

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Plant License Renewal Subcommittee

Docket Number: (not applicable)

Location: Rockville, Maryland

PROCESS USING ADAMS
TEMPLATE: ACRS/ACNW-005

SUNSI REVIEW COMPLETE

Date: Wednesday, April 4, 2007

Work Order No.: NRC-1513

Pages 1-193

ORIGINAL

NEAL R. GROSS AND CO., INC.
Court Reporters and Transcribers
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

**ACRS OFFICE COPY
RETAIN FOR THE LIFE OF THE COMMITTEE**

TR04

DISCLAIMER

UNITED STATES NUCLEAR REGULATORY COMMISSION'S
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

April 4, 2007

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, taken on April 4, 2007, as reported herein, is a record of the discussions recorded at the meeting held on the above date.

This transcript has not been reviewed, corrected and edited and it may contain inaccuracies.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

+ + + + +

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

MEETING OF THE PLANT LICENSE RENEWAL SUBCOMMITTEE

+ + + + +

WEDNESDAY,

APRIL 4, 2007

The meeting was convened in Room T-2B3
of Two White Flint North, 11545 Rockville Pike,
Rockville, Maryland, at 10:30 a.m., Dr. Otto L.
Maynard, Chairman, presiding.

ACRS MEMBERS PRESENT:

OTTO L. MAYNARD Chairman

WILLIAM J. SHACK

THOMAS S. KRESS

GRAHAM B. WALLIS

J. SAM ARMIJO

SAID ABDEL-KHALIK

MARIO V. BONACA

1 NRC STAFF PRESENT:

2 JIM BARTON

3 MAITRI BANERJEE

4 PERRY BUCKBERG

5 GLENN MEYER

6 JIM DAVIS

7 CLIFF MARKS

8 NAEEM IQBAL

9 KEN CHANG

10 LOUISE LUND

11 RICHARD CONTE

12 DUC NGUYEN

13 CLIFF MARKS

14 GLENN MEYER

15 NAEEM IQBAL

16 KEN CHANG

17 MATTHEW MITCHELL

18 LAMBROSE LOIS

19

20

21

22

23

24

25

1 ALSO PRESENT:
2 ROBERT SMITH
3 STEVE BETHAY
4 BRIAN SULLIVAN
5 ALAN COX
6 BRYAN FORD
7 FRED MOGOLESKO
8 GARY DYCKMAN
9 BARRY GORDON
10 FRANZ-JOSEPH ULM
11 TIM GRIESBACH
12 RAY PACE
13
14
15
16
17
18
19
20
21
22
23
24
25

1
2
3
4
5
6
7
8
9
10
11
12

A-G-E-N-D-A

OPENING REMARKS 3

INTRODUCTION AND BACKGROUND 7

 Entergy

OPEN ITEMS 99

 Entergy

NRC STAFF PRESENTATION

 Scoping and Screening Results 137

 On site Inspection Results 144

 NRC Audit 158

 TLAA 169

SUBCOMMITTEE DISCUSSION 180

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

10:29 a.m.

1
2
3 CHAIRMAN MAYNARD: Good morning. This
4 meeting will now come to order.

5 This is a meeting of the Plant License
6 Renewal Subcommittee. I'm Otto Maynard, Chairman of
7 the Pilgrim Plant License Renewal Subcommittee.

8 ACRS members in attendance, we have Mario
9 Bonaca. Said Abdel-Khalik, Sam Armijo, Graham Wallis,
10 Bill Shack, Tom Kress and our consultant for this, Mr.
11 Barton. And Ms. Maitri Banerjee of the ACRS staff is
12 the Designated Federal Official for this meeting.

13 The purpose of this meeting is to review
14 the license renewal application for the Pilgrim
15 Nuclear Station, the draft Safety Evaluation Report
16 and associated documents with focus on the unresolved
17 items in the Staff's draft Safety Evaluation Report.
18 We will here presentations from the representatives of
19 the Office of Nuclear Reactor Regulations and the
20 applicant, Entergy Nuclear Operations.

21 The Subcommittee will gather information,
22 analyze relevant facts and formulate a proposed
23 position and action as it is appropriate for
24 deliberation at the full Committee.

25 The rules for participation in today's

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 meeting were announced as part of the notice of this
2 meeting previously published in the *Federal Register*
3 on March 23, 2007.

4 We have received no written comments or
5 requests for time to make oral statements from members
6 of the public regarding today's meeting.

7 We have provided telephone bridge
8 connections following requests from the members of the
9 public to listen in. And to avoid unnecessary
10 interruption and reduce the noise level, we request
11 that these telephone bridge lines be kept in mute.

12 A transcript of the meeting is being kept
13 and will be made available as stated in the *Federal*
14 *Register* notice. Therefore, we request that
15 participants in this meeting use a microphone located
16 throughout the meeting room when addressing the
17 Subcommittee. Participants should first identify
18 themselves and speak with sufficient clarity and
19 volume so that they can readily be heard.

20 We will now proceed with the meeting, and
21 I call upon the NRC Project Manager, Mr. Perry
22 Buckberg of the Office of Nuclear Reactor Regulation.

23 MR. BUCKBERG: Thank you. Good morning.

24 My name is Perry Buckberg, I'm the Project
25 Manager for the Staff review of the Pilgrim license

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 renewal.

2 Joining me is my Branch Chief Bob Shaft,
3 Deputy Division Director Louise Lund. From the Region
4 are Rich Conte and Glenn Meyer. Glenn Meyer is the
5 Inspection Team leader. Also joining me is Dr. Jim
6 Davis from NRR, who is the audit team leader. And the
7 technical reviewers are present as well.

8 We'll be presenting the results of the
9 Staff's review this afternoon. This morning, the
10 Pilgrim staff is going to present first. And let me
11 turn it over to Steve Bethay from Entergy.

12 CHAIRMAN MAYNARD: Good morning, Steve.
13 And before I turn it to you, I have looked through
14 your representation here. You've got a lot of slides,
15 a lot more than we can spend a lot of time on. I do
16 think you're hitting a number of the key issues,
17 especially towards the end there. I think some of the
18 information up in the beginning is important, but I
19 don't think you have to necessarily go over it line-
20 by-line. In fact, some of it I think you can put for
21 the record and see if there's any questions rather
22 than spend a lot of time going through that.

23 MR. BETHAY: Just on that point, my
24 intention wasn't to go through every picture and
25 drawing that we put in there. We put that in there for

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 background information. There are a handful that when
2 we'll get to that portion I would like to emphasize,
3 but any point if you're good, I can move on.

4 The first part I can go through fairly
5 quickly. With that, I'll turn it over to Bob Smith
6 for brief introductory remarks. He's our Plant
7 Manager.

8 MR. SMITH: Good morning, Mr. Chairman.
9 Thank you for having us here.

10 My name is Bob Smith. I'm the General
11 Manager of Plant Operations for the Pilgrim Station.
12 We're pleased to be here today and to represent
13 Pilgrim for license renewal to the Committee on
14 Reactor Safeguards.

15 Steve Bethay, to my right, is our Director
16 of Nuclear Assurance. He will be our main speaker
17 today in presenting for Pilgrim. Also with us today
18 are members of our engineering department. Brian
19 Sullivan, to Steve's right, he's the Director of
20 Engineering.

21 And other members as I introduce you in
22 the audience, if you'd just raise your hand. Tom
23 White, Manager of Design. Ray Pace, Supervisor Design
24 Mechanical and Civil. Gary Dyckman, Senior Staff
25 Engineer.

1 Members of our Project Team for License
2 Renewal. Fred Mogolesko is our Project Manager at
3 Pilgrim. He's up front. Gary Young, our Corporate
4 Project Manager. Alan Cox, who is also a Project
5 Manager representing corporate following closely with
6 the Pilgrim project. And Dave Locke, Project Manager.

7 For our Licensing Group, we have John
8 McCann, Director of Licensing for corporate. Bryan
9 Ford, Licensing Manager at Pilgrim, and Brian's up
10 front. Jay Thayer is our Vice President for Operations
11 and on loan to the Nuclear Energy Institute.

12 And we have several members in the
13 audience from our license renewal teams at James A.
14 Fitzpatrick and Vermont Yankee Station.

15 That concludes my introductions. And I'd
16 like to turn it over to Steve Bethay.

17 MR. BETHAY: Good morning.

18 CHAIRMAN MAYNARD: And again, Steve, I'm
19 sure we're going to ask questions that will require
20 somebody from the audience. Again, everyone out here,
21 if you are asked question please come to a microphone
22 and identify yourself for answering.

23 MR. BETHAY: Okay. Just a point of order.
24 In the past there's been a microphone stand, so they
25 just come to this table or up to the front here.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Okay.

2 CHAIRMAN MAYNARD: Yes.

3 MR. BETHAY: We'll get them to a
4 microphone.

5 CHAIRMAN MAYNARD: We'll get them to a
6 microphone, that's the main thing.

7 MR. BETHAY: We'll get to a microphone, if
8 need be.

9 CHAIRMAN MAYNARD: We may have one up here
10 by the time they're called upon.

11 MR. BETHAY: Okay. Terrific.

12 Well, i'll apologize in the beginning. I
13 have a terrible cold. If my voice starts to fade out,
14 I may have to stop for a sip of water.

15 My name is Steve Bethay, as Bob said. I'm
16 the Director of Nuclear Safety Assurance at Pilgrim,
17 and I'm the senior management sponsor for our license
18 renewal project at the plant. And I'll be serving as
19 the master of ceremonies today and directing questions
20 as appropriate to our team members.

21 I won't go over the list here.

22 MEMBER WALLIS: Slide one?

23 MR. BETHAY: Yes, sir.

24 MEMBER WALLIS: That big building is the
25 reactor building, right? The big cube is the reactor

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 building?

2 MR. BETHAY: Yes, sir. Just very briefly
3 a side orientation --

4 MEMBER WALLIS: Well --

5 MR. BETHAY: Cape Code Bay intake channel,
6 reactor building --

7 MEMBER WALLIS: Right.

8 MR. BETHAY: Turbine building.

9 MEMBER WALLIS: Now later on in the
10 pictures do you have pictures of ground water in this
11 presentation? But the lagoon intake seems to go right
12 up to the reactor building. So how does the ground
13 water compare with the sea water?

14 MR. BETHAY: We have a detailed discussion
15 on that.

16 MEMBER WALLIS: You're going to talk about
17 that later on?

18 MR. BETHAY: Yes, sir. Yes, sir.

19 MEMBER SHACK: Well, while you have the
20 picture here, where are the wells that you're taking
21 these water samples from located?

22 MR. BETHAY: There's one in this area.
23 There's one back here. As part of another effort
24 we're also installing three new wells back in this
25 area between the ocean and the building.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Dr. Wallis, I will get into the --

2 MEMBER WALLIS: It is striking how close
3 the sea water is, though.

4 MR. BETHAY: Yes. Guys, help me with the
5 perspective here. From the edge of the building to
6 the water, this is the diesel generator building, so
7 it shields a good bit of property back here.

8 MEMBER WALLIS: Is there a drop from there
9 to the water that we don't see?

10 MR. BETHAY: Yes. Nominal ground level is
11 23 feet between sea level.

12 MEMBER WALLIS: Ah.

13 MR. BETHAY: So ground level is about 23
14 feet above the mean tide level.

15 MEMBER WALLIS: Mean?

16 MR. BETHAY: It's probably 30 or 40 feet
17 from the reactor building to the ocean. Maybe more,
18 I'm estimating.

19 MEMBER WALLIS: All right.

20 MR. BETHAY: It's a good distance.

21 MR. FORD: This is Bryan Ford.

22 We also just completed a hydrology study
23 of the site. And it shows that the water flow is from
24 the land out towards the sea, not from the sea in
25 towards the land.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER WALLIS: Sort of has to be, doesn't
2 it?

3 MR. BETHAY: Okay. That's good news.

4 Moving on the agenda that I'd like to
5 cover this morning, is I'll talk very briefly about
6 the plant description and the current plant status.
7 I'll briefly hit some significant licensing highlights
8 for the plant. Our license renewal project, a brief
9 overview of that.

10 I think it's noteworthy to spend just a
11 minute on some of the cost beneficial SAMAs that we
12 identify here. I think that's a very unique and
13 interesting part of the whole license renewal process.

14 And then we'll spend the bulk of our time
15 discussing the four open items that were identified in
16 the report.

17 Pilgrim is located in Plymouth,
18 Massachusetts, right on the shores as you saw, of Cape
19 Cod Bay. We're about 40 miles south of the city of
20 Boston sited on 1600 acres of predominately woodland
21 that is managed as a forested area.

22 We are a BWR3 with a MARK 1 primary
23 containment structure. It's a General Electric NSSS
24 design and Bechtel was the original
25 architect/engineering constructor.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Our current license power level is 2028
2 megawatts thermal and we generate approximately 690
3 megawatts electric.

4 As you notice from the site overview, we
5 are an open cycle once through condenser cooling
6 plant.

7 The plant is owned and operated by the
8 Entergy Corporation, with headquarters in Jackson,
9 Mississippi.

10 And we currently have a staff of around
11 655 employees, including our security force.

12 Current plant status as of this morning,
13 the plant is operating at approximately 80 percent. We
14 are in an end-of-cycle coastdown that began in early
15 February. Our 16th refueling outage begins this
16 Friday, April 6th at midnight.

17 Currently all of our NRC performance
18 indicators and inspection findings are green and we're
19 in column 1 of the regulatory oversight matrix.

20 Just a few highlights of the licensing
21 history of the plant. Our construction permit was
22 issued in August of 1968. Following four years of
23 construction the operating license was issued in June
24 of 1972 with a full power license in September of that
25 year, and commercial operation in December of 1972.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 The plant was owned and operated by the
2 Boston Edison Company from that until 1999 when in
3 July of 1999 Entergy bought Pilgrim in the first sale
4 of a nuclear power plant in the United States. And we
5 transferred the license and assumed ownership and
6 possession in July of 1999.

