or the
9 simple model actually bounds it for sure.

10 So I think that would come out. We don't
11 necessarily go through and say here is all the
12 modeling changes that they did.

13 MR. SIEBER: Right. Well, I think that
14 would be too extensive, and would make this too long.

15 MR. HARRISON: Right. As it is, for a
16 section that is supposed to be an insight section, it
17 is still 20 pages long.

18 MR. SIEBER: Right.

19 MR. HARRISON: I hope that there is a lot
20 of insights.

21 MR. SIEBER: Okay. Thank you.

22 MR. HARRISON: We can move on, and the
23 next few slides are just going to repeat really what
24 Dr. Burchill mentioned yesterday, with maybe a
25 different slant on it from the staff's perspective.

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1 They evaluated the key areas, and in the
2 initiating events area, component reliability, success
3 criteria, and operator actions. They addressed all
4 those areas.

5 There were some impacts pretty much
6 identified either by the staff or by the licensee in
7 each area. Again, as you mentioned, each area seemed
8 to have -- we are talking a percent here or two
9 percent there change in CDF.

10 We weren't seeing any major changes. The
11 next result is that there is -- and I think yesterday
12 that you saw Exelon had a CDF delta increase of 9
13 percent, and I listed 8 percent.
14 Maybe we count different. I have probably got more of
15 an error in the way that I added them.

16 Quad Cities is looking at a five percent,
17 and those are very small risk increases. The LERF
18 numbers again are 10 percent at Dresden, and 4 percent
19 at Quad Cities.

20 The difference between Dresden and Quad
21 Cities, I would probably argue, is mostly because the
22 base CDF and base LERF numbers at Quad Cities are
23 about twice as high as they are at Dresden, and
24 therefore, the change in risk is half at Quad Cities.

25 DR. KRESS: So the actual deltas were

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1 about the same?

2 MR. HARRISON: Yes, for the most part.
3 The numerical number would be about the same. Again,
4 we would just point out that there were simple models
5 and simplistic calculations performed, as well as on
6 the transformers, and there was some question on the
7 switch gear and the breakers.

8 And there were some tests that the
9 licensee stated that they were going to perform to
10 show that they were acceptable, and they might have to
11 make some field modifications to make that acceptable.

12 It wasn't clear to me that those tests had
13 been completed and that the modifications had actually
14 been implemented. So that was to recognize that there
15 was some uncertainty there.

16 And then on the thermal hydraulic area,
17 the staff recognizes that they did an analysis of what
18 their typical thermal level will be, and not what
19 their licensed thermal level would be, which means
20 that they did the thermal hydraulics runs using MAP
21 about two percent below what the licensed level is.

22 And the staff recognizes that puts us into
23 a little bit of an uncertainty area as far as success
24 criteria and operator action time. But again we are
25 only talking about two percent in a 17 percent uprate,

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1 and we don't see that as being something that would
2 trip us into a concern.

3 DR. SCHROCK: Did they have some reason
4 for doing that?

5 MR. HARRISON: The rationale again is that
6 the PRA is supposed to reflect more of your realistic
7 operations, and the plant will typically be operating
8 at a lower thermal limit to achieve the same
9 electrical output, except for I think during the
10 summer months.

11 And there might be periods during the
12 summer where they actually have to increase that to
13 get that output. So, yes, it was mostly just to get
14 a realistic perspective.

15 Again, the staff would have preferred that
16 they do it at the license level to just take any doubt
17 out. So that was just to recognize that that was the
18 condition.

19 DR. KRESS: Did they do any uncertainty
20 analysis?

21 MR. HARRISON: No. They did do
22 sensitivity analysis I think in the past, and I think
23 you heard some of that yesterday. But there were no,
24 if you will, sensitivity calculations done at a higher
25 thermal limit, or at least not provided to the staff

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1 to verify that they were acceptable in that area.

2 DR. FORD: To somebody in the public, the
3 use of your words, use of simplified models and
4 simplistic calculations, is somewhat negative. Could
5 they have used a more professional approach?

6 MR. HARRISON: This is not questioning
7 their professionalism. This is more of just
8 recognizing -- and maybe I need to change my words,
9 but recognize the fact that in some cases they were
10 designing a circuit, or designing a feature at the
11 same time that they were modeling that feature.

12 And Exelon took the approach of trying to
13 bound that, and they bounded it by using simple
14 models.

15 DR. FORD: But that --

16 DR. SHACK: Simplified bounding.

17 MR. HARRISON: Simplified bounding, or
18 simplified conservative models. Again, there is not
19 a confirmation at the end to ensure that the circuit
20 that they actually did install is bound. I mean,
21 there is uncertainty there.

22 And again if this had been a risk informed
23 scenario, we would probably be chasing down that
24 confirmatory analysis to make sure that what was
25 installed is truly bounded by what they actually

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1 analyzed.

2 Typically, an example would be that on the
3 reactor recirculation pump run back feature. They
4 increased their turbine trip initiating event
5 frequency by a few percent, and ran it through their
6 model, and did not take credit for at Dresden the fact
7 that the recirc pump would keep you from tripping.

