

See Rpt.

LICENSEE: Pennsylvania Power and Light Company
FACILITY: Susquehanna Steam Electric Station, Units 1 and 2
SUBJECT: MEETING BETWEEN MESSRS. DONALD PREVATTE AND DAVID LOCHBAUM AND NRC STAFF CONCERNING SUSQUEHANNA STEAM ELECTRIC STATION SPENT FUEL POOL COOLING LICENSING BASIS CONCLUSIONS

On March 14, 1994, a meeting was held between the NRC staff and Messrs. Donald Prevatte and David Lochbaum. Messrs. Lochbaum and Prevatte are the authors of a November 1992 report, filed pursuant to 10 CFR Part 21, that details certain postulated design deficiencies at the Susquehanna Steam Electric Station (SSES). The cited deficiencies pertain to systems designed to cool the stored spent fuel at SSES. The purpose of the meeting was to discuss certain staff regulatory processes and procedures as well as the results of the staff's review of the SSES licensing basis as it related to the issues raised in the Part 21 report.

The staff concluded that the sequence of events leading to a boiling spent fuel pool following a loss-of-coolant accident with or without a loss of offsite power event was beyond the licensing basis of the SSES facility. The details of the staff's review is contained in a letter to Messrs. Lochbaum and Prevatte dated March 16, 1994. At the March 14, 1994 meeting, Messrs. Lochbaum and Prevatte disagreed with the staff's licensing basis conclusions. They further detailed their disagreements in a letter dated March 21, 1994. The staff is evaluating the content of the March 21, 1994 letter.

Enclosure 1 is a list of those who attended the March 14, 1994 meeting. The meeting was transcribed and the transcript is attached as Enclosure 2. The staff's meeting handout is attached as Enclosure 3.

Original signed by:

Joseph W. Shea, Project Manager
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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1. List of Attendees
2. Meeting Transcript
3. Meeting Handout
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Memorandum

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NAME	MO'BRIEN	JSHEA, ETC	CMILLER		
DATE	4/17/94	4/17/94	4/11/94		

DF01



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 12, 1994

Docket Nos. 50-387
and 50-388

LICENSEE: Pennsylvania Power and Light Company
FACILITY: Susquehanna Steam Electric Station, Units 1 and 2
SUBJECT: MEETING BETWEEN MESSRS. DONALD PREVATTE AND DAVID LOCHBAUM AND NRC
STAFF CONCERNING SUSQUEHANNA STEAM ELECTRIC STATION SPENT FUEL
POOL COOLING LICENSING BASIS CONCLUSIONS - March 14, 1994

On March 14, 1994, a meeting was held between the NRC staff and Messrs. Donald Prevatte and David Lochbaum. Messrs. Lochbaum and Prevatte are the authors of a November 1992 report, filed pursuant to 10 CFR Part 21, that details certain postulated design deficiencies at the Susquehanna Steam Electric Station (SSES). The cited deficiencies pertain to systems designed to cool the stored spent fuel at SSES. The purpose of the meeting was to discuss certain staff regulatory processes and procedures as well as the results of the staff's review of the SSES licensing basis as it related to the issues raised in the Part 21 report.

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A handwritten signature in black ink, appearing to read "Joseph W. Shea".

Joseph W. Shea, Project Manager
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. List of Attendees
2. Meeting Transcript
3. Meeting Handout

cc w/enclosures:
See next page

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Mr. Donald C. Prevatte
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Fogelsville, Pennsylvania 18051

LIST OF ATTENDEESMEETING BETWEEN MESSRS. LOCHBAUM AND PREVATTE AND THE NRCMARCH 14, 1994

<u>NAME</u>	<u>ORGANIZATION</u>
1. J. Shea	NRR/PDI-2
2. D. Lochbaum	Self Representing
3. D. Prevatte	Self Representing
4. C. Miller	NRR/PDI-2
5. S. Varga	NRR/DRPE
6. A. Thadani	NRR/ADT
7. M. Fleishman	NRC/OCMKR
8. M. Virgilio	NRR/DSSA
9. C. McCracken	NRR/SPLB
10. G. Hubbard	NRR/SPLB
11. J. Kenny	PP&L/Licensing
12. P.K. Eapen	NRC/RGN-I
13. L. Prividy	NRC/RGN-I
14. R. Matakas	NRC/OI
15. G. Kelly	NRR/SPSB
16. R. Pedersen	NRR/PRPB
17. R. Clark	NRR/PDI-2
18. I. Kaplan	PP&L
19. R. Summers	NRC/RGN-I
20. J. Hayes	NRR/PRPB
21. D. Skeen	NRR/EAB
22. P. Gunter	NIRS
23. R. Pollard	UCS
24. A. Smith	Newsday
25. A. Maykuth	Phila. Enquirer
26. J. Ruch	GAP
27. J. Royce	GAP





1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION

3 *****

4 MEETING BETWEEN NRC &
5 MR. DAVID LOCHBAUM & MR. DONALD PREVATTE
6 CONCERNING LOSS OF SPENT FUEL POOL COOLING
7 AT SUSQUEHANNA STEAM ELECTRIC STATION

8
9 U.S. Nuclear Regulatory Commission
10 Conference Room 12B11
11 11555 Rockville Pike
12 Rockville, Maryland

13
14 Monday, March 14, 1994
15 1:07 p.m.
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1 PARTICIPANTS:

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- J. Shea, NRC/NRR
- A. Thadani, NRC/NRR
- S. Varga, NRC/NRR
- M. Virgilio, NRC/NRR
- R. Matakas, NRC/Region I
- D. Prevatte, Co-writer of Part 21 Report
- D. Lochbaum, Co-writer of Part 21 Report
- C. McCracken, NRC/NRR
- G. Hubbard, NRC/NRR
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- M. Fleishman, NRC/OCMKR
- J. Kenny, PP&L
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- S. Lee, NRC/NRR
- R. Summers, NRC/Region I
- G. Kelly, NRC/NRR
- P. Gunter, NIRS
- R. Pollard, Union of Concerned Scientists
- A. Smith, Newsday
- A. Maykuth, Philadelphia Inquirer
- J. Hayes, NRC/NRR
- R. Pederson, NRC/NRR
- D. Skeen, NRC/NRR

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P.K. Eapen, NRC/Region I

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J. Ruch, Government Accountability Project

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J. Royce, Government Accountability Project

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P R O C E E D I N G S

[1:07 p.m.]

1
2
3 MR. SHEA: I think we are ready to get started.
4 Today's meeting is a meeting between the NRC staff and Mr.
5 Prevatte and Dave Lochbaum, to discuss the status of the
6 staff's review of some issues Mr. Prevatte and Lochbaum
7 raised in a Part 20 run report they filed in November, 1992.

8 The report raised some concerns regarding the
9 ability of spent fuel pool cooling systems at Susquehanna,
10 and we are going to discuss where the staff is in our review
11 of that. My name is Joe Shea. I am the project manager
12 here at NRR, assigned for resolution or helping get these
13 issues toward resolution. I a minute we are going to go
14 around the room and have everyone introduce themselves.
15 Before we do that, I would like to make a couple of
16 comments.

17 Today's meeting is being transcribed. If you have
18 a question or comment, if you could please speak up. I am
19 going to send this meeting attendance sheet around and would
20 ask everyone to fill that out. Lastly, as I said at the
21 outset, this is a discussion between the staff and Mr.
22 Prevatte and Lochbaum. If time permits after we are
23 finished, we will take some questions and comments from
24 those observing.

25 I would like to go around the room and have

1 everyone introduce themselves.

2 MR. VIRGILIO: Marty Virgilio, NRR.

3 MR. VARGA: Steve Varga, NRR.

4 MR. THADANI: Ashok Thadani.

5 MR. MATAKAS: Richard Matakas, Office of
6 Investigations.

7 MR. LOCHBAUM: Dave Lochbaum, Co-writer of 10 CFR
8 21 report.

9 MR. PREVATTE: Don Prevatte. I was the other
10 writer.

11 MR. MILLER: Charlie Miller, Project Director,
12 NRR.

13 MR. EAPEN: P.K. Eapen, NRC, Region I.

14 MR. PRIVIDY: Len Prividy, NRC, Region I.

15 MR. SKEEN: Dave Skeen, NRR.

16 MR. PEDERSEN: Roger Pedersen, NRR.

17 MR. HAYES: Jack Hayes, NRR.

18 MR. MAYKUTH: Andrew Maykuth, Philadelphia
19 Inquirer.

20 MR. SMITH: Andrew Smith, Newsday.

21 MR. POLLARD: Bob Pollard, Union of Concerned
22 Scientists.

23 MR. GUNTER: Paul Gunter, Nuclear Information and
24 Resource Service.

25 MR. KELLY: William Kelly, NRR.

1 MR. SUMMERS: Robert Summers, Project Engineer,
2 Region I.

3 MR. LEE: Sam Lee, NRR.

4 MR. KAPLAN: Ira Kaplan, PP&L.

5 MR. KENNY: Jim Kenny, PP&L.

6 MR. FLEISHMAN: Mort Fleishman, Office of
7 Commissioner Rogers.

8 MR. HUBBARD: George Hubbard, NRR.

9 MR. MCCRACKEN: Conrad McCracken, NRR.

10 MR. SHEA: Thank you. Ashok, did you want to make
11 some comments before we started?

12 MR. THADANI: No.

13 [Slides.]

14 MR. SHEA: The agenda for today's meeting, I want
15 to briefly recap in a summary fashion the heart of the issue
16 raised in the Part 21 report. After I do that, I want to
17 discuss how the staff treats potential safety issues brought
18 to light after the completion of the initial licensing
19 process. I think it's important to understand that process
20 because it does build directly on the regulations and on
21 some Commission policy statements made in the past and are
22 carried on down through staff procedures.

23 I think it's important to understand that, so that
24 we can understand the technical issues in the proper
25 regulatory light also, so that there's no confusion when we

1 get to the technical issues.

2 After I do that, part of the action plan that the
3 staff put together back in November of 1993 to lay out a
4 plan to evaluate the issues raised in the Part 21 report,
5 one of the tasks in that plan was to thoroughly evaluate the
6 licensing basis of Susquehanna as it pertains to the issues
7 in the Part 21 report. The staff has completed that task
8 and I want to lay that out, the conclusions that we reached
9 and how we reached those today.

10 After I do that, I want to just provide an update
11 of where we are on review of some of the technical issues in
12 the action plan. I will let you know where we are in those
13 and where we think we are going on those.

14 [Slides.]

15 MR. SHEA: Just, again, recapping the Part 21
16 report contents and how it came about. While you all were
17 working as contractors for PP&L doing some work on power
18 uprate stuff you worked with the design basis documents that
19 evaluated how the plant was designed to respond to various
20 accidents and transients.

21 You observed during your review that apparently
22 the various design basis analyses did not factor in the
23 operation or the failure of spent fuel pool cooling systems
24 and how that would impact the overall response of the plant.
25 As you postulated the performance systems you saw some

1 things that were of concern.

2 Specifically, if you had a design basis accident,
3 a LOCA, LOOP or a combined LOCA/LOOP, certain failure
4 mechanisms come into play that would result in loss of the
5 normal spent fuel pool cooling system. You postulated some
6 specific failure mechanisms like hydrodynamic loads or some
7 design responses to the plant like the automatic load shed
8 feature, or some procedural responses that the licensee had
9 in place like the tripping of non-1E loads out of out 24
10 hours, a number of failure mechanisms that were going to
11 lead to loss of normal forced cooling to the spent fuel
12 pool.

13 When that was presented in terms of a LOCA, you
14 also postulated that the source term present from the
15 accident itself would then prevent operators from getting in
16 and taking actions to mitigate the loss of pool cooling.
17 That ultimately led in the scenario to the pool boiling.
18 With a boiling pool then, as you described in the report and
19 the subsequent correspondence, the vapor was carried
20 throughout the reactor building and impacted on ECCS and
21 secondary containment systems, systems needed to mitigate
22 the LOCA itself. It postulated that it could exceed there,
23 the environmental qualification of those equipments and
24 cause the LOCA to proceed to severe offsite consequences.

25 I just want to make sure that's more or less

1 right.

2 MR. PREVATTE: Just one other thing that I don't
3 think you included there. As the fuel pool contains boil
4 out at some point in time the fuel in the fuel pool would be
5 uncovered. That also would have severe radiological
6 consequences, both in the onsite and offsite.

7 MR. SHEA: Agreed. That is what you postulated.
8 In addition to that particular scenario as you understood it
9 as far as the licensing and design basis of the plant, as
10 you understood it and presented it in the Part 21 report,
11 the licensing basis was written in such a way that such a
12 scenario was not allowed by the license of the plant.
13 Because of that, there were certain actions incumbent upon
14 the licensee to take when he brought this to light and
15 certain ways that they should analyze it, in going to take
16 corrective actions.

17 MR. PREVATTE: If I may clarify one thing. There
18 wasn't just a licensing concern. It was also a mechanistic
19 concern. That is, regardless of what the license said there
20 was a concern that this could happen and there were no
21 features designed within the procedures that would mitigate
22 the effect of this, regardless of the licensing requirement.

23 MR. SHEA: I understand.

24 [Slides.]

25 MR. SHEA: What I wanted to do now is discuss how,

1 when issues are raised such as you raised in the Part 21
2 report, how they are brought to the staff's attention and
3 how the staff attacks them.

4 Like I said at the beginning of the discussion,
5 the staff actions are driven by regulations by Commission
6 policy and as it's implemented through various guidance
7 documents that are available to the staff down through
8 specific office procedures. As I talked to Dave on the
9 phone, we are preparing a response to your January 24th
10 letter and trying to send out to you all of the source
11 documents that are going to go behind today's discussion on
12 that various policy statement, et cetera.

13 Some of what we are going to discuss, I am sure
14 you are very familiar with. I think it's important to
15 present it in an integrated fashion. Bear with me if it's
16 something that you are already very familiar with.

17 [Slides.]

18 MR. SHEA: Probably one thing that you are
19 familiar with is the initial licensing process. Just to
20 start at the very top, Title X of the Code of Federal
21 Regulations is where the rules and regulations are
22 instituted by the Commission that ensure that the legislated
23 mandated missions of the NRC are met.

24 As an example when you get to initial licensing,
25 50.30 through 50.34 describe the kind of things that an

1 applicant needs to do to get a license, the kind of
2 information they need to submit.

3 Another part of the regulation is Appendix A which
4 has the general design criteria, which are the principal
5 design criteria for systems and components that provide
6 reasonable assurance that the facility can be operated
7 without undue risk to the public.

8 When an applicant submits their application at
9 this point the staff review reviews that application. The
10 staff is looking to ensure that the design as proposed meets
11 the requirements of the GDC. A number of guidance documents
12 are in place that help the staff through that review. Over
13 the years the various guidance the staff uses has evolved.
14 That presents a situation where not every one plant that is
15 licensed has the same licensing basis. We will see that.

16 Currently, the overall guiding document if we were
17 reviewing initial license application today, would be the
18 standard review plan which as it says in the beginning of it
19 provides a step by step approach which the staff uses to
20 provide reasonable verification that the applicable safety
21 criteria have been met.

22 The SRP cites various regulatory guides and branch
23 technical positions which themselves lay out in a more
24 detailed fashion on a system by system basis what is
25 required as acceptable ways of meeting the regulations, not

1 the only ways but they lay out some standard ways that are
2 acceptable for meeting the regulations.

3 When the staff has finished the review and it's
4 obviously an iterative process back and forth between the
5 applicant answering questions and that sort of thing, when
6 the staff has done their review the staff can make a
7 conclusion that the proposed design meets the applicable
8 regulations or they provide adequate justification for
9 relief or exemption from any certain specific regulation.

10 Typically, the staff's conclusion is documented in
11 the operating license SER, and you are familiar with that
12 document, NUREG-776 for Susquehanna.

13 A number of other processes involved in issuing
14 the operating license, ACRS review is one of them. Public
15 hearings are required at the construction permit phase, at
16 least under the previous licensing process. Most plants had
17 public hearings at the operating license phase. That
18 provides additional opportunities for issues to be brought
19 forth prior to issuing a license.

20 After all those reviews are done the Commission
21 can make a finding that the facility -- they do make a
22 finding in issuing a license -- the proposed facility can be
23 operated without endangering the public health and safety.
24 With that, the Commission can issue the operating license.

25 MR. LOCHBAUM: I guess at that point the

1 assumption is that the plant is in full compliance with all
2 the regulations except as noted in the SER.

3 MR. SHEA: That's right, exactly.

4 [Slides.]

5 MR. SHEA: Clearly, things can come up after that
6 and issues can be brought to light. There are mechanisms
7 for dealing with those. These are some of the bigger name
8 issues that have come up over the years. For instance,
9 after the Three Mile Island accident a number of actual or
10 potential weaknesses were brought to light and the staff did
11 a review.