7 We did the small Appendix K, a feedwater
8 flow measurement uncertainty power uprate in 2003.
9 We're currently not actively pursuing any additional
10 power uprates for Pilgrim at this time.

11 Our license renewal application was
12 submitted in January of last year in anticipation of
13 the current license expiration in June of 2012.

14 Just some of the significant modifications
15 and licensing actions that have occurred at Pilgrim
16 over the years. I'd like to touch on these, primarily
17 because looking back Pilgrim was the first or among
18 the first plants to institute many of these
19 modifications and improvements to the plant that in
20 today's life serve us well in anticipation of a period
21 of extended operation.

22 In 1977 we replaced the core spray piping
23 instead the primary containment with intergranular
24 stress corrosion cracking resistant material.

25 In the late '70s and early '80s, as all

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 BWRs with the Mark 1 containment did, we undertook the
2 Mark 1 containment modification program, which was a
3 series of structural enhancements to the primary
4 containment structure to address concerns with cool
5 swell and chugging and condensation loads in the torus
6 following an accident.

7 In 1984 we replaced the recirculation
8 system piping with intergranular stress corrosion
9 cracking resistant material.

10 In 1986 to 1989 it's noteworthy that
11 Pilgrim was among the first plants to implement some
12 pretty significant safety enhancements that became the
13 standards for the BWR industry. We implemented a salt
14 service water to residual heat removal cross type that
15 would allow us to actually pump the ocean into the
16 reactor if that was necessary in a severe accident.

17 We also implemented the direct torus vent
18 that allows us to have a harden vent path through the
19 primary containment for pressure control in an extreme
20 event.

21 And we also were among the first plants to
22 address the station blackout rule. We installed an
23 independent diesel generator that can provide full
24 power to one of our emergency buses in a complete loss
25 of AC power event.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 In 1991 we instituted hydrogen water
2 chemistry, again to address intergranular stress
3 corrosion cracking concerns.

4 In 1995 --

5 MEMBER SHACK: Just out of curiosity --

6 MR. BETHAY: Yes, sir.

7 MEMBER SHACK: What is your fraction of
8 time on the hydrogen water chemistry that your --

9 MR. BETHAY: We currently run about 95
10 percent availability. As I was going to mention in a
11 moment, this outage we're injecting the noble metal
12 chemistry addition, which will require us to increase
13 that to a 98 percent availability. So we've got a
14 number of system enhancements, procedural enhancements
15 underway to raise that availability from the 95
16 percent to the 98 percent, which is a great lead in.
17 What's not on the slide, as I mentioned, our 16th
18 refueling outage starts this Friday, this weekend. And
19 we're taking advantage of this outage. We consider it
20 our license renewal outage. We'll be doing a number
21 of modifications that will position the plant well for
22 an additional 20 years of operations.

23 Some of examples. The noble metal chemical
24 addition, which will allow us to reduce hydrogen usage
25 but increase the availability.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 We're replacing a reactor feedback motor.

2 We're replacing a condensate pump and
3 motor. We're replacing one of the reactor
4 recirculation system pumps and motors. And we'll be
5 doing a preemptive repair of our core shroud tie rods.

6 So a significant outage for us in terms of
7 positioning the plant for continued operation.

8 Just to briefly run through how we got to
9 today.

10 Our license renewal application was
11 prepared by a very experienced team of both corporate
12 and on site multi-disciplined folks. And most of that
13 team is present today should we have questions for
14 them.

15 Noteworthy that the Pilgrim and Vermont
16 Yankee applications were the first that were submitted
17 following issuance of Revision 1 of the Standard
18 Review Plan and the GALL. A lot of the work went into
19 the application in late 2005 to ensure that we were as
20 compliant as possible with Revision 1 of those
21 documents.

22 We have incorporated lessons learned from
23 our own in-house license renewal activities as well as
24 the lessons learned from others.

25 Our application underwent a peer review

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 conducted by ten utilities. We received many comments
2 from our peers that were incorporated into the
3 application.

4 Once the application was completed, it
5 underwent rigorous reviews by our own site safety
6 review committee, our off site safety review committee
7 and our Quality Assurance Department in addition to
8 the technical reviews.

9 MEMBER WALLIS: You mentioned Vermont
10 Yankee. Pilgrim is very much like Vermont Yankee?

11 MR. BETHAY: Very similar. Yes, sir. Very
12 similar.

13 MEMBER ARMIJO: Lower core power density,
14 though, right? You're at three and they're at four?

15 MR. BETHAY: I believe that's correct.
16 Yes, sir.

17 In our application, obviously, a number of
18 commitments were identified. We've refined those
19 commitments over the last year or so. We've developed
20 a number of aging management programs as a result of
21 the inspections and audits and our own evaluations.
22 All of those commitments are being tracked in our
23 tracking process. And at the end of the day we're
24 looking at 40 aging management programs to support
25 operation in the period of extended operation.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Fourteen of those programs currently exist and will
2 continue forward without significant changes. Sixteen
3 programs currently exist but will require enhancement
4 for an additional 20 years of operation. And there
5 are ten new programs that were identified during the
6 evaluations.

7 Next I'd like to move on, not necessarily
8 as directly part of the Safety Evaluation Report, but
9 in the environmental report side of the licensure
10 world, we spend a significant amount of time and
11 energy evaluating severe accident and mitigation
12 alternatives. That review led us to conclude that
13 there were seven potentially cross beneficial SAMAs
14 that we should consider implementing.

15 As you look down that list, you'll see
16 most of these are procedure changes. And it seemed to
17 us that if could improve safety, if we could reduce
18 core damage frequency and large early release
19 fraction, then why not? So these seven SAMAs, none of
20 them are age related, they're not directly related to
21 an aging management issue at the plant, however I
22 think it's important to point out to you that when
23 we've identified something that can enhance safety,
24 can enhance the core damage frequency, that we should
25 seriously consider that.

1 MEMBER WALLIS: This portable power
2 source, is that mounted on a truck or something or is
3 it --

4 MR. BETHAY: It would be a skid. A skid
5 mounting.

6 MEMBER WALLIS: On a skin? So someone has
7 to hitch something up and slide it around?

8 MR. BETHAY: Right. Actually, these SAMAs
9 work very well with a number of the post-9/11 security
10 changes that are going on. Obviously, I can't get into
11 the details of that. But these SAMAs marry very well
12 with the need for firefighting and so forth and
13 restoring power to things that may have been
14 significantly damaged in some event. So they work very
15 well hand-in-hand. and I think we were somewhat
16 fortunate that both evolutions were going on at the
17 same time.

18 MR. BARTON: Can you explain what the use
19 of diesel fire pump fuel transfer pump is all about?

20 MR. BETHAY: Fred or --

21 MR. MOGOLESKO: Yes, I'll try.

22 That SAMA 57 -- I'm Fred Mogolesko. I
23 should have said that first.

24 Basically we're trying to eliminate
25 failures of the direct torus vent valves. There are

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 two of them. Due to the failure of a DC power
2 supplies. And by eliminating that, we enhance the
3 core damage frequency by eliminating at --

4 MR. BETHAY: I think you're in the wrong
5 one, Fred.

6 MR. BARTON: Use of diesel fire pump
7 transfer pump.

8 MR. FORD: This is Bryan Ford.

9 What that is is it's an allowing another
10 pump that we have to pump fuel oil. We use this pump
11 for our firefighting, our fire pumps. It's allowing
12 that pump to supply fuel oil to our diesel generators.

13 MR. BARTON:

14 MR. FORD: For certain failures in the
15 diesel generator fuel system.

16 MEMBER WALLIS: So what I understand is
17 when you fight fire with water and you're going to
18 pump diesel oil through --

19 MR. FORD: No. We have a diesel driven
20 fire pump. And we will be --

21 MEMBER WALLIS: Oh, it's diesel driven?

22 MR. FORD: Yes. We will be using the
23 systems for supplying that fire pump. It's basically
24 doing some procedure changes so that we can use it to
25 feed fuel oil to the emergency diesel generators and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 supply electrical power to the plant.

2 MEMBER WALLIS: Oh, it's a different pump
3 but the same drive, is that it, or something?

4 MR. FORD: No. It's just a different pump
5 to supply fuel oil to the emergency diesel generators.

6 MR. SULLIVAN: It's a hydro pump driven
7 off the water discharge of the fire pump, which runs
8 the fuel pump.

9 MEMBER WALLIS: So it's a fuel transfer
10 pump that supplies fuel oil to the diesel fire pump?

11 MR. FORD: Yes, that's correct.

12 MR. BETHAY: Using it to supply oil to the
13 emergency diesel generators.

14 MEMBER WALLIS: Not water.

15 MR. BETHAY: So all of these SAMAs have
16 been included in our engineering request review
17 process for detailed evaluation and possible
18 implementation.

19 CHAIRMAN MAYNARD: And on the first two,
20 the wiring was already set up to do it? You only had
21 to change procedures to be able to cross tie the buses
22 there?

23 MR. BETHAY: That's correct.

24 Okay. As I said, we would get to that
25 front part fairly quickly. And we'll get to the meat

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 of the matter here to discuss the SER open items.

2 In the SER four open items were
3 identified. The first dealt with our security diesel
4 generator. The second with fire barrier penetration
5 seals. The third with our containment inservice
6 inspection program. And the fourth with the reactor
7 vessel neutron fluence calculations.

8 Now this is the part where if I get into
9 too much detail or too many pictures, please just stop
10 and say I've heard enough, and I'll move on.

11 The first issue dealt with the security
12 diesel generator. And this was a Region I confirmatory
13 item where the NRR Staff asked the Regional Inspectors
14 go out and confirm basically what we had said in our
15 application. Part of the initial request for that was
16 that we didn't include drawings because of the
17 security nature of this. So it required a little more
18 leg work on the part of the Region to go out and
19 verify that that what was in scope was correctly
20 included and that there were no spatial interactions
21 that we had failed to address and so forth.

22 It's our understanding that that regional
23 inspection has been completed and that issues were
24 identified. And that with the requested support, it's
25 been provided and pending NRR review that that issue

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 has been addressed.

2 MEMBER BONACA: So the security diesel
3 components are --

4 MR. BETHAY: Are all within scope.

5 MEMBER BONACA: Within scope?

6 MR. BETHAY: Yes, sir.

7 MEMBER BONACA: Good.

8 CHAIRMAN MAYNARD: Now the Staff's going
9 to have an opportunity to discuss their view on the
10 open items. If something is said here that you
11 disagree with, you can speak up, too.

12 MR. BUCKBERG: Thank you.

13 CHAIRMAN MAYNARD: Okay.

14 MR. BETHAY: The second open item dealt
15 with fire barrier penetration seals --

16 MEMBER BONACA: Let me just get back to
17 the issue. I understand it is a security related
18 issue, but is the guidance now adequate for the
19 licensees that go to license renewal?

20 MR. BETHAY: Yes, sir. It's adequate in
21 terms of what mechanical components should be
22 included, what electrical components should be
23 included. I think the fundamental issue, and the Staff
24 may need to comment on this well, was because we
25 didn't provide the drawings for an off site review,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 that required some extra leg work on site by an
2 inspection.

3 MEMBER BONACA: My question wasn't
4 relating to your closure. It was relating to the items
5 -- I mean it's not necessarily in GALL on what
6 components should be, and so that's what I was trying
7 to understand.

8 MR. BETHAY: Alan, is there anything to
9 add to the --

10 MR. COX: Yes. This is Alan Cox with the
11 license renewal team.

12 The guidance was fine as far as what
13 should be included in scope. We had included the right
14 components in scope.

15 MEMBER BONACA: I know. I understand.

16 MR. COX: The reason was just that --
17 review of actual drawings into the configuration to make
18 sure that we had identified those correctly.

19 MR. BETHAY: Okay. The second open item
20 that was identified expressed a concern on aging
21 management of inaccessible fire barrier penetration
22 seals. And the short answer to this is that all of
23 our seals are included in the program. All of our
24 seals are accessible and are included --

25 MEMBER WALLIS: So there are no

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 inaccessible seals?

2 MR. BETHAY: That's correct, sir.

3 MEMBER WALLIS: Oh, okay.

4 MR. BETHAY: There are no inaccessible
5 seals.

6 MEMBER WALLIS: Well, I was wondering when
7 you put this up how you inspected inaccessible seals.

8 MR. BETHAY: That's a very fair question.
9 And, you know, the fact is that we don't have any
10 inaccessible fire barrier penetration seals. So a
11 little communication problem that has been resolved.
12 And, again, we believe that that's pending Staff
13 concurrence. We believe that issue is resolved as
14 well.

15 Okay. With that, I'd like to take the
16 opportunity to shuffle a couple of folks here at the
17 table and bring up some of our containment people to
18 support me in the next portion of this presentation,
19 if that's okay.

20 CHAIRMAN MAYNARD: Sure.

21 MR. BETHAY: Okay. With that I'd like to
22 ask Gary Dyckman, Barry Gordon and Franz Ulm to please
23 join us.

24 As they're coming up, I'll introduce them.
25 Gary Dyckman is our Senior Design Engineer in

1 Mechanical Civil Branch. He's been a design engineer
2 in the civil structural world for a long time.

3 Next to him is Professor Franz Ulm. He's
4 a Professor at the Massachusetts Institute of
5 Technology in the Civil Engineering Department, who we
6 brought in as a consultant to advise us on one aspect
7 of this portion.

8 And at the end is Barry Gordon from
9 Structural Integrity Associates, again, to help us
10 answer questions when we get to the item dealing with
11 the water on the torus room floor later in this part
12 of the presentation.

13 So, thank you guys for joining me.

14 The third open item was stated as there is
15 potential for corrosion in the inaccessible area of
16 the steel containment shell, the base mat and the sand
17 pocket region. And it also delineated three inspection
18 observations that I'll address in this presentation.

19 1: The status of the rupture drain flow
20 switch.

21 2: Documentation of surveillance
22 documentation.