8 So in that sense the staff then has
9 confidence that their analysis should have bound the
10 impact.

11 DR. FORD: The only reason why I am
12 bringing up this question is that this is open to the
13 public, and someone in the public could construe that
14 as being a simple, but inadequate, analysis, and that
15 is not your meaning.

16 MR. HARRISON: Right. That is not my
17 meaning. I am meaning to say that it is a -- if you
18 want to use a conservative -- well, I don't like using
19 bounding in PRA language, but that seems like an
20 oxymoron.

21 It is a conservative approach to trying to
22 address the condition you are in, where you are
23 designing a component while you are modeling it at the
24 same time. So it just recognizes that fact. If we
25 could move to the next slide.

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1 We also looked at external events and
2 shutdown operations and PRA quality, and we have
3 already touched a little bit on the last one. The
4 staff spent quite a bit of time on the external events
5 portion, primarily in the area of seismic outliers.

6 The IPEEE for both of these stations
7 identified outliers in the seismic margins analysis,
8 and we aggressive pursued those with the licensee.
9 And especially for the seismic dam failure, which I
10 think you have heard about now at least partially
11 twice.

12 We saw after addressing those scenarios
13 specifically from a risk specific to see where we
14 were. At Dresden, the rest of the plant meets its
15 seismic margins analysis criteria for a .3G focus
16 scope plant.

17 We didn't pursue those things that were
18 already at that level. We wanted to see where the
19 outliers were. The results of that were that we had
20 some -- I think if you add it all up on the seismic
21 side, it comes out just a little below 10 to the minus
22 5 as the risk.

23 And that includes not just the outliers,
24 but also taking into account the fact that you could
25 lose the isolation condenser seismically as well. And

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1 if you add that on, you get it right around 10 to the
2 minus 5 as a CDF value.

3 And the isolation condenser does meet the
4 .3G margins analysis, but I put that in just as a
5 perspective. On the fire analysis, they indicated
6 that there was a small risk increase that is mostly
7 due to operator actions.

8 However, again, using Dresden as an
9 example, their methodology is what I would call a
10 progressive screening criteria type methodology, where
11 if you get an acceptable answer, you stop analyzing.

12 MR. SIEBER: That was strictly a control
13 room fire.

14 MR. HARRISON: That was a control room
15 fire, and they took a 50 percent chance of going to
16 core damage if I lose the control room. So any kind
17 of operator actions that changed by 5, 10, 15 percent,
18 are never going to raise to the level that would
19 offset that high of a conditional core damage
20 probability, unless you find out that you just can't
21 do it. That would be about the only way to get there.

22 I think we have talked in the past about
23 shutdown operations for BWRs. Typically, you have
24 long times to boil, and it is not a concern as much as
25 it would be for, say, a PWR.

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1 MR. SIEBER: They did not have a shutdown
2 PRA?

3 MR. HARRISON: They do not have a shutdown
4 PRA. They do have a risk management program called
5 ORAM.

6 MR. SIEBER: Yes, and I am not sure that
7 you get a quantitative number out of that. You get a
8 color, and it really just looks at multiple paths.

9 MR. HARRISON: Right, success paths.

10 MR. SIEBER: So I am not exactly sure how
11 you can draw a conclusion that says negatively small
12 increase in risk from using an ORAM as a tool.

13 MR. HARRISON: Right. We are not basing
14 our conclusion there on a model. It is more of a
15 qualitative conclusion saying operator actions will be
16 reduced by some amount because of the higher decay
17 heat.

18 However, they do have a risk management
19 process in place, and I think there was a discussion
20 yesterday about their backup cooling systems, and that
21 whole topic becomes moot because of their short
22 refueling cycles, and refueling outages.

23 If you are only out for 20 days and it
24 takes you 26 days of cool down to get to a point where
25 you could use a pump, it becomes a non-issue. That

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1 pump is not available.

2 So given that, we are just acknowledging
3 the fact that there would be some impact, but we don't
4 believe that it would be significant.

5 MR. SIEBER: Okay. Now, I do not recall
6 anyplace in the safety evaluation where the idea that
7 the refuelings are probably going to be a day or so
8 longer because of the higher decay heat level. Was
9 that evaluated at all, and will that have an impact on
10 shutdown risk?

11 MR. HARRISON: I would answer that in two
12 ways. No, I did not evaluate that, but off the top of
13 my head, if you are -- and again if I am not going to
14 get -- well, yes, there would be some increased risk,
15 because you are operating another day out there.

16 MR. SIEBER: Right.

17 MR. HARRISON: Again, the backup systems
18 that would be available are marginal at that point
19 anyway. So you would be just progressing your risk
20 management just a little further.

21 You could also argue that backwards and
22 say then if I can shorten my outage by a day or two I
23 save risk. Given the drive of the industry, the
24 shorter they go -- it is an economics question.

25 The licensee is going to drive for a short

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1 outage, and if he can shorten that outage, he will.
2 So there is no way to quantify that type of an answer.

3 On PRA quality, like I said before, they
4 did go through the owners group peer certification
5 process. The last two bullets just point out the fact
6 that with simple models and simplistic calculations,
7 you don't necessarily have a hundred percent
8 confidence that everything is precise.