12 New requirements were issues to operating licensed
13 plants. There were licensees that already held an operating
14 license, and in that particular case they were done by
15 order. In the case of fire protection stuff after the
16 Browns Ferry fire, the review went back and forth for a
17 while. Those requirements were imposed on operating
18 licensed plants and that was taken through the rulemaking
19 process. There are different mechanisms where new
20 requirements can be put in place. These are just a couple
21 of historic examples.

22 [Slides.]

23 MR. SHEA: After the Three Mile Island accident
24 the NUREG-737 requirements were on the street and were being
25 implemented. As the population of existing reactors started

1 to mature and our knowledge of them started to mature, the
2 Commission sought to establish a more methodical approach to
3 evaluating future issues that might come to light to ensure
4 the continued safe operation of existing plants.

5 A series of rules and policy statements to that
6 approach were shaped and laid out. The first one that I
7 want to focus on today is the severe accident policy
8 statement that was promulgated in August, 1985. One thing
9 it does do is define severe accident as an accident in which
10 substantial damage is done to the core, whether or not there
11 are severe offsite dose consequences. I know that question
12 of severe accident was one that went back and forth in some
13 of the correspondence. That's where that definition is laid
14 out.

15 MR. PREVATTE: May I ask a question at that point?

16 MR. SHEA: Sure.

17 MR. PREVATTE: As described in the definition in
18 your policy statement, is severe accident the damage done to
19 the core, is it beyond the original design basis
20 requirements or within the original design basis
21 requirements?

22 MR. SHEA: To the extent that a plant would not be
23 licensed with systems that would knowingly -- the
24 performance of systems would knowingly allow core damage to
25 occur, then any accident where core damage occurs would be

1 beyond the licensing basis.

2 MR. THADANI: Let me try and address that. If you
3 look at the design basis accidents they are essentially all
4 accidents where you are covered. The peak cladding
5 temperature should not exceed, for example, 2,200 degrees
6 for a short time period and so on. That impacts on fuel
7 performance based on that.

8 What you have generally in a design basis
9 accident, that you should not really have damage to the
10 core. Core coolability is not lost, for example. When you
11 get into severe accident you are talking about actually
12 losing core coolability. You do completely non-
13 mechanistically assume a source term in the containment, so
14 that now you can design the containment to perform in some
15 way given the source to meet certain criteria.

16 The traditional approach is non-mechanistic, does
17 not consider fuel melting. If you recall some fuel damage
18 is obvious. The fuel melting large scale is basically not
19 considered in the design basis. The Commission -- we had an
20 event, Three Mile Island, significant core damage and
21 relocation. We started out by saying perhaps we should
22 think about a severe accident rule. Maybe we should have
23 some requirements to deal with severe accidents.

24 After a lot of debate we came to the conclusion
25 that the path they chose was what Joe was describing, to go

1 forward with the policy statement clearly saying what do we
2 mean by severe accidents, what do we think of the operating
3 reactors, and what future actions will be taken to make sure
4 that we have in fact considered severe accidents in the
5 total safety envelope.

6 Were you going to talk about why the Commission
7 said the operating reactors were safe, however, you want to
8 confirm.

9 MR. SHEA: Yes. I just wanted to touch on the
10 definition because that was one thing that had been
11 discussed in some of the correspondence, was exactly what
12 did that term mean and how was it used. What I really
13 wanted to get out of the policy statement was in fact the
14 statements on existing reactors.

15 This was a statement made in time about the
16 judgment on operating reactors as of 1985, and then looking
17 to the future on how to treat issues that came up. The
18 Commission made this statement on the basis of currently
19 available information. The Commission concludes that
20 existing plants pose no undue risk to the public health and
21 safety and sees no present basis for immediate action on
22 generic rulemaking or other regulatory changes because of
23 severe accident risk.

24 With regard to future issues the Commission also
25 said, operating nuclear power plants require no further

1 regulatory action to deal with severe accident issues unless
2 significant new information arises to question whether there
3 is adequate assurance of risk to public health and safety.
4 In which case it says in the latter event, in the event of
5 new information coming to light, a careful assessment shall
6 be made of the severe accident vulnerability posed by the
7 issue and whether this vulnerability is either site specific
8 or generic.

9 Then the Commission said, you need to look for the
10 most cost effective options for reducing vulnerability shall
11 be reached, consistent with the cost effectiveness criteria
12 of the backfit policy as to which option if any is
13 justifiable.

14 The Commission is doing a couple of things in that
15 statement. They are making a clear link between the fact
16 that a plant that met the regulations at that time in 1985
17 posed no undue risk. They are laying out how we need to
18 consider issues that are brought up in the future.

19 MR. PREVATTE: May I ask a question at this point?

20 MR. SHEA: Sure.

21 MR. PREVATTE: Part of their conclusion is, they
22 pose no undue risk. Was it not a consideration in that,
23 that the original design basis requirement designed features
24 into the plant that would preclude undue risk to the public
25 even if you had a severe accident, such features as

1 containment, standby gas treatment and things such as this.

2 That is, those features are designed into the
3 plant to cope with severe accident. If you don't have
4 severe accident you don't need those features. That is, if
5 you never have any fuel melting and never have any source
6 term you don't need containment, you don't need standby gas
7 treatment. Wasn't that conclusion in 1985 that there was no
8 risk to the public based on the knowledge of these features,
9 these design basis required features were in place.

10 MR. SHEA: I have to say that they were. The
11 Commission was willing to make a future statement, and this
12 was in a staff requirements memo which is the formal vehicle
13 by which the Commission communicates down to the staff, in
14 1990. They stated that the presumption is that compliance
15 with the regulation provides adequate protection.

16 The converse, however, is not true. Adequate
17 protection does not necessarily require compliance with the
18 body of the regulation, which is recognizing that the design
19 criteria in the regulations provide a margin of safety for
20 any particular aspect of the design. And that, if a plant
21 meets those regulations and they have that margin of safety
22 that provides the assurance of knowing the risk.

23 But that, on the other hand, because a plant may
24 not have all of the margin of safety that is in the
25 regulations they don't meet the regulations. It doesn't

1 necessarily mean that that's not enough margin. You need to
2 go and look at that on a case by case basis. That's the
3 kind of thing that we are getting into with the spent fuel
4 pool.

5 [Slides.]

6 MR. SHEA: One thing the severe accident policy
7 statement referenced was the backfit process and the backfit
8 rule. It's in 10 CFR 50.109. Also, NUREG-1409, entitled
9 Backfit Guidelines, is the working document that the staff
10 can use when they are looking at any one particular issue as
11 a backfit to go through step by step to make sure that they
12 are complying with the regulation.

13 The backfit definition is fairly cumbersome. I
14 think I am going to step through all of it, and then we will
15 pick out the parts that may apply to the spent fuel pool
16 case.

17 Defined in 10 CFR 50.109 as modification or
18 addition to systems, structures or components or
19 modification or addition to design approval for license, or
20 modification or addition to procedures or organizations
21 required to design, construct or operate a facility. Those
22 modifications or additions which may result or such that
23 they may result from new or amended provisions in the rules,
24 or imposition of regulatory staff positions interpreting the
25 rules that are different than the way the staff interpreted

1 or applied them before.

2 I think what we may be getting into in this
3 particular case is looking at the design approval that is
4 what the staff said when we issued the license, and do we
5 need a different interpretation of the guidance than we used
6 at the time.

7 NUREG-1409 further clarifies the term, applicable
8 staff position, to include NRC staff positions that are
9 interpretations of more general regulations to include
10 interpretations in the standard review plan, interpretations
11 in reg guides or the branch technical positions which kind
12 of proceeded to reg guides.

13 MR. LOCHBAUM: If the applicable regulation from
14 10 CFR 50 never changed those words wouldn't really apply;
15 is that the case? The upper tier regulation hasn't changed.

16 MR. SHEA: You are right about that. What we are
17 going to be seeing is that the staff needs to be asking
18 themselves in this particular case -- let me go into the
19 next couple of paragraphs and come back to your question.

20 MR. LOCHBAUM: Okay.

21 MR. SHEA: The staff states in the SER, the
22 operating license SER, that a plant meets the requirements.
23 That, in itself, is an applicable staff position. That
24 position has come from a review that was conducted according
25 to reg guides and on down from the regulations themselves.

1 Coming down from the regulations through the guidance staff
2 makes the evaluation and makes a statement that a plant
3 design meets the regulations.

4 If something is not considered during the review
5 of a particular facility proposed design the staff goes
6 through and evaluates it according to the guidance that is
7 in existence during the time and finds it acceptable. If we
8 want to go back at any other time and apply a new scenario
9 and evaluate something that wasn't evaluated at the time, we
10 need to follow the backfit process on that. That's why I
11 wanted to get into the backfit process. It poses
12 requirements on the staff for how we need to proceed.

13 The backfit rule breaks down into three categories
14 of backfits. The first one is compliance backfits. They
15 are fairly straightforward and fairly easy to handle when
16 they come up. That's just merely a case of, if a facility
17 commits to meeting something in their FSAR or the staff
18 cites something specific about a plant design in the SER and
19 later it turns out that it's not the case, either the
20 licensee is not meeting the FSAR commitment or something
21 that we cited in the SER is not true in the actual
22 construction of the plant, then it's fairly straightforward
23 to go back and have the licensee correct that. That is the
24 concept of the compliance backfit.

25 The next kind is a backfit that's not a

1 compliance, where a facility may be in compliance with the
2 regulations but the issue that has been brought to light is
3 significant enough that doubt is raised whether there in
4 fact still remains adequate protection. If that's the case
5 then, the staff can do an analysis of why adequate
6 protection may not be still assured and impose changes on a
7 particular facility.

8 The term adequate protection is extensively
9 discusse between the Commission and the staff, but it's
10 left to judgment and is purposely not made into a very
11 precisely quantified term. Some of those discussions are in
12 a paper from the staff to the Commission in 1989 on the
13 implementation of safety goals. The staff said that while a
14 more workable definition of the concept of adequate
15 protection would be useful, the quantitative tools alone are
16 not necessarily adequate to figure out what adequate
17 protection is.

18 The Commission responded that they agreed, and
19 said that adequate protection needs to be considered on a
20 case by case finding of a particular plant considering what
21 the regulations are, and that a more generic and precise
22 definition was not practical or really achievable. Some
23 additional and extensive discussions are provided in
24 statements of consideration for the 1988 backfit rule. In
25 those discussions adequate protection is left to rely

1 substantially on the judgment of the staff and specifically
2 on a case by case basis.

3 The third point that I want to touch on briefly is
4 referred to as a safety enhancement. It's where something
5 -- we don't need to have a facility make a change to comply
6 with their license. It's not necessarily significant enough
7 that adequate protection is in doubt, but we see that
8 substantial safety benefit could be gained at some
9 reasonable cost. It's called a safety enhancement.

10 The requirements for making that kind of
11 imposition on a licensee is, the staff needs to evaluate
12 both the safety significance of the proposed change and the
13 cost effectiveness or a cost benefit study needs to be
14 performed.

15 MR. THADANI: In fact, some of our recent
16 regulations are actually based on enhancement considerations
17 of cost benefit. If you go to the recent regulations,
18 station blackout, I know that Bob, I am sure, remembers
19 anticipated transients without scram. This 50.62, 50.63 are
20 based on that third approach of enhancing safety but in a
21 cost effective manner.

22 MR. LOCHBAUM: The first example that you gave
23 with the FSAR, a statement that was repeated in the SER but
24 with the as-built configuration it didn't match that. I
25 didn't think the backfit rule would apply to that case

1 because the plant was supposed to have been designed to that
2 in the first place. It didn't really invoke the 50.109.

3 MR. SHEA: If there was a case where there was a
4 statement in the FSAR that said the plant has "x" pumps and
5 there is a statement in the SER that said we find it
6 acceptable because the plant has "y" pumps, if there was
7 that kind of conflict then the SER is the licensing basis.
8 That would still be a compliance backfit because the SER
9 establishes the licensing basis. We would be making the
10 licensee bring the plant up to what the SER or the licensing
11 basis said.

12 MR. PREVATTE: What about the case where the FSAR
13 said there were "x" pumps and the SER also says there are
14 "x" pumps but you discovered at some later time that there
15 are "x" minus "1" pumps, would that be a backfit to bring it
16 up to "x" pumps?

17 MR. SHEA: Compliance backfit, yes.

18 MR. THADANI: You have to comply with the
19 licensing basis. The term backfit is used because that's
20 what you have to do with the plant.

21 MR. PREVATTE: I just wanted to make sure I
22 understood the definition.

23 MR. SHEA: One other thing that I think is
24 important to take out of the discussion of the backfit
25 process is that whenever there are questions about a new

1 issue and where it stands with respect either to the backfit
2 process, it's imperative that a clear definition or a clear
3 articulation of what the licensing basis is be made before
4 you proceed down one path or the other. That's what we had
5 to do in this particular case.

6 MR. THADANI: There's another issue, and maybe you
7 said it when I was talking to Steve. There's an important
8 distinction and that distinction is, if we accepted
9 something in the past and later on we realized that we
10 shouldn't have, then the responsibility falls back on us to
11 justify as we should now go back and request that such a
12 modification be made.

13 I will give you an example. It's an issue that
14 has been out there for a year or so now. Fire protection
15 barriers, some people may have said that we accepted the
16 performance of these barriers on the basis of just
17 continuity, point A to point B. Today, we think you have to
18 do more than that to be confident that those cables will in
19 fact do what they are supposed to do.

20 Now, that would be -- we are changing something.
21 If we are changing our acceptance criteria then the
22 responsibility is back on us. Then, we have to go to either
23 option two or three of those categories to be able to make
24 the case.

25 MR. PREVATTE: If the acceptance criteria hasn't

1 changed then it's option one; is that correct?

2 MR. THADANI: In fact, some criteria have not
3 changed. That's exactly what we used before. If the plant
4 does not comply then it's a compliance backfit.

5 MR. PREVATTE: Even if that non-compliance wasn't
6 recognized before would it still be a compliance backfit, or
7 would it go to the other categories?

8 MR. THADANI: You are getting into
9 interpretations, I think. I think you have to look at the
10 issues.

11 MR. SHEA: One last point on the backfit process
12 is that when you find yourself down in considering one of
13 these two kinds of backfit is, the tools you need to use to
14 determine whether there remains adequate protection or
15 whether a significant safety benefit can be achieved, you
16 need to bring all of the engineering tools to bear. For
17 instance, you need to consider probabilistic kinds of
18 things, you need to consider the performance of safety
19 systems as well as non-safety systems, and realistic versus
20 deterministic approaches all need to be combined together.

21 As I said, combined together in a judgment that
22 either adequate protection is still assured or can be
23 enhanced, depending on which way it falls.

24 [Slides.]

25 MR. SHEA: I want to summarize a little bit about

1 what we have talked about so far. One thing I think we have
2 aired pretty thoroughly is the source of the licensing
3 basis. Two things we have touched on are commitments made
4 by the applicant or the licensee typically found in the
5 FSAR, is where you are applying most of those, or statements
6 made by the staff in an operating license SER or an SE for a
7 license amendment, or in staff positions articulated either
8 in the regulations themselves or in generic letters.

9 If there is a conflict -- and we discussed this
10 earlier -- in the case of an SER or FSAR conflict, it's the
11 SER that is established what the licensing basis is. We
12 have talked about this, but you might want to go over that
13 again.

14 MR. VIRGILIO: Before you get into that, there's
15 probably one other concept that I am going to make sure that
16 we don't skip over, and that is accept as is. If, for
17 example, the FSAR says that there are three pumps and the
18 SER says there are three pumps and somehow, as incredible as
19 this may sound, you go out into the field and find that
20 there are only two pumps, because of what Joe talked about,
21 an adequate protection having that margin built into it,
22 there may be an argument that says two pumps are acceptable,
23 a good technical argument.

24 There are processes that one would follow, a
25 change to the license, a change to the FSAR, to accept the

1 two pumps as is, and change the licensing basis. We have
2 talked about compliance and backfit, and I just want to make
3 sure that before we get too much further we don't lose sight
4 of that accept as is concept too. There are processes,
5 there is a generic letter, 91-18 that we put out. There's
6 the exemption process, changes to the license process, that
7 I just want to make sure were covered for completeness.

8 MR. LOCHBAUM: The accept as is process entails
9 something changed in the licensing basis.

10 MR. VIRGILIO: Exactly.

11 MR. LOCHBAUM: The document.

12 MR. VIRGILIO: Exactly. We have issued generic
13 letter 91-18 that I think Joe is going to talk about a
14 little bit later. That goes through the process of, if you
15 want to change the FSAR we have to do the 50.59. If you
16 want to change the license you have to follow the 50.90
17 process. Those are outlined.

18 I think we have just been talking about compliance
19 and getting back into compliance. There are other options.
20 Because this concept of adequate protection provides margin
21 which you can go back and look at and examine that margin,
22 you possibly make a change to the facility and still wind up
23 with adequate protection.

24 [Slides.]

25 MR. SHEA: I want to shift from the more general

1 discussion to results of our review of the licensing basis
2 of Susquehanna as it pertains to the issues in the Part 21
3 report.