23 3: And the third item on which I'll spend
24 the most time is questions that were raised regarding
25 water on the torus room floor.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER WALLIS: Well in this inaccessible
2 area, how do you know what's there? How do you know
3 if it's wet?

4 MR. BETHAY: In the inaccessible area?
5 Hopefully, I will explain that to you over the next
6 few slides. I've got --

7 MEMBER WALLIS: You can look at where the
8 water gets in, but how do you know if it's already
9 there? You're going to explain that?

10 MR. BETHAY: I believe so. That's my
11 objective is to answer that very question over the
12 next five or six slides.

13 First of all, I'd like to start off by
14 saying that the saying that the design for Pilgrim is
15 a little different from maybe some others that you've
16 seen. And I will go through that design.

17 The design minimizes the potential for
18 undetected water intrusion into the air gap. We have
19 a number of diverse methods of prevention and
20 identification of potential water leakage.

21 MEMBER WALLIS: Well, minimizes, you mean
22 it reduces? Minimize is a technical term meaning that
23 you make as small as possible with constraints and
24 as--

25 MR. BETHAY: Meaning that we've made

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 that--

2 MEMBER WALLIS: It is lesser than it as
3 some other plants?

4 MR. BETHAY: We've made it lesser and we
5 believe that we have extremely high probability of
6 detecting any leakage before it were to become a
7 concern. And, hopefully, I can show you through the
8 design how we've come to that conclusion.

9 We have a number of diverse methods of
10 preventing water and for identifying water should
11 there be any. We've had no indication of refueling
12 bellows leakage. Inspection have shown no water
13 intrusion in the air gap, and I will explain that to
14 you. We've seen no indication of drywell corrosion or
15 degradation. And we have performed confirmatory
16 ultrasonic inspections in the past and we will
17 continue those in the future.

18 MEMBER WALLIS: Do you have some material
19 in the dry well air gap? Some other plants have some
20 material. in the gap.

21 MR. BETHAY: We don't have the foam sheets
22 that some plants have had that.

23 MEMBER WALLIS: You don't have that? You
24 don't have that?

25 MR. BETHAY: Correct. There were foam

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 sheets installed, and I'll show you some photographs.
2 There were some sheets installed, but that were
3 removed during the construction process.

4 MEMBER ARMIJO: Just a quick question.

5 MR. BETHAY: Yes, sir.

6 MEMBER ARMIJO: Your comment on no water
7 intrusion into the gap, does that comment apply to the
8 entire history of the operation of the plant?

9 MR. BETHAY: Yes, sir.

10 MEMBER ARMIJO: So you have enough, let's
11 say, documentation or records that would give you
12 assurance that that's a sound statement?

13 MR. BETHAY: Yes, sir. Yes, sir. I
14 believe so. And I think when I talk about some of the
15 design features, kind of to state it simplistically,
16 we'll know for sure Monday morning when we reflood the
17 cavity, that if it's not leaking then it hasn't leaked
18 before. So I'll explain that in a moment.

19 This picture is a little hard to see.
20 Hopefully it's clear in your handout.

21 This is a diagram of the primary
22 containment structure. A typical Mark 1 containment
23 with the drywell and torus with the concrete liner on
24 the outside. This is the torus room, which will be the
25 subject of the next part of the discussion.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 What I'll be going through in detail is
2 this drain and the alarm, this set of drains and
3 inspections, this above sand pocket drain, it's item
4 number 3, and a below sand pocket drain. So just to
5 kind of put it in perspective of the areas elevation
6 wise that I'll go through in the next several slides.

7 MEMBER ARMIJO: Just quickly, that upper
8 sand cushion drain, how many are there?

9 MR. BETHAY: There are four, and I'll
10 discuss that in just a moment.

11 And just to jump ahead a little bit, I
12 personally went and look at all of this Monday
13 afternoon.

14 MEMBER WALLIS: A four-inch drain, you
15 must have expected a lot of water.

16 MR. BETHAY: It does seem like a big pipe,
17 doesn't it?

18 The first one I'd like to talk about is
19 the very first design feature that exists at Pilgrim
20 to prevent water from entering the air gap. And I'll
21 start at the refueling cavity liner plate.

22 The refueling cavity liner plate is
23 attached to the concrete. This area would be flooded
24 during refueling operations.

25 The most noteworthy feature is the bellows

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 plate itself. This is the refueling bellows. This
2 plate is welded to the liner. It's not a mechanical
3 joint that some plants have. So this welded seal
4 between the liner plates and their support structures
5 is the first barrier to water getting into the air
6 gap.

7 MEMBER WALLIS: That's a stainless steel
8 bellows, is it, or what is it?

9 MR. BETHAY: I believe it is stainless
10 steel. I don't know the grade of metal.

11 But if water should somehow get through
12 this welded connection or through the liner plate, the
13 first line of defense is a four-inch by two-inch call
14 it a gutter, trough that runs all the way around the
15 containment structure. At the bottom of that four-
16 inch trough --

17 MEMBER BONACA: Before you go any
18 further--

19 MR. BETHAY: Yes, sir.

20 MEMBER BONACA: Have you experienced any
21 reactor cavity liner cracks?

22 MR. BETHAY: No, sir. But even if there
23 were, the water would come down this way into this
24 area below the bellows, into the four-inch by two-inch
25 trough or gutter that fully sounds the primary

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 containment and be collected in one three-inch line
2 passed by a flow switch, which is annunciated in the
3 the main control room.

4 The set point on this flow switch is
5 fairly high. So it is intended to detect gross
6 leakage that might be coming off of that line.
7 Obviously, leakage below the set point would be
8 collected and just drained off.

9 There was an issue raised in the
10 inspection report about this switch. It was
11 identified in late 2005 as failing surveillance. It
12 was replaced following that surveillance and
13 recelebrated. It's been recently recelebrated. It is
14 functional in anticipation of the refueling outage, as
15 I mentioned, that belongs this weekend where if we do
16 have a significant failure here, then we know that
17 this flow switch and control room alarm are
18 functional.

19 MEMBER SHACK: But that's the only
20 monitoring then of that drain is through the flow
21 switch?

22 MR. BETHAY: That's the only monitoring of
23 this drain. As I'll get to, there are other drains
24 that are monitored.

25 MR. BARTON: How do we know that drain is

1 not plugged?

2 MR. BETHAY: We do a surveillance on it
3 every operating cycle to verify that there's flow and
4 that the flow switch is functional. And that's what
5 was identified in late 2005 that the flow switch
6 failed a surveillance.

7 MEMBER WALLIS: Is this one pipe or
8 several pipes?

9 MR. BETHAY: This is one.

10 MEMBER WALLIS: Just one?

11 MR. BETHAY: This is one three-inch pipe
12 off of the four-inch by two-inch trough that runs
13 around.

14 MEMBER ARMIJO: What's the set point of
15 the switch?

16 MR. BETHAY: I believe six gallons per
17 minute. So it's looking for gross failure of the
18 bellows.

19 MEMBER ARMIJO: And there is just one
20 drain at that location with a flow switch?

21 MR. BETHAY: That's correct.

22 MEMBER ARMIJO: There's nothing else
23 around the circumference.

24 MR. BETHAY: Not on this trough.

25 MEMBER ARMIJO: Correct. Okay. Got it.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. BETHAY: Okay. The next level of
2 defense if we presume that --

3 MR. SMITH: And when we're flooded up if
4 there was any type of a leakage by there, you would
5 see air bubbles up on the refueling floor if there was
6 leakage through there, too. So that's another place to
7 check.

8 MR. BETHAY: But even if we presume that
9 there's been some failure that has allowed either
10 behind the liner plates or through the bellows itself
11 or through this welded joint or this welded joint such
12 that water was collecting in this area and this line
13 were either plugged or nonfunctional for whatever
14 reason, the next line of defense is provided by a
15 drain collection system in four locations around the
16 periphery of the containment where two-inch reactor
17 cavity drain -- this would not only be full of water
18 in refueling. To drain this cavity there are four
19 two-inch drain lines located around the primary
20 containment. Each of those drain lines is encased in
21 an eight-inch sleeve. At the bottom of that sleeve of
22 each of the four is a three-quarter inch drain line
23 that drains to a floor drain on the 72 foot elevation
24 of the reactor building.

25 They're visible. Three of them drain to

1 an actual floor drain, but you can see the end of the
2 pipe. One of them just runs out on the floor. It's
3 not hard piped or directed directly into a floor
4 drain.

5 It's also noteworthy our design provides
6 for a four inch berm at the edge of the concrete from
7 before the air gap. This is the air gap between the
8 concrete and the line and the containment. So the
9 volume is a four-inch high all the way around the
10 primary containment that would be capable of holding
11 whatever leakage came from this area.

12 IF it didn't go out this train, we would
13 detect coming out these three quarter inch telltale
14 drains. Those are part of operator rounds. They're
15 surveilled once a shift. This was a question on
16 documentation during the inspection on how well was
17 that documentation or how well was that surveillance
18 captured in the documentation when we looked to see
19 that there's no water coming out of those pipes. As
20 a result of that feedback, we have enhanced that
21 procedure to make that more clear and a more
22 definitive statement than kind of a statement of the
23 negative that was in the procedure.

24 MEMBER WALLIS: Well, I guess that this
25 works fine if the leak is of a drip. But if it's a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 jet, if you have a sort of hole with a spray coming
2 out of there or a jet, it could conceivably in the
3 worst possible situation aim for the air gap. I mean
4 this is an extreme case. Your vision of a leak is
5 just sort of a rain falling down rather than a jet?

6 MR. BETHAY: Well, I think the design that
7 if it were a raining falling down, I don't know --

8 MEMBER WALLIS: The rain would be all
9 right. IT would fall into that area. But a jet could
10 go anywhere.

11 MR. BETHAY: Right. I don't know the
12 dimension. If someone maybe could check that. Yes,
13 this is several inches wide. And it's got to
14 accommodate an eight-inch sleeve, it's got to
15 accommodate a four-inch --

16 MEMBER WALLIS: You would be a very
17 unusual kind of a leak.

18 MR. BETHAY: Right. But even presuming
19 that, and I think the next line of design defense
20 would help that.

21 So let's assume the water does overcome
22 this drain somehow, water does overcome these four
23 three quarter inch drains such that this entire volume
24 all the way around the cavity fills up and spills over
25 into the air gap, which is this space. Water then,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 you could hypothesize would run down the air gap to
2 this is the 9 foot 2 elevation, the bottom, the floor
3 of the primary containment structure. And it would be
4 collected by four four-inch drain lines that sit just
5 above an 18 gauge sheet metal plate and drain above
6 the sand pocket region into collection containers that
7 are on the torus room floor.

8 And as I started to mention a moment ago,
9 Monday, this past Monday I personally went and
10 verified that all of those catch containments are
11 clean and dry and there's been no evidence of water
12 leakage in there.

13 MEMBER SHACK: How is that four-inch berm
14 plate sealed up at the top?

15 MR. BETHAY: It's welded.

16 MEMBER SHACK: It's welded?

17 MR. BETHAY: Yes.

18 And just as another point of interest,
19 just back in the '80s when the concern was raised
20 about corrosion of the primary containment structure,
21 Pilgrim went into these four-inch drain lines and
22 drilled holes in the elbows and did visual inspection
23 to verify, first, that those lines were clear and
24 unobstructed, and second to do a kind of brief visual
25 inspection of the liner that they could see at the end

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 of that. And the results of those inspections showed
2 that the containment structure was in its original as
3 constructed condition with no indication of corrosion
4 or degradation of the liner.

5 MEMBER ARMIJO: Were any photographs taken
6 of those particular --

7 MR. BETHAY: Unfortunately,, no, sir. We
8 had hoped that there was a video or some photography,
9 but we couldn't find any record of that photography.
10 Just written word.

11 MR. SULLIVAN: We do have a record of the
12 inspection results that document putting a fluoroscope
13 up with no evidence of any debris, of any water or any
14 further material for rust.

15 MEMBER ARMIJO: There wasn't massive
16 amounts of rust or anything like that?

17 MR. SULLIVAN: No, sir. No, sir. No, sir.

18 MR. BETHAY: But if this drain didn't work
19 for whatever reason and water made it into the sand
20 pocket region, there are four bottom of sand pocket
21 drains that would provide the final barrier of
22 defense.

23 MEMBER WALLIS: Now in the previous on
24 page 16 these are shown are inclined drains?

25 MR. BETHAY: Yes, sir.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER WALLIS: And are they inclined or
2 are they horizontal?

3 MR. BETHAY: They're inclined like this.
4 I don't know the exact degree.

5 MEMBER WALLIS: The other one, the one
6 above was horizontal, wasn't it?

7 MR. SULLIVAN: Right.

8 MR. BETHAY: Yes, there's a slight slope
9 to both of them and if you physically go and look and
10 it, you can physically can see that there's a --

11 MEMBER WALLIS: So the sketch on page 16
12 is a little misleading about the angle of the --

13 MR. SULLIVAN: The sketch isn't to scale.
14 I have actual construction drawings that I we can show
15 you at a break or put into the record.

16 MR. BETHAY: We've brought most of the
17 engineering details of this presentation if you need
18 that. These tried to just put it in perspective for
19 you.

20 So in the past as a result of industry
21 concerns about potential degradation of the
22 containment shell, we have performed some limited
23 ultrasonic inspections. We have UT'ed 12 locations at
24 the 9 foot 2 elevation, which is the floor of the
25 inside of the primary containment.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 We have chipped the concrete out an inch
2 down into the sand bed region at four location,
3 performed ultrasonic inspection in those locations, as
4 well as six locations in the cylindrical upper portion
5 of the containment structure. All of those showed
6 nominal wall thickness and no indication of corrosion
7 or degradation of the steel.