9 When you are in PRA, nothing is precise.
10 So there is a little bit of -- I would like to make me
11 feel a little if they did a few extra things, but they
12 don't think -- I don't think that would be -- it
13 wouldn't change the answers and that is the bottom
14 line.

15 The last bullet really just recognizes
16 that in the IPEEE the plant too credit for conditions
17 that do not exist, and they are in the process of
18 making modifications to make that fit.

19 And as part of our review, I believe they
20 conducted their -- they had a seismic condition with
21 the dam failure, and they had assumed that the LOCA
22 conditions were fine.

23 And as part of our questioning, I think
24 they went back and did the study that they had
25 committed to in the IPEEE a few years ago, and the

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1 results of that were that they do need to add a means
2 of -- an alternate means of -- or a seismically
3 qualified means of getting a containment cooling
4 service water path in.

5 MR. SIEBER: But those modifications were
6 just hangers in supports, right?

7 MR. HARRISON: Those modifications for
8 Quad Cities were mostly anchorage. For Dresden, it is
9 not. For Dresden, the modifications that we are
10 talking about are the portable pumps, the hoses, the
11 connections, being able to route the lines through,
12 and drop the pumps in, and get the water where you
13 need it.

14 MR. SIEBER: Right.

15 MR. HARRISON: That is how they are going
16 to address the seismic issues at Dresden. It is not
17 going to be a hard-wired implant system. The next
18 slide just goes over what we concluded through our
19 review.

20 Again, this recognizes that we identified
21 a number of issues, and the licensee -- the
22 methodology that they used, and the simple
23 calculations, this just kind of goes over that again.

24 With the last couple of bullets just
25 recognizing that they had been risk informed, we would

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1 probably require some type of confirmation that the
2 simple models and the simple calculations truly are
3 bounding the conditions.

4 And to actually analyze the procedures
5 that they are creating for like load shedding in a
6 transformer, to verify that their screening human
7 error probability really is screening, and there is
8 not something out there that might be higher.

9 The last bullet there just says, however,
10 the submittal is not risk informed. They are meeting
11 their deterministic requirements, and the information
12 that we have does not make us question the adequate
13 protection of the plant.

14 So with that conclusion, we pass it back
15 to the deterministic folks to address the issues in
16 their areas, and that's all that I had on the risk
17 assessment piece of it. Are there any questions?

18 MR. SIEBER: Does anyone have any
19 questions? If not, thank you very much.

20 DR. FORD: Again -- well, I'm sorry, but
21 just about the last thing, when you say that submittal
22 is not risk-informed. It doesn't have to be risk-
23 informed does it by the regulations?

24 MR. HARRISON: No.

25 DR. FORD: The deterministic requirements,

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1 are they adequate?

2 MR. HARRISON: That is not a judgment for
3 me to make. That is a judgment for each of the
4 deterministic branches that do their reviews
5 collectively and come together as a basis for the
6 final solution.

7 MR. SIEBER: Actually, the submittal is
8 risk-informed, and the decision making was not.

9 MR. HARRISON: Was not, yes. And we may
10 be talking about technical questions, but risk
11 information is provided, but in the terminology of
12 risk informed, it is not risk informed.

13 MR. SIEBER: Right.

14 MR. HARRISON: And again we kind of talked
15 past ourselves.

16 MR. RUBIN: This is Mark Rubin from the
17 staff. It was not submitted as a risk informed
18 licensing action.

19 DR. FORD: Well, the reason that I am
20 bringing it up is that it might sound nitpicking, but
21 again I come to this public perception being that it
22 is out there, and that bold statement of not risk
23 informed.

24 On the face of it, it would sound
25 negative. It is not negative. It just is not

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1 required. It is a factual statement.

2 MR. HARRISON: And it is a factual
3 statement in that it just recognizes that the LTAR
4 requires them to provide risk information. We review
5 that information, and it is not conveying that there
6 is something wrong with the submittal the way it is.
7 I don't want to convey that. Thank you.

8 MR. BOEHNERT: Again, I would like to get
9 copies of your slides.

10 MR. HARRISON: I will make them now and
11 give them to you.

12 MR. BOEHNERT: Thank you very much.

13 MR. ROSSBACH: Okay. Next in our
14 presentation -- well, actually, we didn't have further
15 presentations prepared, but we do have reviewers
16 available to answer questions in these other areas.

17 The first one we have listed is material
18 degradation issues, and it is because in your letter
19 responding to Duane Arnold, you pointed out the
20 significance of flow assisted corrosion and irradiated
21 stress corrosion cracking to the evaluations.

22 Although in yesterday's licensee's
23 presentation, you seemed to be satisfied with that,
24 but we do have reviewers here if there are questions
25 in these areas.

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1 MR. SIEBER: Do we have any questions? I
2 recall someone suggesting that they would like further
3 information on seismic.