4 We looked at the FSAR, we looked at the operating
5 license SER, we looked at the regulatory guides, and we
6 looked at the regulations. We looked at some correspondence
7 from around the time and just preceding the issuance of the
8 license just to try to figure out exactly on what basis did
9 we find the plant, in this particular case the cooling
10 systems, acceptable.

11 I think it's important to remember as we go
12 through this that a determination of what the licensing
13 basis is, is not a statement on the safety significance of
14 any particular issue. It's a statement of, here is the
15 basis, here are the reasons that the staff found a
16 particular proposal acceptable at a particular point in
17 time.

18 [Slides.]

19 MR. SHEA: I put up a slide that just points out
20 some of the general design criteria that we focused on. I
21 meant this one to be GDC 44 instead of 63, although we did
22 look at GDC 63 also. But, 61,44 and 2 were the ones that
23 were the predominant ones that were involved in this
24 particular case.

25 Sixty-one as you know assures adequate safety for

1 fuel storage under normal and postulated accident
2 conditions. That's the words from the GDC, and I think
3 that's one that you found key in your review of the issue
4 back at the time that you were going through it.

5 GDC 44, of course, is heat transfer from various
6 safety related systems to an ultimate heat sinks, and also
7 specifies normal and accident conditions. GDC 2 is on the
8 performance of systems and structures important to safety
9 following various natural events including seismic. Seismic
10 is the one that we will key on here.

11 We also looked at what is the outstanding
12 regulatory guidance that the staff would use to conduct the
13 review against these regulations, and I think you are
14 familiar with these particular reg guides. Reg Guide 1.13
15 is spent fuel pool storage systems, 1.29 is on seismic
16 classification, 1.52 on filtration systems for accidents.
17 They are all tied together by the current version of the
18 standard review plan which is at NUREG-0800.

19 Let me to into the history of the SRP. The
20 original version of the SRP, NUREG-075 back in 1975, for
21 spent fuel pool cooling systems it required a safety related
22 pool cooling system in order to meet GDC 61 and 44.

23 The current version for spent fuel pool systems
24 came out in 1981. In order to meet GDC 44 and 61 either a
25 safety related system or the use of redundant pool makeup

1 and building ventilation systems for anticipated operational
2 conditions including a safe shutdown earthquake, assuming a
3 single active failure.

4 There's a little bit of a change there and there's
5 a little bit more flexibility in the current standard review
6 plan.

7 MR. LOCHBAUM: This regulatory requirements
8 licensing review guidance, they are applicable to PWR's and
9 BWR's, is that right?

10 MR. SHEA: It depends on the issues. Some are
11 applicable to both. Some are specific to BWR and some to
12 PWR. It depends on what system you are looking at.

13 In the alternative approach in the current SRP, it
14 implicitly allows boiling as a decay heat removal. If you
15 were relying on a backup makeup system and a ventilation
16 system then you are implicitly considering that the pool is
17 going to boil and you are going to keep water in it and
18 filter the steam before you vent it.

19 No specific mention is made in any of these
20 guidance on what particular accident conditions may cause or
21 may be affected by a boiling pool. One thing that was clear
22 as we went through this is that except for seismic events -
23 - and in Susquehanna's case the staff issued an RAI to
24 Susquehanna in the 1982 timeframe where, in response to the
25 applicant request to downgrade the pool cooling system from

1 seismic to a non-seismic system, we responded and said
2 please either upgrade it back to seismic or provide an
3 analysis that shows that the offsite consequences for the
4 failure of the non-seismic system are okay.

5 That was the only accident that was specifically
6 pursued by the staff in Susquehanna's case. It's the only
7 seismic event that is the only particular event that is
8 discussed explicitly in these regulations.

9 I think it was clear from our review that the
10 staff did not across the board consider the interaction
11 during a LOCA or a LOOP or LOCA/LOOP with the spent fuel
12 systems, and the concept that the pools could boil and
13 provide negative feedback or negative impact on your
14 accident mitigation and containment systems. It just was
15 not reviewed. I know that the particular case of WNP 2 it
16 did come up, but it clearly did not get factored into an
17 across the board review of applications at the time.

18 MR. LOCHBAUM: I guess we disagree with the final
19 conclusion, and we would like to address that toward the end
20 of your meeting.

21 MR. SHEA: All right. Do you want to wait?

22 MR. LOCHBAUM: We will get it at the end.

23 MR. SHEA: All right.

24 [Slides.]

25 MR. SHEA: The next two slides are going to have

1 identical format. They are going to come to the results of
2 our review. In the last slide we talked about the specific
3 reg guides and GDC that we looked at in doing our review and
4 that were applicable at the time Susquehanna was licensed.
5 We talked about the request for the applicant to submit
6 analysis for the offsite dose consequences for a seismic
7 event.

8 At no time, as I said, was there any evidence of
9 iteration on the postulation of pool boiling and a LOCA
10 event. It just was not considered for this, and it appears
11 for any other particular application with the possible
12 exception of the WNP 2 one.

13 We concluded and the staff made the finding in the
14 SER that, based on a review in accordance with the reg
15 guides the plant met the applicable requirements of GDC 61
16 and 44 and was therefore acceptable. That is the licensing
17 basis for those systems. Now, we get back to the backfit
18 process. For us to go back then and say we overlooked LOCA
19 pool boiling interaction at that time, for us to either go
20 back and impose that and re-interpret what we did at the
21 time, represents a backfit.

22 We would have to go through that process, and in
23 this case we determined it would not be a compliance
24 backfit. We would have to go off and pursue or evaluate the
25 necessity of backfits for either adequate protection or

1 safety enhancements.

2 While we reviewed the overall scenario presented
3 in the Part 21 report, we also went and looked at the SER to
4 see what it said about particular systems or particular GDC,
5 and what basis we found the plant in compliance with those.
6 One we picked up on was looking at Section 3.2.1 on the SER
7 which evaluated compliance with GDC 2 and specifically the
8 seismic/non-seismic qualification of various systems.

9 In the SER we noted six exceptions to strict
10 compliance with GDC 2. One of those exceptions was for the
11 spent fuel pool cooling system. In the SER the staff
12 acknowledged that yes, the applicant had done an analysis of
13 the offsite dose consequences and that they came out
14 favorably. Nevertheless, we based our acceptance of a non-
15 seismic pool cooling system on the existence of the seismic
16 makeup system and the ventilation system, in this case the
17 standby gas treatment system, that met the requirements or
18 the guidance of Reg Guide 1.52.

19 MR. PREVATTE: Excuse me. Implicit in your
20 acceptance of that is that this seismic makeup that was
21 being provided, the licensee would be capable of operating
22 this; is that correct?

23 MR. SHEA: For the seismic event, correct.

24 MR. PREVATTE: Also implicit in that is that the
25 standby gas treatment system would be capable of surviving

1 the conditions for which it was required to provide this
2 filtration; right?

3 MR. SHEA: That is implicit, yes. That is exactly
4 right. That is exactly what is implied in the statement
5 that standby gas treatment system is a basis for accepting
6 it is that the pool would boil. It not only would boil it
7 would actually boil in that particular event, and that the
8 standby gas treatment system -- its performance in a pool
9 boiling event -- was acceptable and therefore was the basis
10 for us accepting the non-seismic cooling.

11 We drew a second conclusion from our review.
12 That's that the pool boiling following a seismic event was
13 part of the licensing basis, and that the performance of
14 certain systems, standby gas and ESW makeup, were part of
15 the basis for us accepting the non-seismic and the boiling
16 event.

17 That's all I had to say about the licensing basis
18 itself. I was ready to move on to a brief discussion of
19 some of the other aspects of our review. If you want to go
20 back to any questions.

21 MR. LOCHBAUM: One of the previous slides on
22 licensing basis for spent fuel pool, the boiling issue,
23 specifically Reg Guide 1.13 and 1.29, 1.52, Standard Review
24 Plan 9.1.3.

25 I think the Susquehanna licensing basis, there is

1 areas of non-compliance that you haven't looked at there.
2 Those have to do with the containment design. Those
3 regulatory guides apply to any spent fuel pool, any that a
4 utility builds, BWR, PWR or whatever. Those regulatory
5 guides don't say that you can't put this next to a school
6 yard. There are other regulatory guides and other guidance
7 that make you put it inside the other controlled area.

8 By the same token, by PP&L placing the spent fuel
9 pool inside secondary containment they required for
10 secondary containment analyses to satisfy all applicable
11 regulatory guides and regulatory requirements. That's where
12 they failed, not in the design of the spent fuel pool.
13 Specifically, GDC 4, GDC 50 through 54 on containment,
14 standard Review Plan 6.2.3 on secondary containment
15 analyses, the FSAR that Susquehanna did, heat loads from the
16 spent fuel pool are not considered..

17 The guidance and the requirements say that you
18 shall consider those things. I think on that basis we have
19 an area of non-compliance and not of enhancement or of
20 adequate protection.

21 MR. PREVATTE: Also, I would also like to point
22 out that this capability of standby gas treatment system
23 with regard to the boiling spent fuel pool was recognized by
24 both Bechtel who was PP&L's contractor and PP&L as early as
25 1979, and there is documentation to that effect. It was

1 recognized on numerous occasions after that.

2 I think this recognition got lost from time to
3 time but then would reappear, and I think there's adequate
4 documentation that we have supplied that shows that.

5 Also, I would like to ask a few questions if you
6 are done, a few questions with regard to whether or not
7 boiling spent fuel pool event in conjunction with a LOCA is
8 in the current licensing basis. I understand that it wasn't
9 recognized as being such and you guys didn't evaluate that,
10 but that does not necessarily mean that it wasn't there. I
11 wanted to ask some questions to make sure that we are all
12 together on our understanding of what was there.

13 In the licensee's FSAR description of the fuel
14 pool cooling system does it describe the fuel pool cooling
15 system as being non-safety related?

16 MR. SHEA: I would have to say it does.

17 MR. PREVATTE: Does it describe it as being non-
18 IE powered and non-seismically qualified?

19 MR. SHEA: Yes.

20 MR. PREVATTE: Non-single failure proof and
21 dependent upon non-safety related systems such as the non-
22 safety service water system, all of those things are
23 described in the FSAR.

24 MR. SHEA: Yes.

25 MR. PREVATTE: Does the FSAR allude to the fact

1 that the system can be lost due to any of these factors?

2 MR. SHEA: Explicitly?

3 MR. PREVATTE: Does it allude to that fact, not
4 necessarily explicitly. Might one logically infer that if
5 you lost 1E power or you had a seismic event or any of these
6 other things, that you could lose the fuel pool cooling
7 system as a result of these things. Is that not alluded to
8 in the FSAR?

9 MR. SHEA: With respect to non-1E power that would
10 be a conclusion yes, that one would draw for similarly for
11 seismic and non-seismic.

12 MR. PREVATTE: As I think you have already stated
13 the FSAR describes the effects of loss of fuel pool cooling
14 system due to a seismic event; does it not?

15 MR. SHEA: Yes.

16 MR. PREVATTE: That's explicitly described.

17 MR. SHEA: I should say the FSAR provides an
18 analysis of the offsite dose consequences following the loss
19 of normal fuel cooling system, assuming a seismic event.

20 MR. PREVATTE: I would maintain that it doesn't
21 describe all of the consequences but it describes a number
22 of those consequences. It's clear that the boiling fuel
23 cool as a result of the seismic event is within the
24 licensing basis.

25 MR. SHEA: Yes.

1 MR. PREVATTE: If the FSAR has described all of
2 these potential causes for loss of fuel pool cooling system
3 then would it be necessary in writing an FSAR to describe
4 the effects of losing the fuel pool cooling system for each
5 one of these events. That is, would you repeatedly have to
6 describe what the effects of it were even if there were
7 other causes that had already been described, in order for
8 those causes to be a part of the licensing basis?

9 MR. SHEA: With respect to for instance non-1E
10 power I would agree that, that statement in itself would
11 mean that following a loss of offsite power that system
12 would not be functioning at that time. I would agree with
13 that. I wouldn't think that needs to be restated. It's
14 implicit in that concept of non-1E.

15 MR. PREVATTE: Even though the effects of these
16 causes aren't described, does that make them any less a part
17 of the licensing basis? That is, these modes of loss of
18 fuel pool cooling are all described in the FSAR. The
19 effects of one of these causes are described. In my mind it
20 would be unreasonable to go through and describe these same
21 effects for the loss of spent fuel pool cooling system for
22 each of these causes.

23 The fact that they aren't described for each of
24 these other causes, does that make them any less a part of
25 the licensing basis?

1 MR. PEDERSEN: Isn't the licensing basis the
2 assumption that the scenario that was analyzed envelopes the
3 other consequences from the other scenarios, that you want
4 to address?

5 MR. PREVATTE: Generally, that's true.

6 MR. PEDERSEN: The licensing basis isn't all the
7 consequences of these other scenarios that are implicit in
8 the analysis. The licensing basis is a conclusion that we
9 make base on the analysis that we assume or we -- I don't
10 want to say assume -- the assumption is that that envelopes
11 the consequences of those other --

12 MR. PREVATTE: Exactly. If it envelopes those
13 other causes then those other causes are a part of the
14 licensing basis.

15 MR. PEDERSEN: The licensing basis envelopes
16 those. That doesn't necessarily mean that those particular
17 consequences are part of the licensing basis. If they
18 weren't addressed from the conclusion as Joe said earlier,
19 the SER -- the conclusion in the SER identifies the
20 licensing basis. Those are the conclusions. Those are the
21 things that the staff made its conclusion on.

22 If it comes out later that this was wrong, that
23 the particular analysis of that particular scenario didn't
24 envelope these other unaddressed scenarios then these are
25 problems with the licensing.

1 MR. PREVATTE: The question here is not whether or
2 not the Commission reviewed and considered all those other
3 things. The question is, were all those other things
4 described in the FSAR. Can they result in a loss of normal
5 spent fuel pool cooling just the same as they can from the
6 seismic event, and would not the consequences be essentially
7 the same. Therefore, would it not be logical for all those
8 other things to be considered as a part of the licensing
9 basis also, since they are described in the FSAR.

10 MR. SHEA: I would have to say that if you are
11 considering -- you describe a system as non-seismic then
12 there's a SER that describes the acceptability of seismic
13 and non-seismic systems, in this case Section 3.2.1. The
14 consequences of a seismic event and their acceptability is
15 addressed there.

16 Without repeating it in a specific chapter on
17 specific system, I would agree with that.

18 MR. PREVATTE: The point that I am driving at is,
19 must an event be explicitly described in the FSAR before it
20 is considered a part of the licensing basis. That is, if
21 there is a logical link between something that is described
22 in the FSAR and an event that is described in the FSAR, does
23 that not then by default include the things that are
24 described in that event?

25 Let me give you an example. If the existing FSAR

1 does not say that the drywell head hold down bolts must be
2 strong enough to hold the head down -- it does not say that
3 -- there are codes to which the drywell must be designed.
4 Therefore, one can logically infer that if you meet those
5 codes you will be within the licensing basis. One can
6 logically infer that having those bolts be strong enough to
7 hold the head down is within the licensing basis, even
8 though it's not explicitly described.

9 MR. SHEA: One would have expected that the
10 applicant would have evaluated that as part of their
11 evaluation of the design of the hold down bolts, what is the
12 pressure that they are going to be seeing. They would
13 assume a certain accident --

14 MR. PREVATTE: That is correct, one would have
15 assumed that. I would agree with you 100 percent. If you
16 take that analogy and apply it to this situation one would
17 have assumed that the licensee would make all the analyses
18 that were appropriate for the other effects of the LOCA
19 event. In this case they actually did. They actually
20 discovered that, and that event for the boiling spent fuel
21 pool, that it would exceed the capabilities of a number of
22 systems in the plant. That was recognized as far back as
23 1979.

24 What I am saying is, there are a number of places
25 in the FSAR where things are described in general terms and

1 are not necessarily linked to the LOCA by direct, explicit
2 description. It is implied that they may be linked to the
3 LOCA by implication because if you can show mechanistically
4 that it will occur as a result of the LOCA, then they must
5 be. I think that's the situation that we have here.

6 In fact, whether it was recognized or not by the
7 Commission is another question. Whether or not it was in
8 the licensing basis document, I think is a question that
9 needs to be answered here. We will concede that it wasn't
10 explicitly addressed in the licensing basis document. That
11 is, you could have a failure of the fuel pool as a result of
12 these other causes. But, were the other causes were
13 described with regard to the fuel pool cooling system?

14 MR. SHEA: The consequences that you are talking
15 about from the historical analyses, are they consequences -
16 - for instance, the standby gas treatment system might not
17 perform in a boiling event or are they linking it to a LOCA?
18 I mean, I understand that you are establishing the link that
19 this will cause that and that will cause boiling pool.
20 Therefore, that whole link is part of the licensing basis.