8 MEMBER ARMIJO: When were those UT
9 inspections done?

10 MR. BETHAY: Brian?

11 MR. SULLIVAN: The UT inspections were
12 informed in 1987.

13 MEMBER ARMIJO: All of them at 1987, the
14 9"2', 9"1" and the upper locations; all of them were
15 done in 1987?

16 MR. SULLIVAN: No. Let me run through the
17 date line. In 1987 we inspected the 9"2" elevation.
18 In 1999 we inspected four location at one inch
19 elevation. And in 1999 and again in 2001 we inspected
20 upper elevations of the drywell.

21 MEMBER ARMIJO: Okay. Good.

22 MR. BETHAY: Again, we verified that the
23 upper sand cushion drains were clear and unobstructed
24 and dry. And as I mentioned, as recently as Monday
25 afternoon I personally looked at them and they're

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 clear and dry.

2 All of the inspections and UT evaluations
3 have identified no corrosion. But in the future we do
4 plan to do the 9"2' elevation locations again; once
5 prior to the period of extended operation. And we've
6 committed to do it again within the first ten years of
7 extended operation, along with the routine
8 surveillance of the drain lines that we do.

9 We've also committed to perform ultrasonic
10 testing at the four 9"1' elevations, once prior to the
11 period of operation and again within the first ten
12 years of extended operation. And then we'll continue
13 to do the upper elevations as part of the primary
14 containment out of the inspection program.

15 MEMBER ARMIJO: Now you still have the
16 sand in this sand cushion region?

17 MR. BETHAY: Yes, sir. Yes, we do.

18 MEMBER ARMIJO: So it's so still there?

19 MR. BETHAY: It's still there. That's
20 correct.

21 MEMBER BONACA: You said at the beginning
22 that the flow switch in the control room activates at
23 8 gpm. And a question I have for that system, I think
24 is a three-inch pipe, I guess it can -- going much
25 more than 6 gpm, right?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. BETHAY: I'm not sure what the maximum
2 flow rate under just --

3 MEMBER BONACA: Certainly you have
4 established what kind of leakage you would have to
5 have in order to then have to rely on the other drain?

6 MR. BETHAY: I think just without doing a
7 calculation in my head, I think you would have to have
8 a pretty substantial leak --

9 MEMBER BONACA: Oh, a substantial leak?

10 MR. BETHAY: -- to not be handled by that.

11 MEMBER BONACA: Because there are four
12 drain pipes, right?

13 MR. BETHAY: There's only one of those.

14 MEMBER BONACA: Only one, and that's the
15 three-inch pipe?

16 MEMBER BONACA: Yes, sir.

17 CHAIRMAN MAYNARD: The gutter.

18 MR. BETHAY: That's correct. There's one
19 three-inch drain off a gutter.

20 MEMBER BONACA: One three-inch drain.
21 Okay.

22 CHAIRMAN MAYNARD: But you have four
23 others that if that overflows --

24 MEMBER BONACA: Well, yes. I'm trying to
25 understand --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIRMAN MAYNARD: It'll go into some
2 others.

3 MR. BETHAY: Yes, sir.

4 MEMBER BONACA: -- how much leakage you
5 need to have to rely on the other four.

6 MEMBER WALLIS: It's not the pipe that's
7 limiting. It's the gutter. I mean, if the leak is on
8 the other side, it has to run all around the gutter.
9 That's probably the limiting.

10 MR. BETHAY: Yes. So I don't know off the
11 top of my head that diameter of the gutter. So
12 perhaps one of your guys could do a quick calc to pick
13 up that volume, and then we can talk. We can come back
14 to that. I don't know that volume off the top of my
15 head.

16 MEMBER BONACA: Now just to understand
17 again the substantial leak.

18 MR. BETHAY: It would be a substantial
19 leak, yes sir.

20 MEMBER BONACA: Yes. Yes.

21 Okay. The next item that I'd like to move
22 to is an item that was identified or came to question
23 -- I shouldn't say identified. But it was a question
24 that was raised during the inspection. And it raised
25 as a question relative to the previous discussion on

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 the fact that there's water in some areas, some
2 limited areas on the primary containment floor. And
3 the question was raised are you sure that this water
4 isn't coming from the air gap drains. We are sure
5 that the water is not coming from the air gap drains.
6 We are sure that the water is ground water that's
7 coming in. We're sure that that's posing no adverse
8 effect to embedded steel or to the structural
9 integrity of the building.

10 And what I'd like to do for the next
11 several slides with the help of my team here is walk
12 through that.

13 Again, this is the part where I got a lot
14 of pictures and drawings. If it's too much, just stop
15 and we'll move on. We do have hyperlinks so we can
16 slip around.

17 The water, as I just said, we have
18 identified the source of the water. Historically we
19 know that it's ground water. I can talk about that.

20 We are quite confident that the water has
21 no effect on the integrity of the concrete or embedded
22 steel or anchor bolts in the floor.

23 We are confident in the overall structural
24 adequacy of the reactor building.

25 And we have committed to continue to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 monitor that water, the concrete, and the bolts
2 pending any repairs that we need to make. And I'll
3 discuss that a little more.

4 CHAIRMAN MAYNARD: And you're going to go
5 ahead and defends your statements here, your
6 conclusions?

7 MR. BETHAY: Yes, sir.

8 Well, I may have to call on some of my
9 cohorts.

10 CHAIRMAN MAYNARD: I understand that. I
11 understand.

12 MR. BETHAY: As I mentioned, this became
13 a question in the regional inspection, but the
14 indications of water on the floor is not a new
15 phenomenon. There have been indications of water on
16 the torus room floor for a number of years. It's been
17 evaluated by engineering several times --

18 MEMBER SHACK: Indications? I mean, is
19 there any indications that the flow is increasing, is
20 it constant, the same water -- the same areas have
21 been wet --

22 MR. BETHAY: Yes, sir. Yes, sir. And I'll
23 show you pictures. I think I can nail that for you.

24 So it's been evaluated many times. Most
25 recently by Dr. Ulm from MIT, who we brought in this

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 year to --

2 MEMBER WALLIS: Well, this water on the
3 floor, does it saturate the air in that area?

4 MR. BETHAY: No, sir. The water on the
5 floor just -- and let me go ahead and click to -- I'm
6 going to show you the worst picture. This is the
7 worst picture of the 16 torus bays.

8 MR. BARTON: Is your radiation something
9 related to the water on the floor or to the activity
10 in the torus.

11 MR. BETHAY: It's related to the activity
12 on the torus.

13 The general dose rates in here are 5 to 10
14 per hour.

15 MR. BARTON: Okay.

16 MR. BETHAY: What you see is this water on
17 the floor, you know we believe is emanating from
18 around some of these base plates. This structure, and
19 I'll show you in some other pictures, is the Mark 1
20 containment modification phase II torus saddle that
21 was installed. There are 16 of these around the
22 plant, each held down by eight rock bolts. They were
23 installed to hold the torus down in the event of a
24 complete blowdown to prevent pool swell, chugging
25 loads from the torus lifting up.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 What we've seen historically is water on
2 the floor around one or more of these base plates.
3 I'll show you some other pictures. Now --

4 MEMBER WALLIS: Now the water comes in and
5 evaporates?

6 MR. BETHAY: It evaporates. When I was
7 down there Monday afternoon, this water is not of a
8 measurable depth. It's wet, so it's not like three or
9 four inches of water. You know, to use a home
10 analogy, it's kind of like what you'd see after a
11 heavy rain maybe in your basement where you get some
12 seepage, the floor gets wet, but it's never a pumpable
13 and mechanically removable depth.

14 MEMBER WALLIS: Presumably the front goes
15 back as the weather changes and the humidity changes
16 and so on.

17 MR. BETHAY: IT flows in and evaporates.

18 MEMBER ARMIJO: Is that white material is
19 salts from evaporation or something else?

20 MR. BETHAY: This? The perspective in
21 this picture is a little hard to tell. This is
22 painted out here. There is no indication -- this is
23 the outside of the torus. The pedestal is under here.
24 So we're standing on the outside of the circumference
25 looking under.

1 MEMBER WALLIS: Okay. What's the white
2 stuff then? It's not sea salt or something?

3 MR. BETHAY: It's not sea salt. There are
4 calcium deposits that -- and we'll show some other
5 pictures where you'll see --

6 MEMBER WALLIS: It comes out of the
7 concrete?

8 MR. BETHAY: --some deposits on the
9 concrete.

10 MEMBER WALLIS: Okay.

11 MR. BETHAY: But this the worst picture.
12 And if you'll let me go along, I'll get to some with
13 a little clear contrast.

14 MEMBER ARMIJO: I still want to know what
15 that white material is. Is that a deposit --

16 MR. BETHAY: Yes, sir. This is --

17 MEMBER ARMIJO: -- or something that's
18 leached out of the concrete or --

19 MR. BETHAY: This is material that has
20 leached out of the concrete. And then I've got the
21 chemical composition. We'll talk about that in a
22 moment.

23 I just want to set this to kind of set the
24 stage to show that you of the 16 bay areas of the
25 torus, this is the worst one. So anything else that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 I show you is less significant than what you see in
2 this picture in terms of what it looks like.

3 So what we've concluded is that the source
4 of the water is ground water. It seeps in under
5 hydraulic pressure. And I'll talk a little bit about
6 that as I show where the water table is relative to
7 the plant.

8 IT's a very low seepage rate and it's
9 counteracted by evaporation.

10 MEMBER WALLIS: This is because you have
11 ventilation in there, do you?

12 MR. BETHAY: I think it's partly there's
13 ventilation. It's a warm area and it's not that much
14 water. And it just comes in and evaporates.

15 MEMBER WALLIS: You're monitoring the
16 humidity in there, the relative humidity, the tendency
17 to condense in other words, are you monitoring it?

18 MR. BETHAY: It does condense. Even with
19 this issue aside, if you were to go into this plant or
20 I venture most plants on a humid day in the
21 summertime, you'll see condensation in the torus room.
22 The torus is cold.

23 MEMBER WALLIS: Right.

24 MR. BETHAY: Relatively. It's not uncommon
25 at all at this plant or any other to see condensation

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 on the torus shell.

2 MEMBER BONACA: Is seepage occurring in
3 every bay?

4 MR. BETHAY: No, sir. And I'll show you. I
5 have a diagram that shows where it occurs and where it
6 doesn't historically.

7 MEMBER ARMIJO: So does that mean there is
8 some damage in some parts of the waterproof membrane?

9 MR. BETHAY: I'll get to that exact point
10 in just a second. The short answer is yes.

11 MEMBER ARMIJO: One last. Is there a
12 drain in that bay, bay 10? Is that one of the
13 locations where you have --

14 MR. BETHAY: Where there's a drain?

15 MEMBER ARMIJO: Yes.

16 MR. BETHAY: No, sir.

17 MEMBER ARMIJO: Okay. There's no drain?

18 MR. BETHAY: There's no drain in bay 10.

19 MR. COX: Are you talking a drain --

20 MEMBER ARMIJO: Drains on the air gap?

21 MR. BETHAY: Oh, no, no, no, no.

22 MR. COX: He's talking about the air gap.

23 MR. BETHAY: The air gap drain. I have to
24 look at the diagram. I don't remember the numbers.

25 MR. GORDON: The answer is no. The answer

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 is no.

2 MR. BETHAY: Okay. Thank you, Barry.

3 MEMBER ARMIJO: Is the hydraulic pressure
4 high enough to allow water to seep through the entire
5 22 foot 8 inch thick concrete pedestal?

6 MR. BETHAY: Well, if I can get to that,
7 I think we can answer that question and then Dr. Ulm
8 has a very scientific answer for that. Just one more
9 second and I'll answer that very question.

10 I wanted to give you kind of the answer
11 conclusions and then we'll go back and build some
12 history and answer both of your questions.

13 We have determined that the water is not
14 aggressive. It's a benign chemistry to both the
15 concrete and any embedded steel.

16 We've seen no structure distress in the
17 structures. No cracking on the floor beyond hairline,
18 normal surface cracks that you might see in concrete.
19 No evidence of spalling. No evidence of building
20 settlement or differential settlements between the
21 buildings.

22 And also as it'll become evident in our
23 discussion later, that the grout around these anchor
24 bolts around which we see water, there's been
25 questions raised whether that grout serves any

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 structural purpose. And it does not. It's there for
2 -- you know , just a bolt.

3 MEMBER SHACK: How does the anchor bolt an
4 anchor?

5 MR. BETHAY: How does it anchor?

6 MEMBER SHACK: Yes.

7 MR. BETHAY: It's a typical Williams lock
8 bolt anchor.

9 Yes, Gary, you want to describe how that
10 works?

11 MR. DYCKMAN: Yes. The Williams Rock Bolt
12 Anchor has a cone and shell. It's a mechanical
13 expansion anchor essentially. So it's drilled -- yes,
14 it's drilled, the holes are drilled 2 inch diameter
15 around 2 to 2½ deep and the bolt is inserted in the
16 hole and then a torquing process or tensioning process
17 is used to draw the cone up within the shell.

18 MEMBER ARMIJO: Now that doesn't penetrate
19 your membrane, your waterproofing?

20 MR. DYCKMAN: That does not. No. The
21 concrete mat is eight foot thick and these tie down
22 bolts were in the range of 2 to 2½ feet deep.

23 MEMBER SHACK: So it is expanding, again--
24 which fraction of that hole? The lower six inches?

25 MR. DYCKMAN: The lower six inches, yes.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 The coning shell are approximately six inches in
2 height.

3 MR. BETHAY: Okay. The current status is
4 that the water has been reanalyzed recently. It's
5 been reanalyzed and it's been analyzed a number of
6 times over the years. But recently we --

7 MEMBER WALLIS: Could you go back to the
8 picture with the white stuff? Now on the left hand
9 picture there there's a rust line or red line behind
10 the anchor bolts on the white. What is that?

11 MR. BETHAY: Yes, sir. That's surface
12 corrosion from this base plate. Because this floor was
13 not flat originally. You know, it has a concave
14 structure to collect water. These were an
15 afterthought in the late '70s, early '90s. This was
16 a grout pad that was poured to level the floor over
17 what was concave. And these structures were set on
18 top of that.