4 DR. FORD: As an independent person with
5 a conflict of interest, I have no problems at all with
6 the materials degradation. I was more interested in
7 just the process by which you evaluated those
8 potential degradation modes. And I don't know if this
9 is the forum to ask those questions. For instance --

10 MR. ROSSBACH: Would you like us to
11 address the process?

12 DR. FORD: -- in the flow area, a lot
13 depends on the CHECWORKS and its qualification, et
14 cetera. Did you perform or did you oversee that
15 qualification of the use of CHECWORKS?

16 MR. PARCZEWSKI: Yes, we did look at it,
17 you know, because this is the only way --

18 MR. BOEHNERT: Could you identify yourself
19 for the record, Kris?

20 DR. FORD: Kris Parczewski, from Material
21 Chemical Engineering Branch, NRR. You need to look at
22 the other CHECWORKS prediction, and we were satisfied
23 that there were relatively low, and what is most
24 important is that the licensee has the program,
25 ongoing program.

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1 And you can always verify, and if you are
2 going to verify the prediction, then he will be able
3 to project it in the future. So this will be a well
4 controlled process for the licensee.

5 And I find that it is not really a very
6 significant change due to a power uprate. The highest
7 one is obviously in the feed water because of the high
8 velocity change.

9 The other components are considerably
10 smaller changes, and so it is not very significant
11 really.

12 DR. FORD: There are a few other minor
13 questions in the area of flow induced vibrations, for
14 instance, and in the new design of putting in a steam
15 dryer. Were those reviewed?

16 MR. ROSSBACH: That would be the
17 mechanical engineering branch.

18 DR. FORD: And the transfer of those loads
19 to the support brackets, and the effect they may have
20 on stress corrosion cracking in that area which is not
21 protected by Noble Chem.

22 MR. MANOLY: My name is Ken Manoly, and I
23 am a section chief in the Mechanic Branch, and I would
24 like to address your questions on the steam dryers.
25 I have one slide to maybe give you a summary of what

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1 are the conclusions in that area.

2 We noticed that you were interested in the
3 topic last time and that's why we gave it more of a
4 focused attention this time, and pretty much the
5 conclusions from both plant reviews, both from Dresden
6 and Quad, were pretty much the same.

7 That there is no increase in the actual
8 pressure of the temperature, and the core flow is not
9 much increased. The only increase is in the steam
10 flow, and to get into flow induced vibration, maybe I
11 can get into detail if you want to get into that.

12 The key thing to emphasize in the
13 submittal is that the component is not faulty, but
14 they still want to ensure its integrity for the fault
15 condition, which is a main steam line break.

16 And for that they evaluate the stresses to
17 the ASME NG Section 3, which is fairly new. It came
18 way after the plant was built. The stresses all meet
19 the code limits.

20 DR. FORD: Just to interrupt you and to
21 save time, I can see all those factual things there.
22 What is not covered is when we had the Duane Arnold
23 review, they stated that there would be a transference
24 of those stresses to the dryer support brackets welded
25 to the RPV.

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1 MR. MANOLY: Right.

2 DR. FORD: I assume the same would apply
3 in this situation, too.

4 MR. MANOLY: That's true.

5 DR. FORD: Was there an analysis done on
6 your behalf of the impact that it might have on
7 environmentally specific cracking on that welded
8 bracket?

9 MR. MANOLY: Well, we didn't do that
10 analysis. We responded to questions in REIs about the
11 adequacy of the anchorages.

12 DR. FORD: Good.

13 MR. MANOLY: And they said to evaluate the
14 anchorages, and they were fine.

15 DR. FORD: And how would that be managed,
16 by the inspection process? Would the dryer brackets
17 also be inspected by BWRVIP-06?

18 MR. MANOLY: Yes. I think with every
19 refueling that the dryers are inspected and removed.

20 DR. FORD: And the brackets, the brackets
21 are also inspected?

22 MR. MANOLY: I am not certain, but I can
23 get back to you on that. I am not quite so certain
24 about the brackets.

25 DR. FORD: The reason that I keep pushing

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1 this is because if they fail, then the whole thing
2 falls, or potentially falls.

3 MR. MANOLY: Right. That would be a very
4 easy thing to verify, the statement in the VIP,
5 because we have the VIP SERs already written up.

6 DR. FORD: I am moving along here, Jack,
7 and I am just trying to get a feeling of the
8 assessment that went through. On the cracking issues,
9 the cracking of the main structural welds in the
10 reactor, in the core shroud, for instance, H-4 and H-
11 3, H-6 welds, was there any analysis done on how the
12 increase in flux of 17 percent, how that is going to
13 affect the cracking of those components?

14 MR. MANOLY: I will have to defer that to
15 the materials branch.

16 MR. CARPENTER: This is Gene Carpenter
17 with the materials and chemical engineering branch.
18 Basically, what we have done with the core shroud or
19 other internals is that we have asked licensees to
20 take a look at just what their fluence levels are.

21 And when they get to a certain threshold
22 limit, that drops them into a higher crack growth rate
23 regime, and at that time they have an increased amount
24 of inspection that is required.

25 DR. FORD: Okay. Is the current -- I have

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1 forgotten the VIP numbers. There are so many of them.
2 But are those fluence values that might be accrued in
3 the next -- since they are going for license renewal
4 in the next 10 years, are they likely to get into
5 fluence regions where they might be a marked increment
6 in cracking susceptibility?