21 MR. PREVATTE: That is correct. I am saying, if
22 there is a mechanistic link between that which is a part of
23 the licensing basis and that which you are saying is not, I
24 would say that it is. If they are mechanistically linked
25 together and if those mechanisms are described in the FSAR -

1 - and they are.

2 MR. VARGA: We have historically in projects
3 practiced the legal profession. We have a problem there,
4 when we try to write SER's. When we do write SER's which
5 are reviewed by counsel every place where we come into
6 judgment, all rather nebulous areas, you are cautioned. You
7 are brought up short by counsel in terms of being explicit.

8 So that, a legal interpretation is not dependent
9 upon logical extensions or interpretations of various
10 statements that are made. My impression is, from some
11 experience with casting SER's together is, if it's not
12 specifically mentioned in the license, if it's not
13 specifically a conclusion, if it's left out and allow the
14 reader to interpret what his logical inference might be, we
15 are in treacherous ground. I don't know how to answer your
16 question.

17 MR. PREVATTE: I agree with you on that. We are
18 on very treacherous ground. It's a difficult situation, I
19 grant you that. I understand the difficulty that you have
20 in dealing with it.

21 MR. SHEA: In fact, isn't this particular case
22 that the general counsel staff pulled us up short from
23 making that engineering connection. We tried to present a
24 case that the inference or that connection flowed very
25 smoothly but in OGC's review of it, it was that you couldn't

1 go back far enough and see explicit statements of
2 consideration of a LOCA and the chain of events leading to a
3 boiling pool, to make the extension that a LOCA boiling pool
4 was part of the licensing basis.

5 MR. PREVATTE: I agree. We need to get to that.
6 That's important. I just want to make sure that we go on
7 record as if we don't agree with you on something that we go
8 on the record for it. To not go on the record would imply
9 conceding a point. There's another point that I would like
10 to make on this with regard to what's in the licensing basis
11 and what is not.

12 One of the things that the NRC requires of
13 licensees is that if they make a change to the plant they
14 must go through the 50.59 process. Basically, the 50.59
15 process says is it a change to something as described in the
16 FSAR.

17 On numerous occasions licensees have been found to
18 decide that a change was not an unreviewed safety question
19 because it wasn't explicitly -- something they were doing
20 wasn't explicitly -- described in the FSAR. When anybody
21 that's reasonable at all would say yes, it's not explicitly
22 described but it is described in general terms. One can
23 logically deduce from those terms that it is a part of the
24 licensing basis.

25 Numerous licensees have been admonished for their

1 interpretation of that 50.59 process. That is, they are
2 interpreting it too literally. That is, if the particular
3 bolt they were working on wasn't described in the FSAR they
4 would say that it is not an unreviewed safety question. I
5 want to make sure that what we are doing here is consistent
6 with that philosophy too. On one hand NRC is saying you are
7 supposed to take a conservative interpretation of the FSAR
8 and in this case we seem, with regard to whether it's a
9 licensing basis or not, we seem to be taking a non-
10 conservative interpretation.

11 MR. SHEA: If you look at the two licensing basis
12 decisions we outlined today, the one on the seismic event
13 and the one on the LOCA sequence, if you look at the words
14 in the SER on the seismic event it's not explicit there
15 either, that seismic event will cause pool boiling, staff
16 requires that for pool boiling that the standby gas
17 treatment system operate.

18 It merely says that non-seismic system is
19 acceptable because of the existence of the standby gas
20 treatment system, which meets the requirements of Reg Guide
21 1.52. It's not explicit there either, but as we looked at
22 that there was no latitude for any other interpretation
23 other than we are accepting a non-seismic system, linking it
24 to a ventilation system. The only real link that you can
25 draw was boil.

1 that made sense in the context of the other
2 analyses that we requested of the licensee at the time of
3 the Appendix A analysis. When we went over to the LOCA
4 sequence there was much less said about that, and we
5 couldn't make that extension. It was two fairly similar
6 situations as I saw them. In one case we could make the
7 conclusion that the licensing basis did bound the seismic
8 event. In the case of the LOCA we couldn't go that far.
9 That's why we came to two different conclusions.

10 MR. PREVATTE: If I may, I would like to make one
11 other statement with regard to that. I hope that it's not
12 misconstrued that my comments are a criticism of the NRC's
13 review process. I don't mean to do that. This is an
14 extremely complex issue and has not been recognized in many
15 areas.

16 In fact, Dave and I looking at it, we have been
17 looking at these systems for two years for this specific
18 plant before we saw it. The fact that it was not recognized
19 by the original reviewers is not necessarily a criticism.
20 It's a very difficult situation you guys are in. I
21 understand that. I just wanted you to know that we
22 understand that.

23 MR. SHEA: Okay.

24 MR. LOCHBAUM: I have one further question on
25 that. In 1988 and 1989 when PP&L implemented their

1 emergency procedure change to manually shed all non-class 1E
2 loads inside the reactor building, it looks to me like under
3 10 CFR 50.59 that it would have introduced a new failure
4 mode if the seismic event is the only licensing basis
5 structure for loss of spent fuel pool cooling.

6 MR. SHEA: We have that on our plate, to evaluate
7 how the review that was done at the time, that procedure was
8 changed to see how they addressed that issue at that time.

9 MR. LOCHBAUM: If it's not the only issue, that
10 increases the probability to one, so that in either case it
11 should have been an unreviewed safety question.

12 MR. SHEA: I would agree with that. We have not
13 explored the evaluations they did at the time that they made
14 that procedure change. Are there any other questions on
15 this part of the procedure.

16 MR. LOCHBAUM: I guess the only one, you said you
17 looked at GDC 44 with respect to the seismic event and the
18 LOCA/LOOP connection. Since GDC 44 requires a presumption
19 of loss of offsite power and single failure, both of those
20 conditions render spent fuel pool cooling, the normal spent
21 fuel pool cooling in operation as described in the FSAR.

22 The single failure takes the only other system
23 available, RHR fuel pool cooling system out of service. It
24 looks to me like there's a very clear case of LOCA directly
25 leads to a loss of spent fuel pool condition. Whether it's

1 boiling or not, it's a function of time.

2 GDC 44 itself, leads directly to that condition.

3 I guess I am having trouble seeing how that link is not
4 made.

5 MR. SHEA: While a LOCA is one event that you
6 consider GDC 44 requirements, that's one of the reasons for
7 GDC 44, is to cope with that event. In this case the
8 reverse was not followed through, we didn't start with and
9 don't have evidence that the licensee started with the LOCA
10 and followed it through to the spent fuel pool cooling
11 system event. We considered --

12 MR. LOCHBAUM: If you look at GDC50 and the
13 standard review plan, 6.2 on secondary containment, 6.2 says
14 that all heat loads within the secondary containment will be
15 considered. It's spent fuel pool, decay heat load or the
16 heat load from the makeup systems are not considered.
17 That's a deficiency in the Susquehanna FSAR.

18 MR. SHEA: I'm sorry, for what?

19 MR. LOCHBAUM: In the FSAR description of those
20 systems.

21 MR. SHEA: That may be, but as far as what is the
22 licensing basis that's a different question. If we
23 establish what the licensing basis is and we use that as our
24 jumping off point for how we are going to handle the review,
25 first is what the licensing basis should be or ought to have

1 been. They are different questions.

2 That's something that we struggled with early in
3 this is, trying to separate what is the licensing basis
4 versus what the different people on the staff think it
5 should have been either historically or where we should go
6 in the future. They are different.

7 MR. LOCHBAUM: You are saying that GDC 44 is a
8 licensing requirement applicable to Susquehanna.

9 MR. SHEA: And, without considering a LOCA we
10 found it in compliance with GDC 44.

11 MR. LOCHBAUM: Without considering boiling spent
12 pool.

13 MR. SHEA: Yes, without LOCA through a boiling
14 pool. Without considering that, we did find it in
15 compliance.

16 MR. LOCHBAUM: In other words, based on the FSAR
17 discussions provided by the utility which said that all
18 heat loads and so on could be handled for that event.

19 MR. SHEA: I see what you are saying, and I can't
20 say that I have looked back at it from the heat load
21 standpoint though GDC 44. I can't say that I have done that
22 so far.

23 MR. LOCHBAUM: Wouldn't you need to do that, in
24 order to say that the LOCA is not included? If GDC 44 is
25 applicable and you state that it is and the licensee did not

1 do the containment analysis that is required under GDC 44,
2 it looks to me like there's a link directly on that basis.

3 MR. SHEA: Go ahead.

4 MR. KELLY: I believe that part of this has to do
5 with how we go about interpreting the usage in this case.
6 There are a number of cases that the staff goes about in a
7 step by step basis of saying look at A and look at B and
8 look at C, and if you look at those and decide that the
9 utility is met those areas we would not. I think that's
10 probably what happened in this case, that the staff had
11 looked at NUREG 0800 or the old standard review plan and
12 said we will check it out or what is the area that meets our
13 steps that we go through for checking it, and that was it.
14 Thy didn't go any further than that.

15 Under that case one could look back and say
16 perhaps the staff might have evaluated it differently and
17 come to a different conclusion. As it was, we went through
18 certain steps in looking at it and didn't find a problem
19 with it.

20 MR. PREVATTE: Again, the question is not whether
21 or not you guys did a correct review. The question is, were
22 the requirements there and were they described in the FSAR,
23 which would make them a part of the licensing basis. Those
24 are two separate questions, as I see it.

25 MR. SHEA: I agree. Similarly, if the licensee in

1 analyzing the overall performance of the facility for a LOCA
2 did not follow true on the tread of LOCA down to a boiling
3 pool but otherwise considered the heat loads and said we
4 considered the heat loads, they have stated what they
5 considered. If there is something that they overlooked or
6 perhaps we overlooked it in our review, it's not part of the
7 licensing basis from their end either.

8 Just as from our finding in the SER based on what
9 we looked at if we found it acceptable it's not part of the
10 licensing basis from our end. Between what the licensee
11 stated in their application, the FSAR, and what we cited in
12 our review, that established our findings in the SER -- the
13 FSAR at the time and the SER -- as the licensing basis and
14 whatever was behind them at the time, the statements in them
15 were made.

16 MR. PREVATTE: There is one other question that I
17 think needs to be addressed at this time. That is,
18 regardless of whether the NRC recognized it and regardless
19 of whether the licensee recognized it -- and I believe it
20 was recognized by the NRC -- even if they didn't there's
21 still the question of licensing basis requirements.

22 I believe the licensing basis requirements should
23 have clearly led both the licensee and the NRC in this
24 direction. Whether it was or not, that's another question.
25 The licensing basis requirements were there. And, to expect

1 compliance today, I think is not compliance with new
2 requirements. Those requirements were always there, as I
3 understand the licensing basis requirements.

4 Reg Guide 1.13, Reg Guide 1.29, Reg Guide 1.52,
5 the standard review plan, the GDC's that you have specified,
6 they were there all along. If one followed the logical
7 thread through all of those completely and totally
8 comprehensively as it should have been done, both the
9 licensee and the NRC, I believe this would have been
10 detected at that time. I don't mean this as a criticism.
11 As I say, it's a very difficult situation.

12 What I am trying to point out is, I want to make
13 sure that it is clearly understood that our position is that
14 the licensing basis requirements for considering this always
15 were there. This is not some new requirement that we have
16 trumped up at some late date. It's been there always, I
17 believe.

18 MR. MILLER: We may have a point there, where we
19 actually have a difference of opinion. To say that all
20 aspects of it should have been caught by both the NRC and
21 the licensee at the time is something that anytime we
22 uncover any kind of new issue that is always 20/20 to say
23 that at the time we should have recognized it. We have
24 many, many things that we have uncovered over the years that
25 were not recognized earlier in the nuclear industry.

1 MR. PREVATTE: I understand that. The point that
2 I am making is, the fact that they weren't recognized
3 doesn't' mean that the requirement wasn't always there.

4 MR. MILLER: That's another area where, you know,
5 there may be some fundamental difference of opinion on that.
6 I agree with you, that the regulations were there, the body
7 of regulatory guidance documents were there in some way,
8 shape or form at the time. What are now the current
9 revisions may not have been there, but some form of revision
10 was there.

11 Susquehanna was reviewed to that body of
12 regulations.

13 MR. PREVATTE: Let me say it another way. These
14 regulations, if we look at the underlying intent for all of
15 these, was to assure that the fuel pool was adequately
16 cooled for all conditions, either by the normal system or by
17 some backup system or for all conceivable conditions that
18 might come along, whether or not they were explicitly
19 described somewhere.

20 That is, if there is a way that this pool may not
21 be cooled, I am sure that it is NRC's intent that that way
22 should have been caught if possible and addressed, if
23 possible, to make sure that under no circumstances do we
24 have a condition which could result in loss of cooling
25 through the pool and subsequent meltdown. You would not

1 want that.

2 MR. MILLER: I agree with you.

3 MR. PREVATTE: It is the intent of all these
4 regulations that address fuel pool cooling that is assure
5 that the fuel pool will always be cooled under any
6 conceivable credible condition. I am sure that you would
7 agree with that.

8 And, anybody who would read the regulations that
9 existed from that time, I think could logically draw that
10 conclusion. I think it is reasonable to say that the
11 regulatory requirement for that existed at least for the
12 time period of the license of this plant.

13 MR. KELLY: I think the problem is that the
14 licensing basis does not cover any and all licensing basis
15 accidents that might occur. It goes in a postulated range
16 of accidents. When we did the analysis we do it within
17 certain bounds. The staff's belief is that this acts as a
18 boundary within which we get adequate protection, that
19 there's no mean that necessarily covers every single
20 accident that one could postulate.

21 MR. PREVATTE: That's a very good point. I am
22 glad you made that point, because all the other modes in
23 which the fuel pool cooling system can be lost were judged
24 by the FSAR not to be incredible. They were judged to be
25 credible modes, loss of offsite power, failure due to not

1 being environmentally qualified, seismic event, which is the
2 one that is described, to design of the system.

3 This system by design goes away when a LOCA occurs
4 here. It is load shed. That's not a failure per se, it was
5 just designed incorrectly. There are a number of things
6 here that are not incredible. They are credible causes.
7 Those causes were described in the FSAR, but they just
8 weren't directly linked to the boiling.

9 They were directly linked to this system. This
10 system as it is described in the FSAR says it is non-
11 seismically qualified, it's non-1E powered, it's not
12 environmentally qualified, et cetera.

13 MR. SHEA: As a jumping off point for our review,
14 we could not make -- you said the failure mechanisms were
15 identified but they were not linked in the FSAR to a LOCA.
16 We couldn't, in stating the licensing basis, we could not
17 make that extension.

18 MR. PREVATTE: I just want to make sure that --

19 MR. SHEA: We cannot make that extension.

20 MR. PREVATTE: One of the things that I want to
21 make very sure that we don't do here is say that the things
22 we are describing are incredible events or incredible
23 things. I hope you are not saying that.

24 MR. SHEA: No.

25 MR. PREVATTE: The only things that we have

1 postulated here are described in the FSAR as being linked to
2 the fuel pool cooling system, and they are also recognized
3 by the NRC as being credible things associated with the fuel
4 pool cooling system and associated with the LOCA. In fact,
5 the design and licensing basis requirements for this plant
6 are that you must take a LOCA in conjunction with the loss
7 of offsite power, seismic event, single failure, the
8 environmental conditions that are created as a result of the
9 LOCA.

10 MR. SHEA: I would agree, LOCA/LOOP, seismic
11 event, LOOP --

12 MR. PREVATTE: Not all at the same time. I am not
13 saying that those are apt to occur at the same time. I am
14 saying they are all part of the licensing basis. I am not
15 saying that all of these things are going to happen at
16 precisely the same time.

17 MR. SHEA: I understand.

18 MR. PREVATTE: That is incredible. Nobody has
19 ever said that.

20 MR. SHEA: I would agree.

21 MR. PREVATTE: By the way, just to make another
22 point. The licensee has implied on numerous occasions that
23 we have said that you must have all of these things
24 happening simultaneously in order for this to be a problem.
25 I want to go on record to make absolutely certain that

1 everybody understands that we are not saying that.

2 MR. SHEA: We recognize that you are not saying
3 that.

4 MR. MILLER: We recognize that.

5 MR. VARGA: Let's proceed.

6 MR. SHEA: I understand your position.

7 MR. PREVATTE: All right.

8 MR. SHEA: I will go into a discussion of our
9 review of our other issues by recognizing, yes, the failure
10 mechanisms being postulated, we don't suggest that any one
11 particular one of them is incredible or a couple of them
12 together are not credible.

13 [Slides.]

14 MR. SHEA: We forwarded to you the action plan
15 that we drew up in November or sometime shortly thereafter,
16 and outlined a number of specific issues we put on our plate
17 to look at. That's what I wanted to get into today.

18 As go through this discussion I want to keep in
19 mind that our determination is that the LOCA/LOOP boiling
20 pool sequence is not one that is bounded by the existing
21 licensing basis of the plant. Therefore, it's not a
22 compliance issue. In backfit space it moves us from
23 compliance into considering the next two categories,
24 adequate protection or safety enhancement.