19 So you'll evidence -- in some areas, this
20 is -- it looks worse than it is person. This is fairly
21 minor surface corrosion --

22 MEMBER WALLIS: That's corrosion of this
23 thing which was put it to support the torus?

24 MR. BETHAY: That's correct. Of this base
25 plate that runs all the way across.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER WALLIS: So that it's wide sitting
2 on the white part there.

3 MR. BETHAY: This is just a painted --

4 MEMBER WALLIS: That's just paint?

5 MR. BETHAY: This is just paint. Yes, sir.

6 MEMBER WALLIS: Okay. So obviously
7 there's a separation there between the base plate and
8 something else?

9 MR. BETHAY: That's correct.

10 MEMBER WALLIS: Okay.

11 MR. BETHAY: Now what I'd like to do is
12 you have several questions about the base mat, you'd
13 asked how it was built. I'd like to run through these
14 because I think it's instructed to kind of see how we
15 ended up today and how we started out. And if this
16 gets too much, just stop me.

17 When the plant was originally built, the
18 site was excavated to a depth of about 50 feet. And
19 because the water table was around 24 feet below
20 normal grade level, a dewatering system was installed
21 to help in the construction of the site.

22 MEMBER WALLIS: And where is sea level
23 there?

24 MR. BETHAY: Sea level, this is nominal 23
25 foot elevation. So sea level is the --

1 MEMBER WALLIS: Sea level is above the
2 water table.

3 MR. BETHAY: It would be on average,
4 they're about the same at this point. As your point
5 earlier, it's very close to the ocean. So there --

6 MEMBER WALLIS: So the water table is
7 about the same as mean sea level?

8 MR. BETHAY: Approximately.

9 MEMBER WALLIS: So there much inducement
10 for flow to be towards the sea, is there?

11 MR. BETHAY: Well, we've done pretty
12 detailed hydrological studies that clearly show, while
13 it's not a rapid flow, the flow is clearly towards the
14 sea.

15 CHAIRMAN MAYNARD: And that close you
16 wouldn't expect a big difference of elevation.

17 MR. BETHAY: You wouldn't expect a huge
18 difference. That's correct.

19 So the dewatering system was installed in
20 order to facilitate the --

21 MEMBER WALLIS: Now is this rock or is
22 this sand?

23 MR. BETHAY: Gary?

24 MR. DYCKMAN: At the bottom of the
25 excavation there's approximately 60 feet of a granular

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 material before you get to the top of bedrock.

2 MR. BETHAY: I believe it's been described
3 as granular glacial till.

4 MEMBER WALLIS: So this is part of the
5 huge glacier that made the Cap?

6 MR. DYCKMAN: Yes. Yes.

7 MEMBER WALLIS: So it is porous?

8 MR. DYCKMAN: Quite porous, yes.

9 MR. BETHAY: And there you can see in the
10 1968 time frame where the site had been excavated in
11 preparation for the placement of the base mat.

12 And then a three inch work slab was poured
13 just to provide a nice level surface on which to work
14 and the water system was still in place.

15 We have construction pictures showing that
16 the work slab being laid.

17 Then the waterproof membrane was laid down
18 on top of that. That was intended to provide the vapor
19 barrier below the base mat and up the sides.

20 MEMBER WALLIS: What's it made of?

21 MR. BETHAY: Gary, can you help be again?

22 MR. DYCKMAN: There were three different
23 materials that were specified, and I'm not sure which
24 one was used. But there was a neoprene, and a butile
25 rubber material. It was in the original

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 specifications.

2 MEMBER WALLIS: So what supports it on the
3 side there? It doesn't seem to have any meaningful
4 support.

5 MR. BETHAY: This is just a cartoon. This
6 just shows --

7 MEMBER WALLIS: It doesn't have any means
8 of support ont he side.

9 MR. BETHAY: No, this is just a cartoon.

10 MEMBER WALLIS: Okay. So there is some
11 granular rocky material it's resting on or something
12 on the side?

13 MR. DYCKMAN: This is just a cartoon.

14 MR. BETHAY: It's just a cartoon. This
15 isn't actual --

16 MEMBER WALLIS: Presumably what's in that
17 white triangle is glacial till?

18 MR. BETHAY: This is air. No, sir. this is
19 air.

20 MEMBER WALLIS: Air? It's just standing
21 there in air? It can't do that.

22 MR. BETHAY: This line -- Gary, help me
23 here.

24 MR. DYCKMAN: Well, again, it's a cartoon.
25 And once the concrete map, they had put the concrete

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 map and it's placed and the vertical walls begin to be
2 constructed, that material is brought up and bonded to
3 the side of the concrete and then backfilled against
4 the -- held in place with backfill.

5 MR. BETHAY: And I think that shows on the
6 next picture you'll be able to see it.

7 MEMBER WALLIS: It doesn't get damaged
8 where it's kinked from the edge of the slab there?

9 MR. DYCKMAN: WE suspect it probably did,
10 and that's why we have water intrusion.

11 MR. BETHAY: And you can see where they've
12 laid the portion of it. This is the membrane lying on
13 the work slab before they begin replacing the rebar to
14 fill the basin.

15 MEMBER WALLIS: They build a drain or
16 something there, too.

17 MR. BETHAY: Then they poured the 8 foot
18 thick base slab and the 14 foot pedestal in the
19 middle.

20 And this construction picture is important
21 because it shows us how the basement was actually
22 constructed.

23 This is the outer portion of the torus
24 room base mat, the reactor building base mat. You can
25 see that it was poured in four sections. Here are the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 construction joints. And there's another one over
2 here.

3 These four corner areas were poured first
4 and then the large octagonal center core was poured
5 the last. And that, we believe is a significant
6 design factor or construction factor that led to small
7 pathways for water intrusion.

8 MEMBER WALLIS: See, none of this do we
9 see the waterproof liner.

10 MR. BETHAY: Just in the previous
11 construction photo you could see it lying on the
12 floor.

13 MEMBER WALLIS: Okay. Where is it there?

14 MR. BETHAY: Slide 34.

15 MEMBER WALLIS: Is it a cartoon or is a
16 real thing.

17 MR. BETHAY: Slide 34.

18 CHAIRMAN MAYNARD: No, no. It's a real
19 picture.

20 MEMBER WALLIS: So that's a mat that --

21 MR. BETHAY: That's the waterproof
22 membrane.

23 MEMBER WALLIS: That looks like a tarp
24 laid out on the ground?

25 MR. BETHAY: That's correct, yes.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER WALLIS: Now doesn't this concrete
2 settle?

3 MR. BETHAY: Yes, sir.

4 MEMBER WALLIS: This kind of foundation?

5 MR. BETHAY: Gary?

6 MR. DYCKMAN: No. The material, the
7 foundation matter is grainy material and it will
8 settle elastically in response to load. And at the
9 determination or completion of loading, it's basically
10 stable and there's no time dependent settlement that
11 I'm aware of.

12 MEMBER WALLIS: But it does settle when
13 you load it?

14 MR. DYCKMAN: Yes, it does and the
15 elasticity --

16 MEMBER WALLIS: So there is some motion?

17 MR. DYCKMAN: Yes, sir.

18 MEMBER WALLIS: So you could tire the
19 liner, presumably? Then it gets through eight feet of
20 concrete even if it gets through the liner? The
21 water?

22 MR. BETHAY: Right.

23 Just as another point of reference, this
24 is a side view of the base mat rebar as it was being
25 installed. You can see point of reference. This is

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 a six foot stepladder that's inside the rebar mat.
2 This was then filled with concrete in the four
3 sections that I showed before.

4 Then, as Gary mentioned, the walls were
5 built on the side and this membrane is folded up
6 rolled up the sides.

7 The primary containment structure
8 construction began. This is an interesting -- you
9 know about half way through the construction of the
10 primary containment and the torus you can see the
11 torus under construction here with the vent header
12 inside. This is the primary containment, a drywell.
13 This guy standing on the ladder, he's standing on the
14 sand pocket region that we talked about before.

15 This is the floor. This is good for
16 perspective on the size of the room. This is the
17 floor on which we see the water. And this is the
18 center mat that was poured as the pedestal for the
19 primary containment structure.

20 MEMBER WALLIS: IS that snow there?

21 MR. BETHAY: I think it's just glare.

22 MEMBER WALLIS: Just glare. Okay.

23 MR. BETHAY: Now this guy doesn't have a
24 coat on, so it's not -- I don't think it's snow.

25 And then the construction continued. They

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 continued to build the containment. You can tell here
2 that when we say bays, it's these segments of the
3 torus where it's welded together. That's what when we
4 talk about bay, that's what we're talking about.

5 The room itself is octagonal in shape,
6 essentially close to a circular room.

7 You can also -- it's interesting how they
8 haven't actually placed the concrete coming up around
9 the containment structure. It's an interesting note.
10 This is looking towards the ocean.

11 Containment continued to be placed. The
12 dewatering system was secured. And they began the
13 cylindrical construction on the primary containment
14 structure.

15 Finished completion of the reactor
16 building and the water table then returned to its
17 preconstruction level and the level that we believe it
18 is today based on our hydrological studies. This
19 level is at 23 feet main sea level. A nominal water
20 table is around minus one. It's pretty much the same
21 as sea level, very close on average. and then the
22 bottom of the reactor building is another 25 feet
23 below that.

24 So the bottom of the reactor building sits
25 under a fairly constant static head of about 25 feet

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 of water.

2 The water on the floor that we're talking
3 about is this floor. The bottom of the reactor
4 building floor.

5 MEMBER WALLIS: IS it on the land side or
6 the sea side?

7 MR. BETHAY: If you'll look at the next
8 drawing, sir, I'll show you. This is a plan view of
9 the torus room and the construction sequence. The
10 dotted lines represent the various construction
11 concrete placements, being the four corner placements
12 that were done that form the base mat, the eight foot
13 base mat. The center section, octagonal section that
14 forms the containment pedestal.

15 In this picture north is up and to the
16 ocean. So in this drawing the ocean is to the top or
17 in line with bay 10.

18 Each of the dots that you see in this
19 picture represent one of the bolts that's holding down
20 a torus saddle.

21 Where you see a red dot is indicative of
22 an area that is currently or has shown some evidence
23 in the past of having been wetted.

24 The green dots indicate bolts that we have
25 not seen evidence of being wetted.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 So you see the predominately the bays of
2 concern as bay 10 and bay 6 are the most significant.

3 MEMBER ABDEL-KHALIK: So the red dots
4 coincide with the location of the bolts?

5 MR. BETHAY: Yes, sir.

6 MEMBER ARMIJO: So is it possible that
7 during tightening of these Williams Anchor Bolts that
8 you may have fractured the concrete at the bottom of
9 the bolt?

10 MR. BETHAY: We don't think that's the
11 case. And in just a minute I'll probably ask Dr. Ulm
12 to add some perspective on that. He's done some work
13 that I believe has a better answer than we fractured
14 the concrete. So let me just show you a couple of
15 pictures again for perspective.

16 If you go to bay 2, this is the southern
17 bay of the containment. And I think in your
18 presentation the bay numbers are the top of the
19 sheets.

20 Again, you're looking at -- this is the --
21 we're looking from the outer radius of the torus
22 underneath the torus. You see one saddle structure on
23 this side and the saddle structure on this side.

24 MEMBER ARMIJO: Are those the bolts that
25 you're talking about?

1 MR. BETHAY: Yes, sir. These are the rock
2 bolt anchors that were drilled down into the concrete
3 approximately three feet. These 2 to 2½ inch diameter
4 bolts were then dropped into the holes. Tensioned
5 against this jacking plate, set into place. The holes
6 were then regouted and this load bearing assembly was
7 constructed.

8 MEMBER ARMIJO: Okay.

9 MR. BETHAY: There are four of these on
10 each side of each saddle.

11 This one, obviously, is in pretty good
12 shape. You don't see any indication of stain. This
13 line here is a paint line where they painted the
14 floor. But these bolts look very good on the other
15 side as well, however it doesn't show up well.

16 MEMBER WALLIS: These things that support
17 the torus, are they reenforced concrete or are they
18 steel?

19 MR. BETHAY: They're not supporting the
20 torus, sir. They're actually holding it down.

21 MEMBER WALLIS: They've gone over the top
22 of it?

23 MR. BETHAY: No, sir. This is the torus.

24 MEMBER WALLIS: Yes.

25 MR. BETHAY: The huge doughnut These

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 support structures -- got to bay 9, Ed.

2 MEMBER WALLIS: They go around. How do
3 they hold it down?

4 MR. BETHAY: I'll show you. Let's go to
5 bay 9. This is a slide.

6 You see this is the torus.

7 MEMBER WALLIS: All right.

8 MR. BETHAY: This is the original torus
9 support. This is a pillar, there's one on each side.

10 In the phase one of the Mark 1 containment
11 modifications this support structure was modified to
12 provide not support capability but hold down
13 capability.

14 MEMBER WALLIS: How does it hold down?

15 MR. BETHAY: How does it hold down or why?

16 MEMBER WALLIS: It pulls on it. It must
17 pull on it. How does it pull on it?

18 MR. BETHAY: This is welded to the torus.
19 This is bolted to the floor. And from a hold down
20 perspective, originally --

21 MEMBER WALLIS: It could hold it down or
22 up? I mean, it's just holding it.

23 MEMBER WALLIS: Right. Correct.

24 MEMBER WALLIS: It's not any tension.

25 MR. BETHAY: But this is the modification,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 this saddle --

2 MEMBER WALLIS: Yes, but it doesn't hold
3 it down.

4 MR. BETHAY: -- it's welded to the torus.
5 And its purpose is not support, but restraint.

6 MEMBER WALLIS: So it's the welding in,
7 it's welded?

8 MR. BETHAY: Yes. Yes, sir. It's welded
9 here and it's bolted to the floor.

10 MEMBER WALLIS: Well, it could support it
11 up or down.

12 MR. BETHAY: I guess it actually does, but
13 it's designed --

14 MEMBER WALLIS: It stops it bouncing?

15 MR. BETHAY: Exactly. Exactly. Okay.
16 Move back.

17 MEMBER ARMIJO: Before you leave, that's
18 a good spot.

19 Where are your drain lines from the supper
20 sand bed region? Where do they come out on the --

21 MR. BETHAY: You've got the exact
22 location?

23 MR. DYCKMAN: Yes, we do. They're in bays
24 12 -- I'm sorry. Bay 11, bay 15 --

25 MEMBER ARMIJO: Eleven?11,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. DYCKMAN: Eleven, 15, bay 17 and bay

2 3.