7 MR. CARPENTER: Some licensees have
8 already reached the 5E to the 20th neutrons per square
9 centimeter fluence value, which is what we consider
10 the threshold value.

11 And as these reactors age, they obviously
12 have more internals coming to that point. Now, when
13 I say some licensees, what I am saying is that is at
14 the core shroud. We are not talking about the vessel.

15 DR. FORD: I asked a question the other
16 day about the delta-P across the access hole covers,
17 and I presume there will be an increased delta-P, and
18 they mentioned that they had a redesign of the access
19 hole covers. Was that analyzed or examined by the
20 staff? Is there any increase in the cracking of --
21 and I am not too sure what the redesign is. Are they
22 still welded designs or bolted designs for the access
23 hole covers?

24 MR. MANOLY: I cannot respond to the
25 question right now. I need to get back to you to see

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1 what information we have on it.

2 DR. FORD: It is not a major safety issue
3 I don't believe. Thank you. Those are the only major
4 questions that I had. I just wanted to understand
5 what the process was.

6 MR. SIEBER: Do we have anything else that
7 the staff would like to present?

8 MR. ROSSBACH: Earlier, we did have one
9 question from the ACRS dealing with the pipe supports
10 modifications, and if you want any information on
11 that, I can tell you that some main steam and TORUS
12 attached piping systems were determined to require
13 support modifications to bring the piping within code
14 level stress limits.

15 Now, some TORUS attached piping support
16 MODS are required due to higher power uprate thermal
17 loads, and some main steam support modifications are
18 required as a result of applying the turbine stop
19 valve closure loads. If you want any elaboration on
20 that the staff is here.

21 MR. SIEBER: Well, that is basically in
22 the SER, almost verbatim. So does anyone have any
23 questions? Okay. I would like to -- I think we are
24 done now, and so I would like to thank the staff for
25 their presentation, and also Exelon and G.E.

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1 I think it was very informative, and very
2 knowledgeable, and you certainly brought enough people
3 with you to cover anything and everything that we
4 could have asked.

5 What I would like to do now though is
6 spend some time with the members so that we can get an
7 idea of what members comments are at this point so
8 that we can provide those comments to Dr. Wallis while
9 he begins drafting a letter.

10 I presume that the staff wants a letter
11 from us at their next full meeting, and so with that,
12 Dr. Shack, do you have any comments that you would
13 like to make?

14 DR. SHACK: No. I missed much of
15 yesterday's presentation and so I feel a little
16 restricted about making comments and so I will just
17 defer to the members who attended the full session.

18 MR. SIEBER: Okay. Dr. Ford.

19 DR. FORD: There seems to me to be five
20 kind of areas in the materials degradation area that
21 needed or should have been addressed, and in large
22 part were.

23 And those include the flow induced
24 vibration, and the flow assisted corrosion, the
25 embrittlement of the pressure vessel, and the whole

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1 question of cracking of the main structural welds in
2 the reactor, all of which could conceivably be
3 affected one way or the other.

4 I think they all have been addressed both
5 by the licensee and analysis done by the staff of all
6 of those. And I don't think that with the ACRS that
7 they should be discussed in any detail. I don't think
8 there is a major problem that cannot be managed with
9 the management programs that exist.

10 It would be an idea just to put those up
11 as I mentioned yesterday in just one page just to
12 record that they have been analyzed. And one area
13 that wasn't discussed yesterday was a question of
14 Nitrogen-16, which would depend very much on the
15 adherence of Noble Chem with the higher flow rates.

16 I personally don't think it is a problem,
17 but it is something that should be addressed
18 somewhere.

19 MR. BAILEY: Would you like to discuss
20 that now?

21 DR. FORD: Well, I am just asking has it
22 really been looked at and are people satisfied. Can
23 it be managed.

24 MR. CARPENTER: This is Gene Carpenter
25 again with materials and chemical engineering branch.

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1 We have been looking quite closely at the chemistry
2 that is involved with the BWR internals, and
3 specifically hydrogen water chemistry and the Noble
4 Chem issues.

5 Obviously if you have an increase in N-16,
6 you are going to have an increase in shine, and so it
7 is a very easy problem to ascertain that you have.

8 We have also asked the industry to go back
9 and have a monitoring program to ensure that the NMCA
10 is appropriately applied, and that it is maintained
11 throughout the operating cycles so that they do need
12 to know when they are going to reapply it to maintain
13 effectiveness.

14 We have also asked them to have an
15 effective hydrogen water chemistry program in place,
16 and we have been making some great strides towards
17 that. So the N-16 problem, I think, is under control.

18 MR. SIEBER: Well, that was actually
19 discussed in the safety evaluation report and the
20 issues were does this provide additional safety to
21 workers, and does it affect equipment qualification,
22 and things of this nature.

23 And obviously N-16 without some additional
24 offsetting treatment is proportional to the change in
25 power, and that the safety evaluation radiological

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1 evaluation indicated that the increase was negligible
2 as far as to workers and potential dose off-site.