25 In the severe accident policy statement and safety

1 goal policy statement, for looking at events that are beyond
2 the licensing basis of the facility, the staff is obliged to
3 consider the range of tools available for analyzing the
4 safety significance of that issue.

5 We could use realistic assumptions if there is
6 consensus on a particular assumption if that's realistic or
7 not, rather than any specific design basis assumption that
8 went into -- for instance, Reg Guide 1.3 may or may not be
9 the most realistic and appropriate one to use. It may or
10 may not be. Each one has to be evaluated on a case by case
11 basis. It allows us to use probabilistic techniques in our
12 overall review of all of the issues together to determine
13 their overall safety significance.

14 MR. PREVATTE: When you use the term probabilistic
15 techniques, are you talking about risk assessment techniques
16 with regard to probability and consequences or just
17 probability?

18 MR. SHEA: I will let you answer that question.

19 MR. KELLY: It is an evaluation and looking at
20 frequency where you get pool boiling. If you have pool
21 boiling it's a probability of having -- the probability of
22 having core damages was the potential consequences.

23 MR. PREVATTE: Just for whatever it's worth, I
24 just want to make sure that I understand. When we are
25 looking traditionally at what NRC has looked at in the risk

1 assessment where you are looking at both probability and
2 consequences, the product of those two things, traditionally
3 you have looked at core melt as the ultimate outcome that
4 you are trying to assess.

5 In this case here though, this focus needs to be
6 in a different direction. That is, ultimately we are
7 concerned about core melt too. But in the case of this
8 particular concern you get to a just as serious consequence
9 as core melt before you ever get to core melt very likely.
10 That is, melting of the fuel in the fuel pool, itself.

11 During your risk assessment, was it aiming its
12 assessment at the risk associated with melting of fuel in
13 the pool or just at core melt in the reactor.

14 MR. KELLY: It looks at both.

15 MR. PREVATTE: That's an important consideration.

16 [Slides.]

17 MR. SHEA: Starting at the top of the sequence
18 outlined in the Part 21 report, if we look at the normal
19 fuel pool cooling system, the non-seismic, non-safety
20 related system, we postulated a number of failure
21 mechanisms. Some were failure mechanisms -- they were put
22 forth because there was no analysis to prove one way or
23 another whether it was a factor.

24 Some were put forth because they were known actual
25 responses of the plant, the auxillary load shed feature.

1 Some were known procedural steps, the one that you pointed
2 out. We went down through those. In some of them we took a
3 look at specifically -- I just want to go through some that
4 we have looked at so far.

5 I think you received the information, probably the
6 January 6 letter, on hydrodynamic loads. We have had a
7 number of interactions with the licensee. We went up there
8 in October and requested that they quantify the effect of
9 hydrodynamic loads rather than just a qualitative assessment
10 that appeared to be existing before that.

11 That was submitted, I think, in November. We
12 asked similar questions on that. We specifically asked the
13 licensee to justify why the portions of the systems that
14 were done, which was not the complete system for either fuel
15 pool cooling LOOP or the service water, was appropriately
16 representative. They provided that response in the January
17 letter.

18 We have found overall the response to the issue
19 was acceptable, and that hydrodynamic loads are not likely
20 to exceed the stress for the piping or the hangers or the
21 components attached to the piping based on the analysis that
22 was submitted and reviewed. I don't know if you had any
23 more subsequent to that.

24 MR. PREVATTE: I just have one question on that.
25 Had the licensee done this analysis on a quantitative basis

1 prior to the submission of our Part 21 report?

2 MR. SHEA: I didn't go up in October, but the bulk
3 of the analysis that was done that we looked at and found
4 acceptable, I think was done subsequent to the staff's visit
5 in October.

6 MR. PREVATTE: Thank you.

7 MR. SHEA: Some staff went up to the site in early
8 February and took a look at existing body of procedures as
9 they exist today and the training as it exists today on this
10 scenario and the systems training.

11 Probably the most significant finding on that
12 review was on the emergency preparedness, EPPS 102, which is
13 procedure for the tech support center coordinator, his
14 guidance for his overall actions during a LOCA. There was
15 reference in there to procedure, kind of a damage control
16 procedure. At the time the staff said it was not in place.

17 The DC procedure was not in place.

18 We think that's a hole we need to clean up with
19 the licensee. In general, the tech support coordinators
20 appeared to be knowledgeable about the issue, and that it
21 was something that they needed to consider. We think there
22 is some procedural strengthening that needs to be done in
23 that particular case.

24 MR. PREVATTE: I have a question on that, with
25 regard to the procedures and training. Were those

1 procedures and training that do address this issue, were
2 they in place before our Part 21 report?

3 MR. SHEA: We are looking at those questions
4 separately. We are looking at the adequacy of procedures as
5 they exist at the time of our recent visit or at the time
6 that we issued the SER as one question. Then, we are
7 looking at the history of procedures and what they may have
8 been in the past separately.

9 MR. PREVATTE: Thank you.

10 MR. SHEA: The question of access, which is a huge
11 question in this whole picture, is one that we are taking up
12 with the licensee tomorrow. We are talking about it at the
13 meeting tomorrow. We seek at that meeting to understand all
14 of the assumptions that go behind the operator -- they put
15 forth back in May and the ones they responded to in the more
16 recent submittals.

17 We will be looking to understand first, what have
18 they done to come up with the numbers they came up with.
19 After that, we will have to go and make a judgment about
20 them.

21 As far as standby gas treatment system
22 performance, we issued the RAI the other day on standby gas
23 performance for a seismic event. We will also consider its
24 performance during a LOCA for a single boiling pool. We
25 reviewed the analysis that the licensee had available as of

1 early February.

2 We saw a few weaknesses, and those weaknesses were
3 pointed out in the recent RAI, about the lumped parameter
4 model and that sort of thing. Also, we asked about an
5 outstanding question on the EQ issue in the standby gas
6 treatment room, if that's a problem. That's an outstanding
7 question. But, don't believe that it's going to be beyond
8 the capability of the system to handle a single boiling
9 pool. The question is more on two boiling pools.

10 MR. PREVATTE: One question on the standby gas
11 treatment system performance. In evaluating performance of
12 that system, is the qualification of the equipment in the
13 standby gas treatment room being considered with regard to
14 the environment that would be created as a result of the
15 boiling spent fuel pool.

16 MR. SHEA: Yes.

17 MR. PREVATTE: That is not the in line stuff such
18 as the filters but in addition to that, the other equipment
19 such as the fan motors, et cetera.

20 MR. SHEA: Yes. That's the question that we have
21 outstanding.

22 MR. LOCHBAUM: Is that two boiling pools or one
23 boiling pool? The seismic event assumes two boiling pools,
24 as I recall.

25 MR. SHEA: We certainly want to know that, if the

1 equipment qualification is going to be -- I need to go back
2 and see how explicit we were in phrasing that question.

3 MR. LOCHBAUM: Okay.

4 MR. SHEA: We don't believe that there is a
5 significant open issue as far as the capability of the RHR
6 system to perform in the assist mode. Essentially, the test
7 results, the preoperational test results of that system -- I
8 understood that you had a question about NPSH, whether the
9 calculated NPSH was adequate. I think that our staff has
10 looked at the NPSH. It's going to be available at whatever
11 temperature -- I think we assumed 170 -- whatever
12 temperature is appropriate, and found that it will be
13 adequate.

14 MR. LOCHBAUM: We will have to keep building
15 ultimate heat sinks to handle the heat loads in that mode,
16 as required by GDC 44.

17 MR. SHEA: That's something that we are looking
18 at. It's not up here.

19 MR. PREVATTE: Did I understand you correctly?
20 Did you say that you felt that there was sufficient NPSH
21 available?

22 MR. SHEA: Yes.

23 MR. PREVATTE: This is based on 170 degree
24 temperature of the fuel pool?

25 MR. SHEA: I can't tell you exactly what

1 temperature our staff used to make that determination. We
2 are confident that it's not a problem.

3 MR. PREVATTE: I would like to know the details on
4 that. As I have understood from PP&L's own description for
5 that condition, for the flow rate that is required and for
6 the pool level for which you would have at that point in
7 time where you are trying to run this in a fuel pool cooling
8 mode, the normal level without raising the pool level up.

9 MR. SHEA: That's something that would have to be
10 integrated procedurally when you put the system on line, as
11 far as pool level tied to NPSH.

12 MR. PREVATTE: I think the assumptions that you
13 make in an NPSH calculation have a very large bearing on
14 whether it's acceptable or not. If the conditions that are
15 being postulated that you go into that analysis with aren't
16 achievable, then the analysis is not valid. I would
17 maintain that with the Reg Guide 1.3 source terms, they
18 can't raise the level in the fuel pool to achieve the
19 conditions that would require that to give you an acceptable
20 NPSH.

21 MR. SHEA: I agree, that it all needs to be looked
22 at in an integrated way. That is, we need to understand if
23 NPSH requirements require you to raise the level up is
24 access adequate for the operations necessary to raise it up.
25 I understand that it needs to be looked at in an integrated

1 fashion.

2 MR. PREVATTE: Does this mean that you are still
3 evaluating this question?

4 MR. SHEA: We would be evaluating still -- I guess
5 the assumption would be that if the level is raised up, if
6 the procedures are adequate to do that and the access is
7 there to make that happen, then NPSH would be adequate.

8 MR. PREVATTE: I think that's inherent in
9 evaluating the analysis, is validating the assumptions. If
10 the assumptions aren't validated -- as I recall the test
11 data available on this system shows that when the fuel pool
12 level is at the normal level you will lose suction on this
13 system due to cavitation at well below the required flow
14 rate; does it not?

15 Also, that that is for a fuel pool temperature
16 condition substantially less than 170 degrees, probably on
17 the order of 90 degrees because it was done during a
18 preoperational testing phase at the plant when there was no
19 fuel in the pool. If you are losing suction on the pump
20 under those conditions, why would it make sense that you are
21 not going to lose suction under much worse conditions?

22 MR. SHEA: If you raise the pool level up then you
23 could achieve the necessary NPSH. Looking at it from that
24 point down, that's as far as we have gotten so far. Looking
25 at it from the point of integrating procedures and the

1 operator access, we haven't done that yet.

2 MR. LOCHBAUM: There's another aspect. As PP&L
3 has stated in numerous recent submittals, that they will not
4 use the RHR fuel pool cooling system post-LOCA due to the
5 fact that the system originally lines up in the LPCI mode.
6 If you realign the system to RHR fuel pool cooling system
7 you pump source terms up to the refuel floor for which there
8 is no analysis to support the offsite dose consequences.

9 They have told the NRC that they will not use that
10 system post-LOCA. I guess this would be some other --

11 MR. SHEA: The reason I brought this issue up was,
12 the ability of that system to operate in that loop was at
13 question. That's something that we are looking at.
14 Regardless of under what accident scenario you are trying to
15 put in your question, its ability to do that at all was in
16 question.

17 MR. LOCHBAUM: I think it still is.

18 MR. PREVATTE: I think it still is, too. If we
19 impose enough special conditions we can make anything
20 happen. Those special conditions have to be reasonable.
21 That is, again, the NRC has roundly criticized licensees in
22 the past for not validating assumptions in their analyses.

23 If they have assumptions in this analysis that
24 aren't validated and don't make sense and NRC is accepting
25 them anyway, that is contrary to the position that you have

1 taken in the past with other licensees. It's also contrary
2 to common sense.

3 Additionally, in order to show the RHR fuel pool
4 cooling assist at work one must be able to show that you
5 have someplace to put that heat. Has that also been shown
6 in this analysis?

7 MR. SHEA: We are looking at that part of it. The
8 ultimate heat sink capacity is also part of the review.

9 MR. PREVATTE: But then, in order to make this
10 conclusion that the RHR fuel pool cooling assist mode is
11 okay would not one have to evaluate all of the aspects
12 associated with operation of that system under the
13 conditions that we are concerned about here?

14 MR. SHEA: I guess maybe I oversold what I was
15 trying to present here. It's just a very narrow look at it.
16 There was sufficient NPSH to operate that system in that
17 loop. Not saying anything more about it, but recognizing
18 that to give or take credit for the operation of that system
19 in any accident scenario, all of the other conditions
20 associated with that scenario would have to be considered to
21 give it credit for that scenario.

22 All I am saying is that the pumps taking suction
23 will put water back in. That's all I was saying that we
24 have done so far.

25 MR. PREVATTE: Okay. I thought you were saying

1 that you were giving credit to the licensee for that as a
2 credible cooling mechanism for this scenario.

3 MR. SHEA: Not today, I am not doing that.

4 MR. PREVATTE: Okay. I will concede, that the RHR
5 pump can be run under some conditions providing cooling to
6 the spent fuel pool. It can be and is, regularly run under
7 some conditions. Under the conditions which we are
8 concerned about here, I do not concede that is capable of
9 doing anything.

10 MR. SHEA: I am not making a statement one way or
11 the other those scenarios.

12 MR. PREVATTE: Okay.

13 [Slides.]

14 MR. SHEA: The last slide talks about the scope of
15 our probabilistic tools we are planning to bring into bear.
16 I think Glen actually talked about those a few minutes ago.
17 I have broken the task into two parts. First is, we are
18 trying to calculate the frequency for boiling the pool for a
19 number of different initiators, LOCA being only one of them.
20 Following, starting from the initial events would be
21 subsequent events, down to the point that the pool boils,
22 and trying to come up with an overall frequency for boiling
23 the pool.

24 Then, taking the pool boiling in its initial
25 condition of itself, following that through to its

1 consequences, both core damage frequency and consequences in
2 the pool itself.

3 Some of the things that we will need to treat from
4 that viewpoint, probabilistic viewpoint are, what is an
5 appropriate LOOP duration. I know that you brought up
6 recent actual experience with Turkey Point and that sort of
7 thing as saying it should -- a longer duration should be
8 considered than may have been considered in the past.
9 That's how we are going to treat that issue.

10 MR. LOCHBAUM: Non-1E loads, 24 hours after they
11 get power back anyway according to procedure.

12 MR. SHEA: For a LOCA.

13 MR. LOCHBAUM: For a LOCA.

14 MR. SHEA: Right, but as far as just a LOOP alone.

15 MR. LOCHBAUM: For LOOP alone, you get access to
16 the reactor building.

17 MR. SHEA: Agreed. Some of the environmental
18 failures were for systems that don't have existing
19 qualification programs, we will treat probabilistically
20 also. That was the conclusion of what I had to say in my
21 formal remarks.

22 Do you have any additional questions or anything
23 that you wanted to say specifically.

24 MR. LOCHBAUM: I think I disagree with the
25 licensing basis conclusion you reached as far as LOCA/LOOP.

1 If you look at the design as stated in the FSAR for
2 Susquehanna, the design basis LOCA results in the non-safety
3 related fuel pool cooling system being automatically load
4 shed. There is no discussion of that system ever coming
5 back.

6 The RHR fuel pool cooling system which is the
7 other assist system that is capable of cooling the cooling
8 the pool and maintaining it below boiling, is described in
9 the FSAR as only performing a function during refueling.
10 There is no other function described for that mode. It's
11 non-single failure proof. It has never been considered in
12 the analyses for the ultimate heat sink properly.

13 The design basis LOCA itself directly results in a
14 loss of spent fuel pool cooling. As far as how long it
15 takes to reach boiling, it's a function of the heat load in
16 there. I think the key is, because that pool is in a
17 secondary containment the consequences of the loss of spent
18 fuel pool cooling which are described in the FSAR at
19 Susquehanna for a LOCA don't include the decay heat or the
20 heat from the spent fuel pool.

21 The regulatory requirements in place then and in
22 place now, which have never been changed, require those
23 loads to be considered. Under that basis I think there's a
24 non-compliance with the regulations that were in effect at
25 the time. There has not been a change in the interpretation

1 of those requirements. There has not been a change in the
2 regulatory guidance covering those requirements.

3 That's why I believe this is not an issue of a
4 non-compliance that we have to do it from the other two,
5 it's an issue of compliance backfit and all this other stuff
6 doesn't need to be done.

7 MR. SHEA: I guess my response to that would be
8 that the regulations were not applied in such a way that a
9 LOCA was followed through to a boiling pool event. For us
10 to go back and apply them that way, whether they could have
11 been interpreted at the time or now, they were not applied
12 that way at that time. If we were to go back and apply them
13 it makes it a backfit that is not a compliance backfit.

14 MR. LOCHBAUM: That's what I don't understand.
15 The Susquehanna FSAR says that the plant is in compliance
16 with GDC 44. That conclusion is based on an evaluation
17 report in an FSAR Section 6.2, where they do all the heat
18 loads in the reactor building following a design basis LOCA.
19 They go down to the heat from lightbulb, the heat from a
20 quarter horsepower engine, and neglect a heat load in the
21 spent fuel pool that is --

22 MR. PREVATTE: That's the total of the rest of the
23 building.

24 MR. SHEA: I understand.

25 MR. LOCHBAUM: That analysis should have included

1 that.