3 MR. BETHAY: So they're here, here and
4 here.

5 MEMBER ARMIJO: I wish there wasn't one at
6 a 11.

7 MR. BETHAY: Go to bay 11, let's look at
8 that.

9 MEMBER ARMIJO: So that's close to your--

10 MR. BETHAY: That's bay 11.

11 MEMBER ARMIJO: The argument I'm getting
12 at is how can you conclude the water doesn't come from
13 that drain collection area which is closer, you know
14 pretty near by the bay 10?

15 MR. BETHAY: That's true. This is bay 11.
16 The catch containment, again we're looking at the
17 outside of the torus. That catch container is behind -
18 - it's at the end of the structure.

19 MEMBER ARMIJO: Yes.

20 MR. BETHAY: And the pipe comes down from
21 above into a collection container. And we surveill
22 that collection container, and it's always dry. So if
23 this were water from there, it would be coming from
24 that pocket.

25 MR. BARTON: Well, the chemistry would be

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 different, too, wouldn't it?

2 MR. BETHAY: And the chemistry would be
3 different, yes.

4 MEMBER ARMIJO: You know, I think it's
5 just -- it may be just coincidental, but if you look
6 at that picture you could argue that the water is
7 coming from that inside corner there and coming out
8 ont he floor and wetting --

9 MR. BETHAY: I think that's what raised the
10 question to begin with.

11 MEMBER ARMIJO: Yes.

12 MR. BETHAY: And so we've gone in and
13 verified that those drains are not the source of the
14 water.

15 MEMBER ARMIJO: Okay. So you have an
16 independent way of proving that that water came from
17 the ground water?

18 MR. BETHAY: That's correct. By
19 chemistry, as was mentioned, and by visual inspection.

20 MR. COX: One other point.

21 This is Alan Cox.

22 If you go back to the slide that Steve
23 showed that showed the bays. You'll notice the
24 construction joints are also shown on there. And I
25 think it's interesting to note that the places where

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 you had the most red dots are associated with those
2 joints between the plates.

3 MEMBER ARMIJO: Yes.

4 MEMBER WALLIS: But the water on the floor
5 is on the inside, isn't it? It's not on the outer
6 periphery.

7 CHAIRMAN MAYNARD: It's on the inside.

8 MR. BETHAY: Go to --

9 MEMBER WALLIS: But it's on the inside.
10 My impression is the picture we see is the water is on
11 the inside of the --

12 MR. BETHAY: This is bay 6 now. This is
13 not currently wet.

14 MEMBER WALLIS: No. But when you show
15 water on the floor in a wet bay, the water is on the
16 inside of the torus.

17 DR. ULM: If I can help, Steve.

18 MEMBER WALLIS: It's not on the outer
19 wall.

20 MR. BETHAY: Yes.

21 MEMBER WALLIS: It's on the inside.

22 MR. BETHAY: No, it's on the inside.
23 That's correct.

24 MEMBER WALLIS: So if it were seeping from
25 the outer wall near -- you would expect to see it on

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 the outside, wouldn't you?

2 MR. BETHAY: Yes. The floor is concave,
3 so--

4 MEMBER WALLIS: Why do you see it in the
5 middle? I mean it's got to get there somehow.

6 MR. BETHAY: Right. And we believe --

7 MEMBER WALLIS: It comes up the bolts and
8 drains. Is that your theory, is that it comes up the
9 bolts.

10 MR. BETHAY: Yes, the theory is it comes
11 up the bolts.

12 Franz, maybe you could perspective here.

13 DR. ULM: I think first of all, the first
14 question you have to ask is where does the water come
15 from and how does it come from. So there are
16 discontinuities there, it's clear.

17 The first question which was waste maybe,
18 can it be due to the old older constantly seeping back
19 through soil from under this high hydraulic rate. And
20 if you make the calculations, you end up with a water
21 fill per day of 7 micrometer. So it cannot be the
22 water which you observe. And that directly evaporates
23 in this humidity condition.

24 So it must be a very localized response.

25 The second one is if we look at that

1 picture, now comes the picture with the joints and you
2 are seeing sequence of construction. So they first
3 made the outside bays. And, you know, concrete is
4 exothermic, is made with sediment. Sediment hydration
5 is exothermic reaction.

6 So the temperature goes up and then it
7 cools down.

8 Now then they made the inner parts, so the
9 core, which is even much thicker. So the water is in
10 between while the inner part was heating, the outer
11 part was already cooling. And then you directly know
12 where it comes from. Imagine just that the core here
13 swells while the other part shrinks and you get
14 exactly there at those construction joints, you get
15 stress concentration and this continued.

16 MEMBER WALLIS: Well, you think it comes
17 from that inner octagon there?

18 DR. ULM: Exactly. Now let's say those
19 areas, of course, it's the way they emerge. If you
20 look very very carefully. First of you all you see in
21 bay 10. You see two construction joints, a vertical
22 and a horizontal one. You know, that's made to happen
23 at that joint. This is unavoidable in all concrete
24 applications.

25 Same thing bay 6, which is similar type of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 configuration.

2 Now if you look at bay --

3 MEMBER WALLIS: But it doesn't come from
4 the bolts. It comes from the main construction joints
5 in the concrete.

6 DR. ULM: It is that is weakened by that
7 point. That's my analysis would be to identify why
8 does it come from. Because I cannot see the reason it
9 was to raise the question before that if you make the
10 bolt inside the material, would you actually crack
11 something, would you damage it. Well, that's not the
12 case. Because if you think about any tunneling
13 operation, actually it doesn't create stress
14 concentrations in contrast to if you would wedge
15 something out. So that's the reason why it's actually
16 pretty homogeneous. So that actually does not create
17 sufficient stress intensity on --

18 MEMBER SHACK: If you tighten up on the
19 bolts, you're going to create stress concentration
20 down there.

21 DR. ULM: But if you would get it
22 radiated, which would not propagate downwards. It
23 goes down two feet?

24 MR. DYCKMAN: Two feet.

25 DR. ULM: Two feet and you have six feet

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 left. You know, you really must -- so it cannot come
2 from additional damage from that.

3 So the only source then of that here which
4 really is over the entire depth, because you have to
5 go from the bottom upwards of the joints from the
6 construction level.

7 Now could they have done it better? Well,
8 honestly I've worked on so many concrete projects, you
9 cannot avoid those cracks if you have those massive
10 things, except for if you start, you know, moving
11 different layers, let it cool down and construct.
12 It's not over four years, but over 20 years and then
13 it becomes --

14 MEMBER ABDEL-KHALIK: So why are they
15 saying that the water comes up through the bolts?

16 DR. ULM: Well, first of all, it's
17 assembled in this here. We have no direct record
18 whether it comes through the direct to the bolt itself
19 or in that area. Now please note the area where they
20 have it from the bolt here, you see for instance bay
21 10, you have it both sides, right? The red points
22 which is indicated there is that it's a large area.
23 It's a specific area, which happens to be that the
24 bolts are wet because there where you see most of the
25 water actually standing, right? But what you see

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 actually there are areas in which it occurs.

2 MEMBER ARMIJO: Is it typical that those
3 membranes fail then? You know, are the membranes put
4 there with the expectation that they'll do some good
5 but they're not expected to be impervious?

6 DR. ULM: Yes. Unfortunately, this is the
7 case. At the time, and I think also in the '80s and
8 '90s when people built it, they still believed that
9 those membranes would protect it forever. But it is
10 a real problem. We all know that they are not, you
11 have to do other things today. And if you were to
12 rebuilt it, I think you would use other type of
13 protective system.

14 So, that's the first thing: Where does
15 the water come from?

16 Now the second question then which arises
17 from those is to answer question how does it -- if it
18 comes from there, what actually does that, this water
19 seepage in terms of effecting your structural
20 integrity? That's the second question which you want
21 to answer.

22 Now, what I've done on the request here,
23 you're taking the observations, taking sort of the
24 surface areas. What I did, I calculated, I took the
25 following problem. I said, okay, let me put at the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 bay or the joints into one cylinder. And let me
2 calculate what is the diameter of the cylinder in
3 order to explain the amount of water which you observe
4 on the surface.

5 When you do this, you end up with a
6 calculation of basically that all those add up to
7 something four millimeter, so that's 1/6th of an inch
8 size cylinder of water which is there. It's not much,
9 but given the hydraulic pressure which you have there,
10 the hydraulic head difference, 25 feet -- well, you
11 know it's sufficient in order to bring that water up
12 there. And so that's a maximum size of -- you can
13 expect.

14 MEMBER WALLIS: Does this water corrode
15 the bolts and the cones?

16 MR. BETHAY: Franz or Barry.

17 MR. GORDON: Yes. Still you have a high
18 pH of your concrete bore water which will protect the
19 bolts. If there is any subsequent corrosion of the
20 steel, you know, there will be a passive film on the
21 steel. And in fact, in your NUREG-6927 it
22 demonstrates that you get corrosion. It actually
23 increases the bonding between the steel and the
24 concrete, just like 200/300 percent.

25 MEMBER WALLIS: Unless you have enough--

1 MR. GORDON: Unless it starts actually
2 cracking the concrete.

3 MEMBER WALLIS: Presumably as it corrodes
4 it grows and it gets tighter?

5 MR. GORDON: Yes. Yes. But it would take
6 bore force to pull it out, that's correct.

7 DR. ULM: Let's bear in mind the four
8 millimeter size, right. You don't have a complete
9 reinforcement mat one beside the other. Actually, you
10 saw you had quite a bit spacing in between. The
11 likelihood that you hit exactly with one reinforcement
12 those four millimeter diameter is very small. So the
13 localized nature actually saves you of this here.
14 There's a pH value which is on the order of 9.4, which
15 is lower than the typical pH value which you have in
16 concrete, which is 12.13 or rather on the 13 side
17 which I expect to be everywhere in the concrete will
18 be well protected. Around those local -- and that
19 means including the bolt anchors, I expect that maybe
20 some corrosion would be worthwhile to dig into that
21 local corrosion --

22 MEMBER SHACK: So you are arguing that if
23 you're getting the low pH because this is all local
24 channeled water, you're not getting as much
25 dissolution as you might expect from a --

1 DR. ULM: You not get so much -- you know,
2 all over that.

3 MEMBER SHACK: Not as much alkalinity as
4 you would expect --

5 DR. ULM: That's right.

6 MEMBER SHACK: -- because you're getting
7 a more direct transport of the water?

8 DR. ULM: That's right. That's right. In
9 addition what you have observed is that the calcium
10 concentration, the water which has been measured
11 actually in the calcium concentrated which was
12 measured in the water, is lower than the calcium
13 concentration which holds the -- back in the
14 concrete. So you have around those joints some
15 dissolution phenomena. But those dissolution
16 phenomena are, unfortunately, so slow that they don't
17 do much harm actually to the structure, at least not
18 in the time scales you're looking at.

19 MEMBER SHACK: But they've got one
20 measurement of chloride level that's fairly high.

21 DR. ULM: Yes.

22 MR. BETHAY: And maybe we could jump ahead
23 to -- go to slide 62.

24 MEMBER ABDEL-KHALIK: Before we do that,
25 now in the equivalent four millimeter diameter hole

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 what is the calculated flow rate? What is the
2 calculated seepage rate?

3 DR. ULM: What I actually did, I mean the
4 model is basically the pressure flow through a
5 cylinder. And what I said, let's say I said okay, I
6 concentrate all this here and then I got the
7 information that basically 20 square meter face on the
8 top of one bay was filled with a water film of one-
9 quarter of an inch of water. And if they dried it out
10 and it came out it was after one day or two days that
11 you have this flow rate. So I had the entire flow
12 rate of flow mass that came up.

13 Now by setting this here per day equal to
14 the flow which I need under the pressure gradient with
15 the -- flowing through it, you can back calculate the
16 diameter or the radius of the cylinder.

17 MEMBER ABDEL-KHALIK: And what is that
18 flow rate, do you recall?

19 DR. ULM: I don't have it here. I have it
20 on my computer. I can show it. But the flow rate
21 actually was relatively high because, you know, you
22 get through four millimeter in there. It was pretty
23 high. So that was actually also the reason when I
24 looked at the problem, the calcium region may well
25 have reached those bolt anchors was one of my

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 conclusions from that. It was pretty high, actually.

2 MEMBER ABDEL-KHALIK: Well, what's pretty
3 high? One gallon per minute, ten gallons per minute?

4 DR. ULM: No, no, no. I mean, no, no.
5 We're not on this yet. I would say we're speaking
6 about a foot per day. So that's what I'm talking about
7 here. This is a foot, and then you have to take the
8 volume. To permeability to concrete, yes. So typical
9 velocities which is to concrete, which is very small
10 rate.

11 MEMBER ABDEL-KHALIK: Okay. Thank you.

12 MR. BETHAY: And I think why don't we jump
13 the pictures to slide 62.

14 MEMBER WALLIS: There's no tritium in this
15 water?

16 MR. BETHAY: There is tritium in the
17 water.

18 MEMBER WALLIS: How much tritium is in the
19 water.

20 MR. BETHAY: It would be amazing if there
21 were not.

22 MEMBER WALLIS: Yes, but how much?

23 MR. BETHAY: It was sampled for tritium,
24 and we have that report. I'm not going to try to
25 quote the numbers off the top of my head. We have

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 that report with us for the water.