3 And in equipment qualifications space, I
4 think they had to run or get additional data on
5 Rosemont transmitters. And there were some
6 transmitters that were installed that weren't EQ, and
7 that had to be changed out to make them EQ.
8 And so I think the N-16 issue was pretty well covered.

9 MR. CARPENTER: Yes.

10 MR. SIEBER: And as far as fluence is
11 concerned, it seems to me that the Dresden and Quad
12 Cities reactor vessels are fairly large compared to
13 the core that is inside them. So there is some
14 absorption that takes place, which means that the
15 fluence does go up by 17 percent at the vessel wall or
16 the shroud.

17 And so the impact isn't as great as one
18 might presume, and also in that type of vessel there
19 are other plants that operate with higher power
20 levels, and so that doesn't make Dresden or Quad
21 Cities any different than those plants, at least in my
22 way of reasoning.

23 DR. FORD: That is my point.

24 DR. SHACK: Just to come back to Peter's
25 question, and again it is a question for Gene. The

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1 way the hydrogen water chemistry will run under the
2 Noble Chem is that they may not be continuously
3 modeling potential.

4 And so they will probably be putting in a
5 fixed amount of hydrogen, which means that if they
6 lost their Noble metal coating, what would really
7 happen would be their susceptibility to cracking would
8 go up for a portion of the cycle.

9 MR. CARPENTER: That is correct.

10 DR. SHACK: And then with an N-16 concern,
11 their susceptibility would increase presumably until
12 the end of the cycle and they found out that they had
13 somehow mis-estimated the potential wear rate for the
14 Noble Chem. Isn't that the way it would work
15 basically?

16 MR. CARPENTER: That is the way that it
17 would work, and we have also asked the industry to go
18 back and have a way to monitor during the operation
19 that they do have an effective hydrogen water
20 chemistry in place at least 80 percent of the time,
21 which we believe is sufficient to ensure the crack
22 growth rate will maintain itself at a sufficiently low
23 level.

24 MR. SIEBER: Okay. I guess from my
25 standpoint, I am not -- I need to study some more

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1 about the unit auxiliary transformer and the RAT to
2 assure myself in my mind that what has been done is
3 okay from an electrical standpoint and I will do that
4 on my own.

5 I did have another question where I would
6 note that a number of set points have been changed,
7 and the safety evaluation, the draft safety evaluation
8 discusses the set point change methodology, which I
9 presume originally came from Commonwealth Edison?

10 MR. BAILEY: Actually, it was done more
11 recently. We just approved a new revision or a new
12 version of their set point methodology with the ITS or
13 improved tech specs, which was granted to these two
14 plants this March.

15 MR. SIEBER: Since March?

16 MR. BAILEY: Yes, since March.

17 MR. SIEBER: And do you have a safety
18 evaluation specifically for subpoint methodology?

19 MR. BAILEY: It is part of the approved
20 tech spec safety evaluation.

21 MR. SIEBER: Which is probably huge,
22 right?

23 MR. BAILEY: It is big.

24 MR. SIEBER: Is there a chance that
25 somebody could send me the pages that relate to the

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1 set point methodology?

2 MR. BAILEY: You would like the pages
3 related to the set point methodology?

4 MR. SIEBER: Right, because you referenced
5 them, and I remember Commonwealth Edison set point
6 methodology from a few years back, and so I would like
7 to assure myself that what they are doing now is in
8 conformance with the way that the industry is doing
9 that.

10 MR. BAILEY: Okay. It was done as part of
11 their transition to a 24-month fuel cycle.

12 MR. SIEBER: Okay. But just send me the
13 pages, as opposed to sending me the whole thing,
14 because my office is now full of papers. Dr. Kress.

15 DR. KRESS: One of my points that I would
16 like to have a little more help from the staff was how
17 they were able to assure themselves that the LOCA
18 codes to meet the figures of merit, and Appendix K
19 requirements were still valid for flat flux, knowing
20 that the validation was based on 2D and 3D type tasks,
21 which did not have a flat flux.

22 I would like to know how they assured themselves
23 that the codes were still valid. The other thing that
24 I would be interested in is maybe a little more on
25 Virgil's point about the Origin code, and how they

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1 assured themselves that it was used properly to get
2 the right inventory.

3 MR. SIEBER: Okay.

4 DR. KRESS: And I guess I would like to
5 see a little better explanation of why the MELLLA
6 curves were different, even though I understand that
7 there is good reason for them to be different. But
8 maybe a little explanation of why precisely they were
9 different.

10 MR. SIEBER: Okay.

11 MR. BAILEY: I understand at the break
12 that the licensee has looked at them again, and sees
13 only differences in the low flow region. Did you want
14 to --

15 MR. PAPPONE: I don't know where the
16 proper forum is to address that is, but we can address
17 that with the staff or with the ACRS afterwards, or at
18 any time.

19 MR. BAILEY: Okay.

20 MR. SIEBER: Well, I think if we are going
21 to discuss it, we ought to discuss it while we are in
22 formal session, as opposed to having a sidebar that is
23 not on the record.