2 MR. SHEA: Should have.

3 MR. LOCHBAUM: Should have.

4 MR. SHEA: Should have, perhaps, but should have
5 is the operative word there.

6 MR. LOCHBAUM: Right. I think the regulatory
7 requirements are very clear, that it states that it shall.
8 The fact that it was missed by PP&L in their analysis -- and
9 the licensee is not responsible for doing a technical review --
10 the licensee's work -- the fact that it wasn't picked up in
11 the SER is not a failing of the NRC. The failure was on the
12 part of the licensee to fully comply with the regulations
13 that were in effect at the time the plant was designed and
14 built.

15 MR. SHEA: I understand your position.

16 MR. LOCHBAUM: It makes a big difference of
17 whether it's a backfit for safety enhancement or compliance
18 backfit.

19 MR. SHEA: You are right, it does. That is the
20 bottom line on what the licensing basis determination --
21 that's the whole point of doing it.

22 MR. LOCHBAUM: Right. It's a very big decision to
23 be made, and I think there has been a mistake made with the
24 current decision.

25 MR. SHEA: All right. I understand what you are

1 saying.

2 MR. PREVATTE: I would like to address one of the
3 other points that you discussed. That is the point about
4 severe accidents. As I understand it, you said severe
5 accidents was an issue that was addressed in 1985 and came
6 recognized as a special issue.

7 MR. SHEA: That's when the policy statement was
8 issued, that's right.

9 MR. PREVATTE: When the policy statement was
10 issued. I would like to put forward a notion that severe
11 accidents may not have been called that before, but the
12 concept that you may have core damage significantly
13 exceeding what you would have if you mechanistically go
14 through all the analysis -- it's been around for a long,
15 long time -- and that concept -- it may not have been called
16 severe accident as in modern day parlance but that concept
17 has been around since day one.

18 In fact, that concept is the basis for the concept
19 of defense-in-depth. That is, we design all these systems
20 to prevent having any core failure. If everything goes as
21 designed you shouldn't have any core failure as a result of
22 the accident. However, to make sure that we have all the
23 bases covered in case we do, we require that licensees have
24 containment, have standby gas treatment systems, they have
25 control room ventilation system and many other features.

1 They have shielding around the containment and many other
2 features in the design of the plant.

3 All of those features were a part of the original
4 design basis. They were a part of the original licensing
5 basis. They have been a part of the concept of licensing
6 these plants since before any of the GDC's were ever
7 written. That is not something new. It was always there.

8 So, the requirements of Reg Guide 1.3 to say you
9 must assume a certain source term for the LOCA is not a new
10 concept. It has always been there. In fact, in the only
11 commercial plant in which we have any experience, TMI, the
12 core damage was significantly worse than what Reg Guide 1.3
13 required.

14 I just want to make sure that we all understand,
15 that's not a new concept and not a new set of requirements.
16 Maybe the policy statement is a new statement by the NRC,
17 but the policy was always there all along that we must
18 consider severe damage to the core in designing these
19 plants. Otherwise, you wouldn't need all these features.
20 You could just set the reactor out in the middle of the
21 field the way the Russians do, and we see what happened to
22 them by following that kind of a philosophy.

23 I would also like to point out that I don't think
24 I have seen it yet, but maybe you presented it. With regard
25 to the Reg Guide 1.3 question, I understand you are going to

1 be addressing that question tomorrow. Neither Dave nor I
2 will be here. I just want to go on the record while I am
3 here as saying from what I have seen of the licensees
4 responses so far they have not done an analysis that
5 complies with Reg Guide 1.3 and NUREG 0737, which they are
6 committed to in their FSAR and I think which they have
7 acknowledged and you have acknowledged their
8 acknowledgement.

9 The ways they haven't complied with this in the
10 beginning in addressing this question and they haven't
11 complied with it at all. Since the Part 21 report was
12 written they have gone back and done an analysis which
13 assumes the same source terms as Reg Guide 1.3 requires, but
14 does not assume the tech spec leakage rate as required by
15 Reg Guide 1.3, and also does not assume that the leakage
16 rate is for the duration of the accident.

17 They have reduced the leakage rate they have
18 assumed which was already non-conservative linearly, I
19 believe, with the reduction in pressure that they would
20 mechanistically see in the accident. That is not in
21 compliance with Reg Guide 1.3.

22 MR. PEDERSEN: May I respond to that before you go
23 on?

24 MR. PREVATTE: Yes.

25 MR. PEDERSEN: Would you concede that the

1 acceptance criteria for the staff to evaluate any of those
2 other features that you are talking about, the containment
3 and control room habitability, that the acceptance criteria
4 for that particular feature does not necessarily apply to
5 all the design features of the plant. Would you concede
6 that?

7 I guess what I am getting at is, Reg Guide 1.3,
8 the source term assumptions that are in 1.3, the one percent
9 leakage from containment, those were designed towards the
10 analysis of offsite consequences to meet Part 100, whether
11 it's acceptable siting criteria for this particular plant.

12 MR. PREVATTE: Okay.

13 MR. PEDERSEN: Whether all the assumptions in 1.3
14 are applicable to some other consequence, some other
15 scenario such as whether someone can access a piece of
16 equipment in the secondary containment, that doesn't
17 necessarily follow.

18 MR. PREVATTE: Let me ask you some questions.

19 MR. PEDERSEN: That's where we have some
20 misunderstanding.

21 MR. PREVATTE: I don't think it's a
22 misunderstanding. Let me ask you some questions on that.

23 MR. PEDERSEN: I know that you referred to 0737.
24 In a lot of the documentation I noticed a reference to 0737
25 II B2, the five rem acceptance criteria. 0737 II B2 is a

1 shielding design --

2 MR. PREVATTE: Not applicable, is that what you
3 are saying?

4 MR. PEDERSEN: It is to assure that the operator
5 can get to an area where an operator may have to operative
6 vital equipment close to the accident from the sources that
7 are contained in the reactor water bearing systems. It's a
8 shielding design. In that particular item, 0737, there is a
9 statement that says you don't have to consider the leakage
10 from that. Airborne source term was not a consideration in
11 that particular design.

12 It's not really appropriate, because that
13 particular 0737 item was looking at whether someone can get
14 into a particular area. It also happens to have a piece of
15 piping that has a high source term in it or may have a high
16 source term in it from the circulation of the reactor water.

17 MR. PREVATTE: You have made several statements
18 here. Let's review them, just one at a time. When you said
19 that Reg Guide 1.3 and the regulatory requirements don't
20 necessarily apply to people --

21 MR. PEDERSEN: No, I didn't say that.

22 MR. PREVATTE: To people other than the offsite
23 dose. That's not necessarily applicable to operators.

24 MR. PEDERSEN: No. I said the analyses of Reg
25 Guide 1.3 that the guidance in 1.3 was provided for, the

1 assumptions that are in 1.3 for that particular analyses,
2 those assumptions might not be portable to any other
3 analyses done.

4 MR. PREVATTE: Would you say they are not portable
5 to the analysis for operator actions, post-LOCA and control
6 room habitability questions? Those are the key questions
7 that we are talking about here, operator access and control
8 room habitability.

9 MR. PEDERSEN: Yes, I understand that.

10 MR. PREVATTE: Are they portable to those?

11 MR. PEDERSEN: In the design of the control room
12 we have used the 1.3 source term. We have considered
13 airborne source term. GDC 19 is the acceptance criteria.

14 In the lessons learned from Three Mile Island and
15 0737 II B 2, we addressed specifically what goes to the
16 operators from the sources that are contained in the
17 systems, not the airborne source term. The airborne source
18 term was not addressed in II B 2. The leakage from those
19 reactor water bearing systems was also not addressed in II
20 IB 2.

21 That five rem acceptance criteria for the
22 shielding design was not necessarily applicable to the dose
23 from the airborne source term that I postulated.

24 MR. PREVATTE: Let's go through that one at a
25 time. I read through the document, NUREG 0737 and Reg Guide

1 1.3, and I have read them very thoroughly. Both of those
2 documents describe in detail that they are intended to limit
3 doses to people. In NUREG 0737 it explicitly says to
4 operators who are requiring access to vital areas.

5 MR. PEDERSEN: True.

6 MR. PREVATTE: A vital area is defined as a place
7 where you have to go to take action to mitigate the
8 consequence of the accident. In this case the reactor
9 building is the place in concern. It also says that you
10 don't have to consider leakage from those systems such as
11 RHR and core spray. I will concede that.

12 When you have water in those systems you assume
13 that those systems are leak tight because they are leak
14 tight during normal operation. There's no reason why they
15 should be otherwise post-accident. But that is talking
16 about leakage from those systems, water leakage from those
17 systems, when they are in operation. That's a different
18 thing than the leakage through your other containment
19 penetrations for Appendix J requirements.

20 MR. PEDERSEN: I agree with you.

21 MR. PREVATTE: Those are the ones that give you
22 the airborne dose of concern. We are not concerned about
23 leakage out of the systems, but the systems as defined in
24 the NUREG 0737 include containment. It doesn't include
25 those systems that are full of water. We are concerned

1 about the airborne dose, and that airborne dose is the one
2 that is very high in the reactor building.

3 MR. PEDERSEN: I agree with you.

4 MR. PREVATTE: Also, you must be concerned about
5 the dose that results from the internal source in those
6 systems. You can't ignore that, either.

7 With regard to whether or not --

8 MR. PEDERSEN: I am sorry, I didn't hear what you
9 said. Internal dose, internal to human beings?

10 MR. PREVATTE: No. Internal to the system.

11 MR. PEDERSEN: The dose from the source --

12 MR. PREVATTE: If you have RHR system running
13 there and it's full of contaminated water from the reactor,
14 you must consider that the dose from the system through the
15 wells of the pipe -- not leakage of the pipe but the dose
16 coming directly from those systems.

17 MR. PEDERSEN: I agree with your concerns. I
18 agree about all the statements that you made about you have
19 to be concerned about those aspects.

20 MR. PREVATTE: I am not just concerned. The
21 regulatory requirements state that you must consider those.
22 I will read it to you, if you like. I have the quotes right
23 here.

24 NUREG 0737 states in Section II.B.2, with the
25 assumption of a postulated release of radioactivity

1 equivalent to that described in Reg Guide 1.3 and 1.4 -- in
2 this case 1.3 is the applicable one -- each licensee shall
3 perform radiation and shielding design review of the spaces
4 around systems that may as a result of an accident contain
5 highly radioactive materials.

6 MR. PEDERSEN: Read that again. If the review of
7 the shielding design --

8 MR. PREVATTE: You have to read that in context.

9 MR. PEDERSEN: That's right. You have to read the
10 whole paragraph.

11 MR. PREVATTE: I will read the rest of the
12 paragraph. The design review should identify the location
13 of vital areas and equipment in which personnel occupancy
14 may be unduly limited. Personnel occupancy may be unduly
15 limited.

16 MR. PEDERSEN: That's why you do --

17 MR. PREVATTE: It's not for the equipment and it's
18 not for the -- it's for the operating personnel.

19 MR. PEDERSEN: That's true.

20 MR. PREVATTE: I will finish. By the radiation
21 fields during post-accident operation of these systems.
22 Further on it states, each licensee shall provide for
23 adequate access to vital areas. Access means people. The
24 purpose of this item is to ensure that licensees examine the
25 plants to determine what actions can be taken to reduce

1 radiation levels and increase the capability of operators,
2 to control and mitigate the consequences of an accident.

3 Any area which will or may require occupancy to
4 permit an operator to aid in a mitigation of or recovery
5 from an accident is designated as a vital area.

6 In order to assure that personnel can perform
7 necessary post-accident operations in vital areas the
8 following guidance is to be used by licensees to evaluate
9 the adequacy of radiation protection to the operators. Item
10 one, source term. The minimum radioactive source term shall
11 be equivalent to the source terms recommended in Reg Guide
12 1.3, 1.4 and 1.7 and standard review plan 15.6.5 and
13 numerous other statements.

14 MR. PEDERSEN: Contained within the systems -- if
15 you go farther in I believe that you will see that.

16 MR. PREVATTE: You seem to be saying you exclude
17 the air leakage.

18 MR. PEDERSEN: From that particular 0737 to that
19 particular item, that specific requirement is addressing the
20 direct radiation from the sources that are contained within
21 the systems. Airborne -- the dose from an airborne
22 concentration is not considered in that II B 2 item.

23 MR. PREVATTE: Dose from an airborne
24 concentrations from leakage from those systems. But from
25 containment it is to be considered.. Are you trying to say

1 that you don't have to consider containment leakage?

2 MR. PEDERSEN: If that is a concern, that is a
3 separate item. It's not that particular requirement.
4 That's where I am saying there is some confusion. There
5 seems to be a confusion as to what specific regulatory
6 requirement applies, what are the acceptance criteria that
7 the staff uses in those types of analyses.

8 Several times I have noticed in the documentation
9 that has gone back and forth, missed references to what the
10 regulatory requirement is.

11 MR. PREVATTE: The regulatory -- this says that
12 you are supposed to use Reg Guide 1.3. Reg Guide 1.3 says
13 that you are supposed to assume the leakage rate that is
14 contained in the station license in the technical
15 specifications. That leakage rate in the technical
16 specifications also doesn't include leakage from these water
17 filled system, because that leakage is negligible with
18 regard to the airborne source term.

19 MR. PEDERSEN: Again, 1.3 was guidance for doing
20 Part 100 evaluations, offsite consequences. There's a lot
21 of very conservative assumptions that are made in there to
22 envelope the problem. Whether the margin that is provided
23 by this conservative assumption is appropriate for this
24 particular analysis, I can't tell you that right now. We
25 are looking at that.

1 But just to say you have to use 1.3 because that's
2 the design basis for a LOCA for determining offsite
3 consequences doesn't necessarily follow. That's my point.

4 MR. PREVATTE: Let me dwell on that point for just
5 a moment. Are you in effect saying then, that you are going
6 to have leakage from the containment. This is the primary
7 containment now that we are talking about, the secondary
8 containment being the reactor building which is the access
9 area that we are concerned about, we can have leakage from
10 the primary containment which can't be any higher than what
11 Reg Guide 1.3 requires with regard to the offsite dose
12 consequences.

13 It can't be any higher than what Reg Guide 1.3
14 requires with regard to the control room consequences. But
15 you don't have to consider that amount of leakage for the
16 consequences inside the reactor building.

17 MR. PEDERSEN: Just because these are the acceptable
18 criteria for the control room design and the acceptable
19 criteria for Part 100 calculation, doesn't necessarily mean
20 it's the appropriate criteria for determining the operator
21 dose in the reactor building. Yes, that's what I am saying.

22 MR. PREVATTE: There's another place in NUREG 0737
23 -- and I don't have that one written down right now -- where
24 it says the intent of this requirement is that it assure
25 that operator shall not receive a dose in excess of what

1 they would receive as required under GDC 19, the five rem
2 limit in the control room.

3 MR. PEDERSEN: Five rem to the whole body.

4 MR. PREVATTE: That's right. That is explicitly
5 stated in the NUREG 0737 as the intent of that document.

6 MR. PEDERSEN: In most cases the airborne source
7 term is not the concern. In most cases for outside of the
8 reactor building or for in a PWR during post-LOCA response,
9 the sources that are contained within the system are the
10 major contributors to the dose of an operator trying to take
11 action.

12 MR. PREVATTE: Yeah, but this isn't a PWR.

13 MR. PEDERSEN: You are right. In most cases, I am
14 talking about. The action that 0737 requires the licensee
15 to do was addressing that major concern of, can they get to
16 an area because all of a sudden this pipe now has a high
17 source term in it because it's circulating reactor water.

18 MR. PREVATTE: I understand. Let me say this
19 about that. First of all, this is a different animal. This
20 is a BWR.

21 MR. PEDERSEN: I understand that.

22 MR. PREVATTE: In a BWR -- I understand what you
23 are saying. This concern was with regard to the contained
24 sources in the piping. In a BWR you have leakage from the
25 primary containment into the secondary containment, and that

1 leakage into the secondary containment creates rad levels
2 inside the reactor building that are horrendous on the order
3 of thousands of R per hour.

4 MR. PEDERSEN: I understand that.

5 MR. PREVATTE: That leakage must be considered per
6 Appendix J.

7 MR. PEDERSEN: This particular issue, to my
8 knowledge, is the first issue that has come up that requires
9 such extensive operator action within the reactor building.
10 The question is, what is the appropriate assumptions for a
11 source term that would apply to this analysis. That is the
12 question right now.

13 This is specifically saying Reg Guide 1.3, source
14 term applies and 0737 II B2 five rem dose criteria applies
15 as acceptance criteria is not necessarily true. That's not
16 necessarily appropriate.

17 MR. PREVATTE: Let me say this about that. I
18 believe it applies. We will have to agree to disagree on
19 that one.

20 MR. PEDERSEN: That's fine.

21 MR. PREVATTE: If you decide that it doesn't
22 apply, then that will be completely inconsistent with the
23 other requirements with regard to exposure to both operators
24 and the general public, and it will defy logic.