2 Bryan?

3 MR. FORD: I can call up the numbers for
4 you.

5 I'm sorry. My name is Bryan Ford. I can
6 call up the numbers for you during the break. But when
7 we sampled for tritium what we found was numbers that
8 were indicative of equilibrium with the tritium
9 concentration in the air of the building. It was
10 much, much lower than tritium concentrations from,
11 say, the spent fuel pool. So it was indicative of
12 water that was in an equilibrium with the reactor --

13 MEMBER WALLIS: Tritium does come from
14 nuclear reactions. It's not a natural thing. It just
15 decays away.

16 MR. FORD: Yes. But since we have tritium
17 in our spent fuel pool and our spent fuel pool
18 evaporates, we have an equilibrium concentration in
19 the reactor building atmosphere. So that's what we
20 compared it to.

21 MEMBER WALLIS: Okay.

22 MR. BETHAY: Next slide was just to show
23 you some of the water chemistry results that we've
24 seen over the years. Unfortunately, not every analysis
25 was done every time, so there's some holes in the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 analyses.

2 The minimum threshold limits that are
3 established by the GALL are shown at the top with a pH
4 greater than 5.5 of chlorides, less than 500 in
5 sulfates, less than 1500 would establish a threshold
6 of acceptable, I'll say, water chemistry.

7 You can see that our ground water, which
8 we sampled in the vicinity of the reactor building,
9 has a nominal pH of around 6.2, chlorides between 200
10 and 400, and sulfates somewhere between 5 and 16 ppm.

11 And you can see that in 1989 when this is
12 now inside the building when the floor was sampled, it
13 indicated a pH of around 8.7, 8.8, chlorides around
14 120, calcium around 292 ppm.

15 In '88 and early '07 the water was again
16 sampled just for pH, it wasn't sampled for it's -- of
17 course, who knew at the time.

18 In March of this year we sampled it again.
19 It indicated a pH of about 9.3, chlorides of about
20 560, sulfates of 9.1 and then the calcium very low. We
21 think that had to do with differences in degree of
22 cleaning and how well the floor was cleaned and
23 decon'ed before the samples were collected.

24 MEMBER WALLIS: Presumably ground water
25 near the ocean gets chlorides from ocean spray and you

1 know fine sea driven mists and things. There's a
2 transport of sea water through the air. That's not
3 insignificant.

4 MR. BETHAY: I don't think that would
5 contribute substantially to the ground water, which is
6 flowing under the basical till. Maybe Gary or
7 somebody else could help me a little more with that.

8 MEMBER WALLIS: It's a very slow ground
9 water flow.

10 MR. BETHAY: It is very slow.

11 MR. BETHAY: Are you going to pick up --

12 MEMBER ARMIJO: But that's more chlorides.
13 It seems pretty --

14 MEMBER SHACK: I mean that threshold on
15 chlorides sort of assumes you have a pH. I mean, what
16 you really have is a kind of a chloride oH balance.
17 And, you know you're really assuming the concrete is
18 probably higher than 9.

19 MR. GORDON: Again, Barry Gordon
20 Structural Integrity.

21 And these are measurements, you know, they
22 pick up CO₂ while they're measuring it, you know. And
23 probably if you just did it raw, it would probably be
24 2 points higher than that.

25 MEMBER SHACK: You're right. You're right.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 I mean this stuff is sitting there on the floor.

2 MR. GORDON: Yes.

3 MEMBER SHACK: Yes. Okay.

4 MEMBER WALLIS: But technically speaking
5 560 is bigger than 500.

6 MR. BETHAY: Technically that's correct.

7 MR. GORDON: That's also, that's on the
8 surface and that's where it's been concentrated, you
9 know. I mean who knows how many times it's been
10 concentrated. It's not inside the concrete adjacent
11 to embedded steel. So, it could be a build up over a
12 period of time and as it evaporates you're going to be
13 concentrating the amount of chloride on the surface.

14 MR. BETHAY: Thank you, Barry.

15 So our assessment findings and Dr. Ulm may
16 -- yes sir.

17 MEMBER ABDEL-KHALIK: If we go to some of
18 these pictures, these white deposits on the floor have
19 a fine --

20 MR. BETHAY: Which bay, and we'll go back
21 to it?

22 MEMBER ABDEL-KHALIK: Bay 10 on page 26.

23 MR. BETHAY: Can we go back to that.
24 Let's go back. Okay.

25 MEMBER ABDEL-KHALIK: These white deposits

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 especially on the left picture appear to have a finite
2 thickness. I mean I can't tell from the perspective,
3 but it looks like these are at least a quarter inch
4 thick. The white deposits.

5 MR. BETHAY: No. That's an optical
6 illusion. It's a calcium salt deposit on the floor
7 that actually you can see it. When I was down there
8 Monday, I tried to scratch some of it loose with my
9 finger, and it's -- you know, it's a very thin layer.
10 It's not an inch thick layer on the floor.

11 Now if you go to buy 6 it's more --

12 MEMBER ARMIJO: But you've never taken a
13 sample of that calcium deposit or what you think is
14 calcium and analyzed the chloride --

15 MR. BETHAY: This is part of the water
16 analysis.

17 MEMBER ARMIJO: But you've actually in
18 that case, you just analyzed water. You didn't
19 actually take the salt --

20 MR. GORDON: No. There is a sample
21 analysis off the deposit.

22 DR. ULM: The deposit, which shows
23 basically dominating calcium.

24 MEMBER ARMIJO: Calcium hydroxide or
25 oxide?

1 MR. GORDON: Just calcium.

2 DR. ULM: Calcium, but it's not a
3 hydroxide.

4 MEMBER ABDEL-KHALIK: Can one sort of
5 estimate the total amount of water that seeped through
6 over the years by looking at the volume of this white
7 material?

8 MR. BETHAY: We have not done that to try
9 to estimate over the years. I think what we could
10 estimate is it's a fairly constant in most areas the
11 amount of water. So, you know you see 80 square feet
12 that generally stays wet, particularly in this area.
13 So at equilibrium, it's coming in, it's evaporating --
14 go ahead, Franz.

15 DR. ULM: Maybe I can say something. So
16 this is a phenomenon of what is known as calcium
17 leaching. Leaching is the phenomenon that you have a
18 concentration of calcium in your pour solution which
19 has been low, the equilibrium concentration which
20 holds the calcium in here solidly. What happens is in
21 order to balance here, it dissolves part of the
22 calcium into the pour solution and transport it away.

23 You were asking before about the high
24 velocity. Because you have this high velocity, it's
25 transported upwards. And that's the reason why you see

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 it up there. That's why I'm believing that it's very
2 localized.

3 Can you completely reconstruct this
4 history? Well, for that you need basically a
5 permanent monitoring of the flow velocity. Only in
6 that way could you reconstruct --

7 MEMBER WALLIS: Does this calcium come
8 from the concrete?

9 DR. ULM: Yes. From the --

10 MEMBER WALLIS: So presumably it's making
11 the hole bigger?

12 DR. ULM: Well, it indeed does. But let me
13 give you a number. Let's say how fast is this? It's
14 basically 0.1 millimeter per square root of days.
15 That's a very, very slow process. It is --

16 MEMBER WALLIS: But it is making the hole
17 bigger by washing out calcium?

18 DR. ULM: It does. It does actually. It
19 increase the porosity, it actually takes away first
20 what is called the -- and then it attacks the calcium
21 acidic hydrates in there. But this is such a slow
22 process that this is not relevant at the time scales
23 you're looking at. It's a very important development
24 for nuclear waste disposal structures, but it's not --
25 because there you speak about 10,000 years. But for

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 that type of scale, time scales you're looking at it
2 is not relevant. But it is sufficient in order to
3 transport the amount of calcium dissolved into the
4 pour solution upwards to the surface.

5 MR. BETHAY: So if you'd go to slide 62.

6 So just to try to bring this piece of it
7 to a conclusion, to follow up on Dr. Ulm's assessment
8 findings, and he can certainly join in, that the
9 ground water migration is a highly localized
10 phenomenon through very small imperfections.

11 That the path is most likely through the
12 vertical construction joints and the zones most likely
13 weakened by the tensions and stresses created during
14 the settling of the concrete pours, particularly in
15 light of the way the five structures were built.

16 That the localized zones are
17 discontinuities equivalent to a cylinder all the way
18 through the base mat on the order of 4 millimeters.

19 And that the localized calcium leaching
20 doesn't affect the overall structural performance of
21 the slab, primarily because of the time frames
22 involved that it would cause any adverse situation.

23 MEMBER SHACK: Now is this for each of the
24 bays it's equivalent to a four millimeter hole, or
25 that's the total base mat leakage you're estimating?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 DR. ULM: No. For each bay.

2 MEMBER SHACK: Each bay?

3 MEMBER WALLIS: So what are you going to
4 do about it?

5 CHAIRMAN MAYNARD: That's what the next
6 slide, I believe.

7 MR. BETHAY: That's what the next slide is
8 about.

9 So because of the work that Dr. Ulm has
10 done for us, he's made a number of recommendations to
11 us.

12 First, that the calcium leaching may have
13 reached the annular space around the bolt. And we
14 will be inspecting bolts and grout around them to
15 verify, first, is that really the source of the
16 leakage that we see. Second, what's the integrity of
17 the bolt. We don't believe there's any adverse effect,
18 but we'll look at it. And third, what's the condition
19 of the grout.

20 MEMBER WALLIS: Aren't you going to sort
21 of mark lines on the floor about how the tide is and
22 see if the tide is rising in the room?

23 MR. BETHAY: We don't believe this any
24 connection to the tides.

25 MEMBER WALLIS: You leave it damp like

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 that. No, I mean it just gets colloquial. But I
2 mean, presumably this wet region is spreading, isn't
3 it?

4 MEMBER SHACK: The holes are getting
5 bigger?

6 MEMBER WALLIS: The holes are getting
7 bigger. I would think it's spreading. So you're
8 going to monitor the spreading of the water?

9 MR. BETHAY: We're going to monitor the
10 water. Until we identified the definitive the cause,
11 the next action is, you know, it's localized zones.

12 MEMBER BONACA: Before you move, answer
13 the question now. Before you move, I mean you kept
14 saying we would look at it. What do you mean by "we
15 would look at it?" I mean could you be a little more
16 specific?

17 MR. BETHAY: If you go back to bay 9, Ed,
18 for a second. Okay. Bay 2.

19 This one's obviously dry, but it's a
20 better picture. What we'll do is loosen this nut on
21 several of these bolts. We'll raise this base plate up
22 and we will inspect the condition of the bolt as it
23 passes into the grout. And we will inspect the
24 condition of the grout around the hole. And based on
25 what we find, then we'll enter that in our corrective

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 action process and go wherever that leads us. But the
2 intent is to loosen this bolt, raise the plate and
3 perform an inspection of the grout, the concrete and
4 the bolt in this area.

5 MEMBER ARMIJO: So you'll be doing that in
6 bay 10 where the worst apparent problem is?

7 MR. BETHAY: We'll be doing it right now.
8 Right. The maintenance request to do this is in the
9 planning stage. And it will look at a sampling of the
10 bolts in bay 10, because that's the worst. And then
11 we'll expand scope if necessary based on whatever we
12 find when we do that inspection.

13 MEMBER WALLIS: I would think the extent
14 of the damp area would change with the seasons and so
15 on, because the humidity of the air and everything
16 changes how fast it dries.

17 MR. BETHAY: It changes with the humidity,
18 that's correct.

19 MEMBER WALLIS: Well, you've seen all
20 that, haven't you? You've seen it come and go during
21 the winter and summer?

22 MR. BETHAY: We've seen it come and go.

23 Go to bay 6, please. That's gone. It's
24 been there, but it's not wet now.

25 MEMBER WALLIS: That's right. So it dried

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 up?

2 MR. BETHAY: It dried up. So we do see
3 the water --

4 MEMBER WALLIS: There is a kind of history
5 when it dries up. When it gets wetter, you don't have
6 quite the same history exposed?

7 MR. BETHAY: That's right. That's correct.
8 Yes, sir.

9 MEMBER WALLIS: So you're going to keep
10 track of it?

11 MR. BETHAY: Yes, sir. Yes. Our
12 intention is to keep track of the water, the chemistry
13 of the water until -- obviously until we identify a
14 fix to stop the water.

15 CHAIRMAN MAYNARD: If you can get to slide
16 65, I think it's not bulletized list of things.

17 MR. BETHAY: Right. If you go to 65, Ed.
18 This is a summary of where we plan to go.

19 That we'll verify the condition of the
20 bolts by sample in bay 10, is what we've lined out.
21 We'll do that prior to extended operation, and
22 actually that's --

23 MEMBER WALLIS: Once in ten years?

24 MR. BETHAY: I'm sorry?

25 MEMBER WALLIS: Well, I mean I'm always

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 astounded by these inspections every ten years or
2 something. Presumably something might be happening
3 this year.

4 MR. BETHAY: Well, there's a difference
5 between what we'll put as an actual regulatory
6 commitment and what we'll --

7 MEMBER WALLIS: What we'll actually do?

8 MR. BETHAY: -- actually do.

9 MEMBER WALLIS: I would think whenever you
10 had an opportunity, you'd take a look and see what's
11 going on down there.

12 MR. BETHAY: That's our actual plan. As
13 I said, we're going to go down and look at the bolts.
14 This is on routine rounds. You know, if anything
15 changes from what's I'll say the norm, that's
16 identified in our corrective action program and we
17 would take corrective action.

18 MEMBER WALLIS: Do people go down there
19 from time-to-time?

20 MR. BETHAY: Oh, yes. Yes.

21 MEMBER WALLIS: They look and see if it's
22 wetter?

23 MR. BETHAY: Well, they look and see if it
24 different from what I've seen before.

25 MEMBER WALLIS: So this five and ten years

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 doesn't mean anything on that scale. It's being looked
2 at several times a year?