24 MR. BAILEY: Dan, can you give a
25 description of what we learned about those curves.

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1 MR. PAPPONE: This is Dan Pappone from
2 G.E. As I said yesterday, when we draw that MELLLA
3 line on the power flow map, we are using a generic
4 line for all the plants and all the product, and so
5 that licensing line does not change. The line on that
6 map for Dresden and Quad Cities, that line is the same
7 for that.

8 DR. SCHROCK: Say that one time again?

9 MR. PAPPONE: The line itself is the same.
10 It is following the same equation as was proposed for
11 the license.

12 MR. BAILEY: Are there scaling factors
13 that make the figures look different?

14 MR. PAPPONE: Where the point of confusion
15 is coming in --

16 DR. SCHROCK: Let me say that Point A has
17 numerical values in the little table in the set of 43
18 pressure, and 23 full.

19 MR. PAPPONE: Right.

20 DR. SCHROCK: And I don't have the other
21 one in front of me, but the numbers were more like 58
22 and something else.

23 MR. PAPPONE: Right. The difference
24 between the two flow maps is in the natural
25 circulation line, and we do have to investigate why we

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1 have a difference in the two lines, and what the basis
2 for that is.

3 But that corner point, I can take the
4 equation for the rod line, which is a function of core
5 flow, and put in that core flow value, and calculate
6 the corresponding power value.

7 MR. BAILEY: And the points going down to,
8 but not including, this natural cert point, would also
9 be calculated from the same equation for both plants?

10 MR. PAPPONE: That's right. If you laid
11 a ruler on that line, you would see a slight curve.
12 If you would also take a look at each corresponding
13 core flow, that power value would be the same. It is
14 a piece that we need to go back and investigate for
15 the basis for the natural circulation line, and the
16 difference between the plants.

17 DR. SCHROCK: And so that is an item to be
18 followed up on prior ot the full committee meeting?

19 MR. PAPPONE: That's right. We don't have
20 that information.

21 DR. SCHROCK: But let me ask it another
22 way. I think the question that Graham followed up
23 with was that this line is in operation limits, and so
24 if during your maneuvers you approach that line, you
25 have to back off?

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1 MR. PAPPONE: That's right.

2 DR. SCHROCK: The position of the line in
3 the vicinities, say, of core flow of 50 and minimal
4 power on the order of 60, is different on the two
5 presentations in the two SERs. So which of those is
6 it that --

7 MR. PAPPONE: Well, you may be seeing
8 different sizes of the plots if you put the two
9 together, and you may be looking at physical plot
10 scales, but the equation for that line is the same for
11 both.

12 DR. SCHROCK: I don't understand how the
13 equation can be the same and then when you use the
14 equation to plot a line, you get a different line.

15 MR. PAPPONE: That's what I am saying. If
16 I go to each one of those points along the line for a
17 given core flow for either unit, I get the same power.

18 It is just that the difference in those
19 two plotted lines, the natural circulation line, and
20 in one case it is minimum and in the other it is 32
21 percent, it is not quite the same.

22 So where those points that are identified
23 in the table, we are looking at different core flow
24 going into the calculation, and so we have a
25 corresponding different power. Does that make sense?

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1 DR. SCHROCK: Not yet.

2 MR. PAPPONE: So the difference in failing
3 is the core flow.

4 MR. BAILEY: And what you are measuring is
5 in percent?

6 MR. PAPPONE: Absolutely.

7 MR. NIR: This is Israel Nir from G.E.
8 Let me help you. This is a quick mathematical
9 exercise. Look at the two maps and establish what is
10 the power level associated with 40 percent core flow,
11 and you will find that in both maps it is 58 or
12 approximately 58.

13 And I am just selecting one point, and
14 that should convince you that these two lines are
15 identical, except that one of them is extended further
16 relative to the other all the way to natural
17 circulation. But the same equation is used in the
18 definition of the two lines.

19 MR. PAPPONE: Right.

20 DR. SCHROCK: Does that explain the
21 differences in the position of Point A?

22 MR. PAPPONE: No, Point A is --

23 DR. SCHROCK: Point A is a different thing
24 in each case?

25 MR. PAPPONE: That's right. And that is

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1 the piece where we have to go back and get the
2 explanation for why that natural circ curve is showing
3 differently. We have a similar situation where one
4 unit plotted that minimum speed line --

5 MR. NIR: Let me make another
6 clarification. As part of this effort, we redefined
7 the power level and the MELLLA boundary. Those are
8 indicated on the flow map. There are certain portions
9 of the power flow map that are not affected by power
10 uprates, and the introduction of MELLLA.

11 And those lines are the natural
12 circulation, the cavitation lines, and these are the
13 same or maintained the same as a power uprate. And
14 the differences that you observe are differences that
15 exist now. Those features that are new are identical.

16 DR. SCHROCK: So you believe there is a
17 difference in the natural circulation characteristics
18 of Quad Cities versus the Dresden plants?

19 MR. NIR: There is a difference in the
20 presentation and we need to get back with you as to
21 the reason.

22 MR. PAPPONE: That piece may tie back to
23 the historical source that was provided and that Jason
24 talked about earlier.

25 DR. SIEBER: Dr. Schrock, do you have any

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1 additional comments that you would like to give us?