25 MR. PEDERSEN: Not necessarily.

1 MR. PREVATTE: That is, you can't get from the
2 primary containment to the public or to the control room if
3 your contamination without passing through the secondary
4 containment, that is, unless you go out through MSIV's. The
5 assumption here is that MSIV's are closed.

6 If you should decide that it would not be
7 applicable it would be completely inconsistent with the
8 positions that you have taken before. You have gone to
9 great lengths to assure the operators in the control room
10 don't get anymore than five rem exposure. Why would it be
11 any more acceptable to let them be exposed to a much higher
12 radiation dose anywhere else? I mean, is there a different
13 group of operators that we are concerned about?

14 MR. PEDERSEN: By that same token then, if it's
15 inappropriate for Appendix E to reference EPA's PAD's for
16 emergency operator worker dose, there are protective action
17 guides that EPA has developed which is up to 25 rem.

18 MR. PREVATTE: Let's talk about this. If you want
19 to bring that up, let's talk about that. That has been
20 touted as a reason for why this acceptable as is, that the
21 EPA allows certain higher dose levels. That is not -- I
22 repeat, not -- a valid design basis for the system.

23 The NRC requirements with regard to these system
24 designs are five rem to the operators. NUREG 0737 makes that
25 very clear, and so does GDC 19.

1 MR. PEDERSEN: We agree to disagree on that point.

2 MR. PREVATTE: That allowance with regard to 25
3 rem total dose is what is allowed to an operator in an
4 emergency condition, where things go beyond what would be
5 expected by the design.

6 MR. PEDERSEN: That's exactly what we are talking
7 about.

8 MR. PREVATTE: No, this is not exactly what we are
9 talking about. We are talking about the design requirements
10 here --

11 MR. PEDERSEN: We will get back to you on that.

12 MR. SHEA: This is truly where we get back to the
13 issue of the licensing basis decision, and which way you go
14 from there and what are the assumptions that you apply,
15 realistic or the existing design ones, and when is it
16 appropriate to apply in evaluating a situation like that.
17 That's the whole point of determining a licensing basis.

18 MR. PREVATTE: I understand. But if you are
19 saying that not considering core damage is realistic, all I
20 would have to do is remind you of TMI.

21 MR. PEDERSEN: I am not saying that at all.

22 MR. PREVATTE: If you would say that not having
23 leakage is realistic from the containment, I would ask you
24 to please review the test results of every BWR in the
25 country. They leak --

1 MR. PEDERSEN: I completely understand. What I am
2 saying is, what we take as assumptions in other analyses,
3 the full source term, the one percent leakage out of
4 containment, whether those assumptions are valid for this
5 particular analysis is --

6 MR. SHEA: It's where we are at right now, and the
7 primary reason we will meet with the licensee tomorrow, is
8 to figure out what they have done.

9 MR. PREVATTE: I think whatever you decide has to
10 be consistent with both the experience and what the
11 regulatory requirements are that are explicitly called out
12 for offsite dose and control room operator dose. In my
13 mind, it's very clear in the NUREG. It talks about
14 operators and operator access to vital areas, and this is a
15 vital area if operator action is required.

16 It says thou shalt not exceed five rem total whole
17 body dose to the operators.

18 MR. PEDERSEN: That's the acceptance criteria for
19 shielding design review. You are applying it to something
20 that is not a shielding design. You are applying it to the
21 dose from an airborne source --

22 MR. LOCHBAUM: In 1984 NRC Region I, Mr. John
23 White, identified a problem with the location of a post-
24 accident sampling panel up on the refuel floor. PP&L agreed
25 to relocate that panel, based on the airborne dose terms

1 exceeded GDC 19.

2 NRC identified it and requested PP&L to move it
3 because it didn't meet GDC 19 due to -- I have to go back
4 and check -- I believe it's high airborne. They applied the
5 criteria of GDC 19 in that case. PP&L agreed that was the
6 proper criteria and relocated that panel subsequent to 1984.
7 I think the precedent has already been set.

8 MR. PREVATTE: It appears that you have made that
9 decision and set the precedent. If you go back now and say
10 that that's not required, that's different from what you
11 said before with this licensee and other licensees.

12 MR. EAPEN: I have a clarification question. Are
13 you all concerned that someone has to enter the reactor
14 building to fulfill that function, and you are saying that
15 the function ought to be limited to GDC 19; is that your
16 assumption? I just want to understand that.

17 MR. PREVATTE: Yes, that is our assumption.

18 MR. EAPEN: I just want to clarify that for
19 myself.

20 MR. PEDERSEN: What was that comment you
21 referenced by John White?

22 MR. LOCHBAUM: A filter on a panel relocated up on
23 the refueling floor, elevation 818. I forget where it was
24 relocated to.

25 MR. PREVATTE: You said that location was not

1 acceptable because it did not consider the airborne doses
2 that the operators would have to --

3 MR. PEDERSEN: I haven't seen that reference by
4 John White.

5 MR. PREVATTE: We have supplied copies of that to
6 the staff. If I may, there are some other points that I
7 would like to make if I may, on a different subject.

8 You have stated that you are going to, as I
9 understand it, going to give further consideration to the
10 equipment qualifications of the standby gas treatment
11 system, did I understand you correctly on that?

12 MR. SHEA: We would request the qualification in
13 the standby gas treatment system -- the conditions in there
14 versus the qualification of that equipment.

15 MR. PREVATTE: To my understanding there's to date
16 been no re-evaluation of the other equipment in the reactor
17 building due to rad exposure as a result of PP&L's procedure
18 changes to not operate reactor building HVAC recirc system.
19 That is, as a result of all of this PP&L has gone back and
20 changed their procedures to not operate the reactor building
21 recirc system which is a safety related system, by the way.
22 They have done that to cope with the conditions created by
23 the boiling spent fuel pool.

24 Now, that will also substantially increase the
25 airborne rad levels in the reactor building. With regard to

1 the equipment qualification there is a question still open
2 as to, is this equipment still qualified with these high rad
3 levels. Is that issue being currently addressed.

4 MR. SHEA: It is still on the table.

5 MR. PREVATTE: That one is not closed, as far as
6 you are concerned.

7 MR. SHEA: That's right.

8 MR. PREVATTE: We have seen PP&L's proposed design
9 for their new fuel pool instrumentation. We have questioned
10 several aspects of this, one being the range of
11 instrumentation. As I understand it, it only has a full
12 range of like 28 inches. If that be the case, it would not
13 cover fuel pool levels that would be of great concern as the
14 fuel pool level is going down, which would imply that the
15 operators would frequently have to go back and add -- if
16 they are going to do this in a batch method -- add water to
17 the fuel pool.

18 PP&L said they are going to batch the fuel pool.
19 If they only have a 28 inch range that means that depending
20 on what the boil off rate is, they may have to frequently
21 batch feed this thing and frequently monitor the level and
22 other things going on with that.

23 I would request that in your considering operator
24 exposure, that you consider the fact that this will not be
25 just one operator entering the reactor building to do this.

1 It will be multiple entries at a quite short frequency.

2 Also, with regard to that operator exposure, I
3 would suggest that you consider how much exposure is going
4 to be required. It appears an operator is going to get
5 totally burned out each time he makes a trip into the
6 reactor building under the most non-conservative of
7 assumptions, which would imply that pretty soon you are
8 going to run out of operators if you have to do it many
9 times.

10 I would request that in considering this rad
11 exposure question, a consideration be how many operators do
12 we have available to do this and are they qualified, et
13 cetera.

14 There is also the question of -- we have seen
15 since we turned in our Part 21 report, that there have been
16 numerous design changes made and proposed to the system. We
17 have seen that procedures have been changed, new analyses
18 have been done, new training has been done, et cetera.

19 PP&L has been maintaining all along that what they
20 had was okay to begin with. I would question, if it was
21 okay why was it necessary to do all of these things.

22 There is another question that I would like to
23 ask. That is, what about all the other plants that may have
24 similar designs; what is happening in that area?

25 MR. SHEA: Two things. We recently received a

1 response from the Owners Group to our request for what
2 activity they might be taking on this issue. We are going
3 to take that and explore it, what we need to do on a generic
4 basis. We recognize that it's important for us to figure
5 out if acceptable resolution is somehow determined for
6 Susquehanna, whether it's taking into consideration things
7 they have done or how they started out.

8 Assuming eventually successful resolution is
9 achieved, look at exactly what it required to get successful
10 resolution. Then, explore what we need to do with that. If
11 there are specific points that are critical to that
12 acceptance, then we will see what we need to do with those
13 for other plants. We believe we need to finish
14 substantially the Susquehanna review before we --

15 MR. PREVATTE: I have one other question. PP&L
16 has conceded in their review that even with their very non-
17 conservative analyses, that they have at least one core
18 spray pump that fails due to flooding, and that they have
19 several other pieces of equipment that are outside the
20 safety related equipment, that are outside the EQ limits,
21 they conceded that much.

22 There are numerous other places that we contend
23 that they have problems which they haven't conceded. They
24 have conceded to you that much. Now, as I understand the
25 regulatory requirements, no safety related equipment is

1 allowed to fail by design. Single failure says that if you
2 design everything the best you can and you maintain it the
3 best you can and you buy it the best you can in spite of all
4 your best efforts, if something fails we will say that we
5 will design it so that we can have one thing fail in spite
6 of all of our best efforts.

7 Single failure doesn't say we are allowed to have
8 something fail because it wasn't designed correctly. In
9 this case they have conceded to numerous pieces of safety
10 related equipment that failed as a result of not being
11 designed correctly. I would just like to know what is NRC's
12 position with respect to this.

13 MR. SHEA: The failure of the core spray pump
14 following flooding from the sump room?

15 MR. PREVATTE: Yes, that's one of the pieces of
16 equipment.

17 MR. SHEA: Rather than failure of various pieces
18 of equipment some days into the scenario based on the EQ
19 reanalysis. That's another source of EQ failures, right?

20 MR. PREVATTE: Right. They are all failures as a
21 mechanistic result of the LOCA. The LOCA starts and
22 mechanistically if you go through it and pull the thread all
23 the way, you see that these other things fail. They have
24 conceded that much.

25 Is the NRC saying that that's acceptable?

1 MR. SHEA: Considering from our perspective that
2 the event is beyond the licensing basis and we will take a
3 look at the performance of all of the systems, we would
4 acknowledge securing of the recirc system as a means for
5 condensation -- let me make sure I am saying this right.

6 MR. PREVATTE: Preventing condensation from going
7 to a lower elevation --

8 MR. SHEA: That was from the floor drains,
9 understood. We are evaluating the amount of condensation
10 and how quickly that floods up the sump room and on up to
11 the core spray room. I can't speak to if there was a
12 flooding that failed the core spray room, how would we find
13 that acceptable. If we consider it a compliance issue from
14 the standpoint of that it's beyond the licensing basis, I am
15 not sure whether there is or is not a way of accepting that.

16 MR. PREVATTE: So, that is still an open issue,
17 the failure of this equipment in the control room?

18 MR. SHEA: Yes.

19 MR. LOCHBAUM: Getting back to the licensing
20 issue. If I understand it, the design basis LOCA is within
21 the licensing basis. In fact, Susquehanna hasn't done an
22 analysis showing that their containment system can withstand
23 that. The effects of that analysis, it looks like it's a
24 direct failure of that licensing basis. They haven't shown
25 -- you have your design basis LOCA. According to their

1 design as reported in the FSAR, the spent fuel pool cooling
2 system is manually load shed.

3 MR. SHEA: I would agree with that.

4 MR. LOCHBAUM: GDC 4 says buildings designed --
5 buildings, structures and components important to safety
6 shall be designed for all environmental consequences of a
7 LOCA. That would apply to the reactor building.

8 MR. SHEA: Right.

9 MR. LOCHBAUM: Susquehanna does not have an
10 analysis showing that the reactor building, which is
11 designed to GDC 4, can withstand spent fuel pool heat up
12 without failure of safety related components.

13 MR. SHEA: I am not sure if you are making a
14 differentiation between heat up and boiling.

15 MR. PREVATTE: Not really. Heat up is just the
16 prelude to boiling. In fact, in heat up environmental
17 conditions are beyond what was originally analyzed. Boiling
18 is much more severe. Heat up, they are still beyond their
19 original design basis. The original design basis only took
20 credit for initially 125 degrees in a fuel pool. Even in
21 the case where they were approaching boiling they only
22 considered the heat at 212 degrees of fuel pool. They did
23 not consider the latent heat, which is overwhelmingly the
24 predominant factor.

25 MR. SHEA: I think we will be considering the

1 contribution of the spent fuel pool to the heat up in the EQ
2 analysis. As far as taking it to boiling, then it comes
3 back to -- we tried to see if the licensing basis could be
4 extended to cover boiling following LOCA and it can't be.

5 Boiling of the pool following LOCA is outside the
6 licensing basis.

7 MR. LOCHBAUM: What about loss of spent fuel pool
8 cooling following a LOCA, that event?

9 MR. SHEA: In the sense that the system shuts off?

10 MR. LOCHBAUM: Designed to.

11 MR. PREVATTE: Designed to. It's not a failure,
12 per se.

13 MR. LOCHBAUM: If it isn't designed to, they
14 manually do it. Either of those two events causes the
15 system to fail or not to operate.

16 MR. SHEA: To shut off, that's right. As far as
17 its restorability, can be it be restored to service, that's
18 something that we are looking at from the perspective of
19 being beyond the licensing basis. We are looking at, can it
20 be credited for being restored or being serviceable or on
21 what basis.

22 MR. LOCHBAUM: The actual loss of spent fuel pool
23 cooling following design basis LOCA is within the licensing
24 basis. I am not talking about boiling, I am saying the loss
25 of spent fuel pool cooling.

1 MR. SHEA: That's right. At some point the
2 question needs to be asked, is restoration of that cooling
3 LOOP following it or some means for forced cooling following
4 a LOCA part of the licensing basis or not. I would agree,
5 the system turns off following design basis LOCA.

6 What you are given credit for following that, is a
7 different question.

8 MR. PREVATTE: In order for boiling spent fuel
9 pool not to be within a licensing basis for a LOCA, the
10 restoration of fuel pool cooling would have to be within a
11 licensing basis. It's within the design basis to lose it.

12 MR. SHEA: Certainly, you are on the boundary of
13 that question, licensing basis and beyond licensing basis.
14 Restoration is going to be beyond the boundary of that
15 question. It's going to define --

16 MR. LOCHBAUM: Right. If it's not within a
17 licensing basis, that spent fuel pool boiling is within the
18 licensing basis.

19 MR. SHEA: If restoration is not, that's right.

20 MR. LOCHBAUM: If it is, then boiling is not
21 within the licensing basis. It has to be one or the other.

22 MR. SHEA: To the extent that the whole issue was
23 not considered previously, one would have to think that
24 restoration was somehow -- I can't say it was assumed
25 because it was not considered. I think that's an important

1 point.

2 I can't say it was assumed because it just wasn't
3 considered.

4 MR. LOCHBAUM: But, the regulations were designed
5 such that it should have been considered.

6 MR. SHEA: Perhaps. It should have been, versus
7 whether it was. I think that's the point we keep coming
8 back to. We are looking at the licensing basis question and
9 pushed the limit of, to what extent we could push the
10 interpretation of what is in the FSAR and SER. And, pushing
11 it to cover the LOCA to boiling scenario was something we
12 could not do.

13 MR. LOCHBAUM: The case earlier we talked about
14 the three backfit categories, the compliance versus the
15 other two. In the compliance case I thought it was the FSAR
16 said we had two "x" pumps and the SER said we had "x" pumps
17 and we found out we had "x" minus one, that's clearly a
18 compliance issue. We have to go out on the compliance
19 criteria and fix it. Or, do the analysis to show that "x"
20 minus one is okay.

21 MR. SHEA: Right.

22 MR. LOCHBAUM: I think in this case we have -- the
23 FSAR says we have adequate compliance with GDC 44. The SER
24 says we have adequate compliance with GDC 44. In actual
25 fact, we do not have adequate compliance with GDC 44. It's

1 a similar case.

2 MR. SHEA: I see it a little bit different. On
3 what basis was compliance with GDC 44 postulated. That's
4 the difference. When you are talking about "x" pumps and
5 "y" pumps, these are things you can put your eyes on. When
6 you are talking about if a statement is made by the licensee
7 or the staff that the station is in compliance, it has to be
8 on some basis.

9 You can't necessarily in this case -- one of the
10 things that is not in the basis is this LOCA boiling event.

11 MR. LOCHBAUM: Right. But what is in the
12 licensing basis is the report in the FSAR, the containment
13 analysis for secondary containment in the reactor building.
14 That's the one that looks at the heat loads for the
15 lightbulb and everything else.