2 DR. SCHROCK: Well, first of all, the open
3 issues, and the testing question I find a little
4 puzzling. I thought that the authorities case was
5 that testing would be unnecessary sounded pretty
6 convincing.

7 It is still unclear to me what the G.E.
8 position was. I heard that G.E. a new submittal
9 related to this, and I guess we didn't hear very
10 clearly a position put forth from G.E. representatives
11 about that, and if they could comment further on that.

12 It is a little unclear to me on why the
13 staff is unable to address that position of G.E. and
14 the utility with regard to this issue. I don't know
15 what evidence is missing that is going to be
16 forthcoming in the making of that decision. So I just
17 find that whole thing a bit puzzling.

18 And I understand the revision done on
19 Duane Arnold, and that we are not to take these graphs
20 for Dresden and Quad Cities is being final either, but
21 it is not clear to me where that stands with regard to
22 the nature of the modifications that are going to be
23 made, and that there are very many weaknesses in these
24 SERs.

25 And over-reliance on such statements as

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1 that the submittal is done in accordance with existing
2 approved codes and using existing codes, and therefore
3 the results must be accepted, and that seems to me to
4 be overly simplistic.

5 And I don't think you need a one inch
6 thick SER to relay that message if that is really what
7 the SER has to say. I found the SER in both of these
8 cases to be rather weak statements of how the staff
9 has come to the conclusion that the SERs should be
10 accepted.

11 That is not to say that I don't think that
12 they are acceptable. It looks to me like they are,
13 but I do think that there are many ways in which
14 things can be done with this sweep of codes that will
15 produce different results.

16 And put them in the hands of different
17 users, and they will come up with different results,
18 and guaranteed almost every time. So, again I have
19 not heard enough to convince me that the staff knows
20 that the codes are applied in the right way to get the
21 answers that justify saying that the thing is an
22 acceptable uprate. That's really all I have.

23 MR. SIEBER: Well, I think that will give
24 us some meat that we can work on over the next 10 days
25 or so.

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1 MR. BOEHNERT: Yes. I think I will get
2 with Graham and we will come up with some agenda items
3 for the licensing.

4 MR. SIEBER: That will be very good.
5 Well, again, I would like to thank the staff, the
6 Exelon, and General Electric, for their presentations.

7 MR. ROSSBACH: Mr. Sieber, I would want to
8 address a little bit of information on the question on
9 the access hole cover that was raised.

10 MR. PARCZEWSKI: Dr. Ford, you asked a
11 question about the access hole cover, and we asked the
12 question in the RAI and we evaluated the new
13 replacements and the loads increased from 70 ksi to 80
14 ksi, but that is still way below their limit of
15 159psi.

16 DR. FORD: This is a bolted design?

17 MR. PARCZEWSKI: Yes.

18 MR. NIR: This is Israel Nir of G.E.
19 again. Just for the record, there was a couple of
20 times that you mentioned the G.E. position on the
21 large transient. Let me just remind the subcommittee
22 that we were here back in June of this year, and
23 provided you some background on the constant pressure
24 power uprate.

25 If you go back to the minutes you will

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1 find that we provided you some information related to
2 Hatch on start up tests, and elevated power up to
3 roughly 114 percent. We also provided you some
4 background on large transient events related to
5 constant pressure.

6 And we will be happy to discuss it
7 further, and I think it will be needed to be in a
8 closed session and clarify our position.

9 DR. SCHROCK: So the reason that we didn't
10 hear any G.E. position in this meeting is that it was
11 an open meeting?

12 MR. NIR: That is the reason, yes, and I
13 cannot get into any details, but we fully support
14 Exelon's position.

15 DR. SCHROCK: All right.

16 MR. SIEBER: Are there any additional
17 comments or statements? Yes, sir?

18 MR. BAJWA: Just a closing comment on the
19 staff's presentation. I would like to thank you for
20 the opportunity to present our review of the Dresden
21 and Quad Cities extended power uprate.

22 The Commission has given a high priority
23 to these amendments. These are the first applications
24 of many that I am sure that we will see for power
25 uprates of this magnitude. I would like to emphasize

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1 that the NRR staff has undertaken an extensive review
2 of these applications and for all areas affected by
3 the uprate have been reviewed and evaluated.

4 The staff has critically examined the
5 methodologies and their application of this power
6 uprate request, and the exception of the open item as
7 we have mentioned, and that were discussed today on
8 the testing issue.

9 And I would like to emphasize that these
10 applications are not risk-based applications, and the
11 evaluations which were conducted on the deterministic
12 evaluation analysis have demonstrated that the
13 proposed increased power level for Dresden and Quad
14 Cities units are acceptable and meets the regulatory
15 requirements.

16 This concludes the staff's presentation,
17 and if you have any questions, we would be glad to
18 answer them.

19 MR. SIEBER: Thank you very much, and I
20 think with that, it is a quarter-to-12, and so we have
21 met all of our goals, and so I will adjourn the
22 meeting.

23 (Whereupon, the meeting was concluded at
24 11:45 a.m.)
25

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Phenomena Advisory Committee

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