16 MR. SHEA: Right.

17 MR. LOCHBAUM: It neglects the heat load from the
18 spent fuel pool. That analysis explicitly assumes that
19 there is restoration of the spent fuel pool cooling as part
20 of the licensing basis. Otherwise, you would have to --

21 MR. SHEA: I would have to look. You are probably
22 more familiar with that specific part of the FSAR as far as
23 what was assumed for the spent fuel pool. Is it not
24 mentioned, or is it --

25 MR. LOCHBAUM: The analysis assumes the spent fuel

1 pool remains at 125 degrees. There is no cooling provided
2 to the system to the pool.

3 MR. SHEA: I don't know on what basis that was
4 made. It would sound like --

5 MR. PREVATTE: The only basis for which that would
6 be valid is if you have restoration of fuel pool cooling.
7 Otherwise, it won't stay at 125 degrees.

8 MR. LOCHBAUM: I believe PP&L stated in numerous
9 submittals that that was the original licensing basis. They
10 had always assumed that they would restore fuel pool
11 cooling.

12 MR. HUBBARD: Let me be sure I understand what you
13 are saying. I think we are going to have to address that.
14 We, as the NRC at this point, have seen that we can't really
15 tie that you go from a LOCA to getting to the boiling spent
16 fuel pool --

17 MR. PREVATTE: Through the licensing basis.

18 MR. HUBBARD: Through the licensing basis. It's
19 still an issue that we have to deal with. I believe you are
20 saying that in the calculations in considering the heat
21 loads for secondary containment under a LOCA condition, that
22 PP&L assumed 125 degrees.

23 MR. PREVATTE: In their calculations they actually
24 assumed 212 degrees. They only assumed a sensible heat from
25 that, not the latent heat, which is five times what the rest

1 of the building combined is.

2 MR. HUBBARD: But they made some assumption,
3 correct or incorrect, that they did consider the heat load
4 of some type from the spent fuel pool. You have an issue
5 that they didn't consider the latent heat.

6 MR. PREVATTE: Not only did they not consider it,
7 they knew they hadn't considered it. It had been detected
8 and recognized on several occasions but they didn't do
9 anything with it.

10 MR. HUBBARD: Your other concern is that with the
11 load shed that would occur, is an appropriate heat load
12 considered in that. Forget that it goes to spent fuel pool
13 boiling. Just the fact that you load shed one hour into it
14 or --

15 MR. PREVATTE: The manual load shed is 24 hours,
16 if it's still --

17 MR. HUBBARD: Your concern is, did they consider
18 it an appropriate heat load, either from the standpoint of
19 the fact that GDC 44 says you shall consider all the heat
20 loads there.

21 MR. PREVATTE: Right.

22 MR. HUBBARD: You have this question on -- it
23 doesn't appear heat load, which you consider appropriate.

24 MR. PREVATTE: Right.

25 MR. HUBBARD: I think we are going to have to take

1 a look at that. They don't know whether we fine tuned it
2 down to that particular heat load.

3 MR. PREVATTE: In other words we see that by not
4 considering this, there are numerous regulatory requirements
5 that were violated. You are saying that one of those
6 requirements you don't consider to be a part of the
7 licensing basis. This is another one that is described in
8 the FSAR. If it's not a violation of one, what about these
9 others.

10 That has been one of the problems in this whole
11 issue is, it's been very difficult to focus on all of the
12 issues at the same time because they are all interconnected.
13 If you look at just any one of them by itself, everything
14 looks okay. You go to the next one and look at it all by
15 itself, it looks okay.

16 You have to look at how all these interact
17 together. That has been one of the problems that we have
18 had all along in trying to convey the concern is, when the
19 accident happens all of these things happen at the same
20 time. It's not like one thing happens and then it gets
21 finished and then another thing happens.

22 One of the frustrations that we have had all along
23 was getting people to concentrate on the Reg Guide 1.3.
24 Everybody is saying we meet the requirements of Reg Guide
25 1.3, but we never said anybody didn't. The fuel pool

1 cooling design met the requirements, except for the
2 instrumentation.

3 It's important, you have to look at the individual
4 pieces, but you also have to step back and say how does this
5 all fit into the big picture. That's the part that has been
6 difficult for everybody including ourselves to get our arms
7 around, because it is so exceedingly complex. That is
8 probably the reason -- I am sure -- why it hasn't been
9 totally and fully recognized by other people concerned.

10 The only reason Dave and I recognize it is because
11 we were focused on that for two years while we were looking
12 at this power uprate issue.

13 MR. KELLY: I think what you are pointing out here
14 is something that is always a potential when a utility does
15 an evaluation in a kind of a piece meal area. One person is
16 working on this and somebody else is working on another
17 problem over there, that the whole thing will not get
18 together.

19 MR. PREVATTE: Sometimes.

20 MR. KELLY: That is why it was important. The
21 Commission promulgated generic letter 8820, the IPE/IPEEE,
22 to ask utilities to come forward with basically PRA's and
23 all of the plans, to give you a systematic way of looking at
24 the problems. When we do our analysis it is not unusual, if
25 I am looking at the pressure in containment, I will take --

1 if I am in the Reactor Systems Branch I will take a low
2 pressure in containment because it gives me a larger flow of
3 water out of the primary system.

4 If I am in Containment Systems Branch I am going
5 to take a high pressure in containment, because that
6 maximizes my overall pressure when I start out. Different
7 people will look at things in different ways. There is a
8 possibility that you do not catch something. I think what
9 we have come upon now in the licensing basis is, we believe
10 that this -- here is how we came to our decision that it was
11 adequate at the time.

12 We may have missed something, and that's what we
13 are looking at now to determine what is the safety
14 significance of the concerns that you have brought up. We
15 have to parcel each one of these concerns that you bring up
16 and the question of, is it something that was the way -- it
17 was within the boundary of how we went about doing our
18 analysis back when the plant was licensed.

19 If it's outside of that boundary, now we are
20 looking at it as factor from the point of view of, is it a
21 confirmatory thing or something that we have to go back --
22 without consideration of cost -- now, we have to look to see
23 whether it's a significant risk associated with it or
24 something that can be improved. I don't know if that helps
25 you.

1 MR. LOCHBAUM: I only have one comment, on the
2 IPE. When we first discovered this problem we looked at the
3 PP&L IPE that was submitted in 1985. Specifically, we were
4 looking at the point of internal flooding, core damage
5 frequency from internal flooding. We had a concern that
6 over the 30 day period of an accident post-LOCA, to make up
7 to a boiling spent fuel pool you are pumping in two and one-
8 half million gallons of water, and it floods up the basement
9 to six or eight feet. We were concerned about what the
10 damage from that would be.

11 The IPE that PP&L submitted considered internal
12 flooding event from the spurious initiation of station up in
13 the reactor building at 749 elevation. There was no
14 discussion mentioned at all of the two and one-half million
15 gallons within our licensing basis that occurs from a
16 seismic event, or from what post-LOCA case can occur from a
17 boiling spent fuel pool after LOCA.

18 I don't think the IPE necessarily ensures that you
19 capture all these things like we identified in the 21
20 report.

21 MR. KELLY: You will find areas that traditionally
22 PRA's don't -- spent fuel pool cooling is normally an area
23 that we don't even consider because it's not associated --
24 normally, we don't consider it to be one associated with
25 leading to core damage.

1 MR. PREVATTE: You are absolutely right. In the
2 past there have been a number of areas that haven't been
3 considered that the NRC has subsequently recognized as being
4 important. A good example is instrument air. A long time
5 ago everybody built instrument air systems and nobody
6 thought anything about it, and they were all non-safety
7 related systems for the most part.

8 Recently the NRC has recognized that this non-
9 safety related system here can cause us big problems if it
10 is not working right. I would maintain that this system
11 here falls in the same type thing. We have fuel pool
12 cooling which was kind of a stepchild in the beginning of
13 these designs. It didn't have the glamor of the design of
14 the rest of the plant. It was just something we will take
15 care of and worry about it, and we are going to move this
16 fuel out to a new processing facility anyway so we don't
17 really need to worry too much about it.

18 In complying with the regulatory requirements at
19 the time people just didn't take the designs all the way to
20 a logical end.

21 MR. SHEA: That, right there, is the basis. They
22 weren't taken to their end, and that's the basis. That has
23 been brought up. We are maybe taking it to its end but
24 maybe outside the compliance arena, into the other arenas.

25 MR. PREVATTE: I am not saying I am agreeing, but

1 I don't understand where you are coming from.

2 MR. SHEA: I am confident that we are going to get
3 our arms around the safety issues here that are out there
4 for this issue. We think we are doing it in the correct
5 regulatory space. That's what the licensing basis decision
6 is about. Are there more questions?

7 MR. LOCHBAUM: The other thing I would like to
8 reiterate is, if that is indeed the licensing basis for
9 Susquehanna, that a LOCA doesn't result in a boiling spent
10 fuel pool, then PP&L's decision in 1988 to manual implement
11 the load shed is --

12 MR. SHEA: We realize that as a question. We need
13 to explore how they made that decision within the context of
14 where the licensing decision has fallen out.

15 MR. LOCHBAUM: Okay.

16 MR. EAPEN: I just want to clarify one statement.
17 You are saying that in the reactor building analysis both
18 the licensee and NRC in its SER is assuming that the spent
19 fuel pool will always be maintained at 125 degree F.

20 MR. PREVATTE: That's what the FSAR says.

21 MR. EAPEN: You don't see how that could be done
22 without having the cooling capability. I just want to get a
23 good picture in my head. Thank you.

24 MR. PREVATTE: I would like to make one more
25 comment, also. I understand that this is a very difficult

1 process for you. It's tough, because you have people
2 pulling you in every direction. You are trying to make a
3 fair assessment and are trying to look at what was, what
4 should be today, what should have been, all of those things.
5 I know it's very difficult.

6 We do appreciate your trying to look at this in a
7 fair way. I am sure you are. We are confident that you
8 will continue to look at this in a fair way, and we
9 appreciate that, too. I hope that you realize that we are
10 trying to do the same things. We see something here that
11 appeared to be wrong, appeared to be incorrect from the
12 design point of view, appeared to be incorrect from the
13 design basis point of view, appeared to be incorrect from a
14 licensing basis point of view, from our perception.

15 We looked it very thoroughly over a long period of
16 time, and we felt that we had no choice but to do what we
17 did. That's why we are all here. We thank you for your
18 continued addressing this concern.

19 MR. SHEA: From our part we appreciate that you
20 brought it up at all, and we appreciate your continued
21 thorough review of the stuff that we send out. The comments
22 that you send back definitely help us. We very much
23 appreciate those and the effort that you continue to put
24 into this.

25 We are aiming to achieve the right solution for

1 this problem. Charlie, do you have anything else?

2 MR. MILLER: If you look at a lot of the issues
3 that came out today, there is still a lot for us to evaluate
4 with regard to the concerns that you brought forth. One of
5 the things that we feel is important is, while we
6 potentially could get to some areas where there is a
7 fundamental disagreement, we want to make sure that you
8 fully understand why we are making decisions as we go along.

9 That's why we thought that this would be a good
10 point in the review process to sit down with you and explain
11 some of the decisions and how we proceeded with regard to
12 licensing basis versus non-licensing basis. It wouldn't
13 have been fair if that had all been saved to the end. As
14 you accurately stated, it's a complex, convoluted issue.

15 We will take everything that we have heard today
16 and keep that in our considerations as to where we come out
17 of it. There is still a lot of things that we are looking
18 into before we will be done with this. We will continue to
19 try to keep you abreast of where we are and how we are
20 going. I can assure you, we have devoted an extensive
21 amount of resources to this problem. It's something that
22 has not been in the forefront of the staff's mind for the
23 years, and it has caused us to go back and take a look at a
24 lot of things.

25 I think one of the things that we needed to do

1 after we were at this for a while was, take a step back and
2 try to look at the whole big picture. We have a tendency
3 sometimes to be focused on one narrow piece of it. One of
4 the things that we wanted to do was take a big step back, to
5 make sure that we weren't missing something in all of this.

6 MR. SHEA: Anybody else have any comments?

7 [No response.]

8 MR. SHEA: The meeting is closed. Thank you.

9 [Whereupon, at 3:57 p.m., the meeting concluded.]

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REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

NAME OF PROCEEDING: Meeting Between NRC & Mssrs. Lochbaum & Prevatte

DOCKET NUMBER:

PLACE OF PROCEEDING: Rockville, MD

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Maryann Estep
Official Reporter
Ann Riley & Associates, Ltd.

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**LOSS OF SPENT FUEL POOL COOLING
STAFF REVIEW STATUS**

**U. S. NUCLEAR REGULATORY COMMISSION
MARCH 14, 1994**

AGENDA

- **Introduction/ Review of Part 21 Report**
- **Review of Potential Safety Issues Raised
Subsequent to Licensing**
- **Susquehanna Spent Fuel Pool Cooling Licensing
Basis**
- **Status of Technical Issues**

10 CFR PART 21 NOTIFICATION - NOVEMBER 27, 1992

- **LOCA/LOOP results in loss of SFP cooling**
 - various failure mechanisms
- **LOCA source term prevents operator access**
 - inability to provide forced cooling
 - inability to provide makeup to pool
- **Fuel Pool Boils**
 - pool vapor transported throughout reactor building;
fails safety related equipment including ECCS and secondary
containment systems
- **Loss of LOCA mitigation; severe offsite
consequences**
- **LOCA/ Boiling Pool Scenario is within the Design
and Licensing basis**

REVIEW OF SAFETY ISSUES AFTER ISSUANCE OF OPERATING LICENSE



INITIAL LICENSING PROCESS

- **10 CFR Part 50**
 - Regulations to implement statutory missions of NRC
 - Requirements for application and issuance of operating license
 - General Design Criteria

- **STAFF REVIEW GUIDELINES**
 - Standard Review Plan, Regulatory Guides, Branch Positions
 - Review Against Requirements of GDC
 - Conclusions Documented in Safety Evaluation Report

- **ISSUANCE OF OPERATING LICENSE**
 - ACRS Review
 - Public Hearings
 - Commission Conclusion on No Undue Risk

IMPOSITION OF NEW REQUIREMENTS

- **Historic Examples**
 - **TMI Actions**
 - **Appendix R**

SEVERE ACCIDENT POLICY STATEMENT

- **Issued in 1985**
- **Definition of Severe Accident**
- **Statements on Existing Reactors**
- **Relationship Between Compliance and Adequate Protection**

BACKFIT PROCESS

- **10 CFR 50.109 and NUREG-1409**

- **Backfitting Definition**
 - **Modification of ... design approval**

 - **.. New or Different From Previously Applicable Staff Position**

- **SER as Applicable Staff Position**

- **Categories of Backfits**
 - **Compliance**

 - **Adequate Protection**

 - **Safety Enhancements**

ROLE OF THE LICENSING BASIS

- **Sources of the Licensing Basis**
 - Licensee Commitments (FSAR)
 - NRC Statements (SER)
 - Conflicts

- **Review of Issues Outside the Licensing Basis**
 - Adequate Protection
 - Application of Regulations in Determination of Safety
 - Analytical Tools Available
 - Safety Enhancements

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**SUSQUEHANNA SPENT FUEL POOL COOLING
LICENSING BASIS**



- **REGULATORY REQUIREMENTS**

- GDC 61

- GDC 63

- GDC 2

- **LICENSING REVIEW GUIDANCE**

- Regulatory Guide 1.13

- Regulatory Guide 1.29

- Regulatory Guide 1.52

- Standard Review Plan 9.1.3

- **REVIEW GUIDANCE DOES NOT ADDRESS LOCA/
BOILING SPENT FUEL POOL EVENTS**



LOCA/LOOP/BOILING SFP

- **LICENSING BASIS**
 - Licensee Commitments
 - Staff Positions

- **LICENSEE COMMITMENTS- FSAR**
 - FSAR 9.1.3
 - FSAR Appendix 9A

- **STAFF POSITION- SER**



SEISMIC EVENT/ BOILING SFP

- **LICENSING BASIS**
 - Licensee Commitments
 - Staff Positions

- **LICENSEE COMMITMENTS- FSAR**
 - FSAR 9.1.3
 - FSAR Appendix 9A

- **STAFF POSITION- SER**



STATUS OF TECHNICAL ISSUE REVIEW

REVIEW OF LOCA/LOOP BOILING POOL EVENT

- **Issue Is Beyond Licensing Basis of Facility**
- **Is Not Compliance Issue**
- **Proper Assessment Must Be Realistic**
 - **May Use Other Than Design Basis Assumptions**
 - **Use of Probabilistic Techniques**

- **Individual Issues Examined Include:**
 - **Hydrodynamic Loads**
 - **Procedures and Training**
 - **Operator Dose for ESW Makeup**
 - **SGTS Performance for LOCA/Single Boiling Pool**
 - **Capacity of RHR Assist Mode**

- **Scope of Probabilistic Assessment**

- **Task 1: Pool Boiling Event Frequency**

- **Task 2: Consequences of Pool Boiling**

- **Part 21 Issues Treated Probabilistically Include:**

- **LOOP Duration**

- **Environmental Failures of Non-Safety Equipment**