3 MR. BETHAY: It's being looked at
4 routinely, that's correct. But what we're planning to
5 do beyond that sort of thing, is to actually go, I'll
6 say, disassemble some of this and look at what's
7 underneath.

8 MEMBER WALLIS: So if over a period of
9 months you suddenly got an inch water on the floor
10 someone would have seen it, right?

11 MR. BETHAY: Yes. That's correct.

12 MR. SULLIVAN: Operators make tours of the
13 torus room routinely. I think it's twice a week
14 they're down there.

15 MEMBER WALLIS: Okay. So that's better.
16 Now I'm more --

17 CHAIRMAN MAYNARD: I would think your
18 corrective action program would require you to take
19 some action if --

20 MR. BETHAY: Absolutely. Yes. You know,
21 this has been analyzed many times. And I'll say that
22 people, the operators that are down there, they know
23 that there's water on the floor from time-to-time.
24 They know because they're there the quantity of water
25 that's there. My expectation would be that if they

1 saw significantly more or significantly less,
2 something has changed and that should be identified in
3 our corrective action process for evaluation.

4 MEMBER WALLIS: That might depend on the
5 safety culture of the plant what they do.

6 MR. BETHAY: I believe that our operators
7 would do just as I described.

8 So in slide 65, as I mentioned, we will
9 verify the condition of the bolts. We'll determine
10 whatever actions are necessary based on the bolt
11 inspections and what that shows us.

12 We'll continue to monitor the chemistry of
13 the water on the floor and the ground water.

14 And then from a macroscopic point of view,
15 our structures monitoring program will continue to
16 ensure that the overall structural integrity of the
17 building is sound as evidence by things like
18 significant cracking, spalling, settlement of the
19 buildings.

20 MEMBER BONACA: Are these actions tied to
21 license renewal or are you going to initiate them
22 before?

23 MR. BETHAY: These actions?

24 MEMBER BONACA: Yes.

25 MR. BETHAY: These actions are ongoing.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 We've been doing these. And although as Dr. Wallis
2 says, it says five or ten years, it in fact is an
3 ongoing process, an ongoing evaluation.

4 CHAIRMAN MAYNARD: I think we'll also get
5 an opportunity to talk to the Staff about what ends up
6 being requirements versus just what they're doing and
7 stuff. Licensees always like to undercommit and
8 overperform.

9 MEMBER ARMIJO: You maintain flexibility
10 when you decide that you don't need to do it anymore,
11 it's not a license commitment, so you're --

12 MEMBER WALLIS: But does the NRC resident
13 inspector take a look at these floors from time-to-
14 time, too?

15 MR. BETHAY: He goes down there. I'd
16 rather you ask him that question. But I know they go
17 down there.

18 So with that, if there are any questions
19 we can probably finish up --

20 CHAIRMAN MAYNARD: What I'd like to do,
21 we're at lunchtime right now. And we're ready for the
22 next topic. We still have an hour for you after
23 lunch.

24 So what I intend to do is to take an hour
25 break here for lunch and then we'll come back and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 finish up on the other open item. And if we have any
2 thought of any other questions that we want to ask on
3 this, we'll have an opportunity and then it'd be the
4 Staff's turn to get up here.

5 So with that, we'll take a break. We'll
6 come back at 10 after 1:00.

7 (Whereupon, at 12:04 p.m. the Subcommittee
8 was adjourned to reconvene this same day at 1:08 p.m.)

9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

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

2 1:08 p.m.

3 CHAIRMAN MAYNARD: All right. I think we
4 can go ahead and get started. Bring the session back
5 into order.

6 Steve, turn it over to you and I think
7 we're ready to talk about fluence.

8 MR. BETHAY: All right. Thank you very
9 much.

10 One point I would like -- Ed, before you
11 do that. One thing I would like to go back on,
12 though, is a question I think Dr. Wallis raised
13 regarding was there any material in the air gap
14 between the concrete and the shell. And I believe
15 that I said the foam was removed during construction.
16 Some of my colleagues pointed out I should clarify
17 that.

18 The way this was constructed was as the
19 panels were poured there was a foam sheet or block put
20 in that was then pulled out as the pours were made
21 going up the side. At the upper elevations, though,
22 there was an FME barrier put in below that so that
23 when they pulled the sheets of foam out to make the
24 next concrete pour, an FME barrier was put in.

25 In the upper elevations the FME barrier

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 may still be there, which that dictates those upper
2 elevation levels where we do the UTs at the 72 and 84
3 foot elevation. But that's why those were selected in
4 case that FME barrier were still there. And that would
5 be a puddling location should there be any water.

6 So I just wanted to make that point of
7 clarification.

8 MEMBER WALLIS: Well, thank you.

9 CHAIRMAN MAYNARD: Good.

10 MR. BETHAY: Okay. Moving onto the final
11 open item in the Safety Evaluation Report. It has to
12 do with the lack of benchmarking data to support plant
13 specific fluence calculations for use in time limiting
14 aging analysis.

15 Simplistically, what we determined here
16 was a significant delta between the fluence values as
17 indicated by our reactor vessel surveillance capsules
18 and the fluence value predicted by the computer code.
19 The computer code fairly significantly underpredicted
20 the fluence level that we got from the in vessel
21 dosimetry. And that gap between actual measured on
22 the surveillance capsules and the predicted by the
23 computer code was beyond a level that was acceptable
24 to the NRC Staff to develop P-T curves for the period
25 of extended operation. That's the gist of why this

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 open item exists.

2 CHAIRMAN MAYNARD: And the actual measure
3 was higher than the computer predicted?

4 MR. BETHAY: Yes, sir. That's correct.

5 So a couple of aspects of this that I just
6 wanted to highlight to the Committee. You know, this
7 is not just a license renewal issue. You know we have
8 to comply with 10 CFR 50 Appendix G for normal
9 operations. So this is a current day, current
10 licensing basis issue as well as for the license
11 renewal term.

12 Our current pressure temperature curves
13 that were recently approved by the Staff are valid
14 through cycle 18. So through 2011, which is obviously
15 before the current license term expires.

16 As part of that license amendment we have
17 a commitment to submit an action plan for final
18 resolution of this. In other words, how are we going
19 to develop curves that fully comply with the reg
20 guide. And we've committed to provide that resolution
21 plan by September of this year to the Staff for their
22 review and evaluation.

23 And we've also got a commitment that based
24 on the outcome of that plan, that we'll submit
25 calculations that fully comply with Reg Guide 1.19 by

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 June of 2010 which is in support of startup from RFO
2 18. Again, this is all current licensing basis
3 information prior to the term of extended operation.

4 So in order to move forward on this and
5 the license renewal term -- and then I was remiss in
6 not introducing Tim Griesbach is with us today. He's
7 with Structural Integrity and has been doing a lot of
8 the analysis for us in resolving this issue. And Ray
9 Pace, who is our mechanic civil design supervisor at
10 the plant.

11 Our current actions are to evaluate the
12 time limiting aging analyses that we have in place for
13 the vessel to determine what the limiting fluence
14 levels would be for those components. And based on
15 that to determine a limiting beltline adjusted
16 reference temperature and upper shelf energy based on
17 those limiting fluence levels. To look at the vessel
18 internals, the welds and the nozzles near the
19 beltline.

20 The core shroud fluence is limiting based
21 on BWRVIP-35 specifications. And we've determined
22 that in all cases for the period of extended operation
23 that the limiting fluence values would not be
24 challenged continuing to operate the plant.

25 MEMBER SHACK: What does it mean that the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 core shroud fluence is limiting?

2 MR. BETHAY: I'll ask Tim to fill in the
3 details.

4 MR. GRIESBACH: There are criteria in the
5 BWRVIP document to maintain the properties of the 304
6 stainless steel below a certain fluence. So there's
7 fluence limitations also for areas outside the vessel.
8 And fluence levels that would be projected if you
9 would scale everything up, you would reach a limit for
10 the shroud or you would reach a practical limit for
11 the vessel material.

12 MEMBER SHACK: This is a toughness limit
13 based on a crack size you can't detect or something?

14 MR. GRIESBACH: No. It's just a crack
15 elements thing you don't want to go above a certain
16 fluence. It still operate for internals. And so it's
17 based on data for 304 stainless.

18 MEMBER SHACK: It's an IASCC limit then?

19 MR. GRIESBACH: Essentially, yes.

20 MEMBER SHACK: Okay. Which is?

21 MR. GRIESBACH: I think it's about eight
22 times ten to the 21st, if my memory serves me.

23 MEMBER SHACK: And you're going to hit
24 that on your core shroud?

25 MR. GRIESBACH: No. If you scaled

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 everything up evenly, well beyond the projected end of
2 fluence you've even seen and what would be the first
3 limit practical limit you would reach. Would it be a
4 limit for the vessel, would it be a limit for upper
5 shelf energy drop or would your internals reach some
6 limit that you would want to go beyond.

7 MEMBER SHACK: But you're not going to get
8 anywhere close to that even if at the end of your
9 cycle here, the extended life?

10 MR. GRIESBACH: No. We're many factors
11 below that even in the worse case projected fluence.

12 MEMBER WALLIS: Now the limit for the
13 vessel is presumably more stringent than it is for the
14 shroud?

15 MR. GRIESBACH: No. The other way around.

16 MEMBER WALLIS: So the vessel is pressure
17 retaining element?

18 MR. GRIESBACH: Yes.

19 MEMBER WALLIS: The shroud just hangs
20 there, isn't it?

21 MR. GRIESBACH: The question is can you
22 maintain all of the ASME code criteria, regulatory
23 criteria for upper shelf energy --

24 MEMBER WALLIS: Great reality, yes.

25 MR. GRIESBACH: -- and such. And the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 answer is yes, the vessel could meet that well beyond
2 the fluence levels that are projected, but you would
3 reach a practical limit on the shroud, the internals,
4 before the vessel would reach its limit.

5 MEMBER WALLIS: At the same limit.

6 MR. COX: This is Alan Cox. I think I can
7 explain the difference here.

8 The fluence, that you're obviously going
9 to have a higher fluence on the shroud because it's
10 inside the vessel wall. So the limit on the shroud is
11 eight times to the 21st. And the limit on the vessel
12 is much less than that, but you're getting less
13 fluence out there. But I mean the limits are not the
14 same on both of them, but you could get to -- because
15 it's closer to the core, you're going to get to the
16 limit on the shroud before you get to the limit on the
17 vessel.

18 MEMBER ARMIJO: But is the shroud limit an
19 NRC limit or basically an economic issue that either
20 you're going to have cracked shroud or --

21 MR. BETHAY: I guess it would be an
22 economic issue. The shroud itself just directs the
23 flow through the vessel --

24 MEMBER ARMIJO: Right.

25 MR. BETHAY: -- and provides some support

1 for the internals. But, you know, obviously if you
2 have to --

3 MEMBER ARMIJO: It's a big economic issue.

4 MR. BETHAY: It's a huge economic issue.

5 MR. FORD: Well, but are also committed to
6 the BWRVIP requirements. Since the BWRVIP has this
7 requirement, we will meet it.

8 MEMBER SHACK: Well, at 8 times 21, this
9 would be brittle and it would be pretty susceptible to
10 cracking. And even hydrogen water chemistry isn't
11 going to save your butt.

12 MR. BETHAY: The point of this evaluation
13 was to show that in the extreme we still wouldn't
14 reach those levels because we haven't actually
15 performed those reg guide compliant calculations yet.

16 MEMBER ARMIJO: Do you have an
17 understanding of why your analyses don't match your
18 measurements.

19 MR. BETHAY: We have a number of theories
20 of why they don't match. We're still evaluating that.
21 We've got Tim and Ray and a team of folks trying to
22 ascertain that to see why this big gap in inability to
23 benchmark the data. That's basically the plan that I
24 talked about that we would submit to the Staff to
25 review, is how are we going to reconcile this and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 what's the cause of it.

2 Today I can't explain why the gap. And
3 that's why we've done this very limiting evaluation to
4 say even with this gap, we know we've got substantial
5 room on the fludence for the vessel.

6 MEMBER ABDEL-KHALIK: Could you give us an
7 idea about the extent of that discrepancy? Is it a
8 factor of two, a factor of ten?

9 MR. BETHAY: Ray or Tim, maybe --

10 MR. PACE: Yes. There is a bias that's
11 .56, and that works out to a multiplier or a factor of
12 1.78. So it's substantial.

13 Presently the P-T curves that we have are
14 based on a capsule pull. So they essentially have that
15 factor worked into them. So in the future what we
16 hope to do as we run through our plan is determine the
17 cause for that bias and have resolved it so that our
18 calculated and our measured values represented here.

19 CHAIRMAN MAYNARD: Is this potentially a
20 generic issue or is this specific to Pilgrim>

21 MR. BETHAY: I think we're probably the
22 first BWR3 that's run into this issue. One of the ways
23 that we may be able to resolve this, you know maybe we
24 have some oddity in our vessel or oddity in our
25 surveillance capsules. We'd look to benchmark another

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 BWR3 of similar construction and similar metallurgy.

2 MEMBER SHACK: But do all the BWR3s use
3 the same fluence calculation technology?

4 MR. BETHAY: I'll have to ask Tim.

5 MR. PACE: This is Ray Pace.

6 Many of the BWRs are using the same
7 fluence calculation methodology. It's the RAMA code.
8 And they are getting reasonable benchmarks. They're
9 meeting the Reg. Guide 1.190 requirements. We happen
10 to be the first BWR3 to use the RAMA code. But the 4s,
11 5s and I think one or two 6s have used it and they've
12 come out within an acceptable bias. For some reason
13 we're not. And being the first 3, there's not a lot
14 of data behind us that we can pull from others. We
15 are looking at other plant data that's similar plants
16 to us. And we hope that as we look at that, we'll gain
17 a better understanding of why we are seeing such a
18 significant bias.

19 MR. FORD: This is Bryan Ford.

20 There is a couple of other 3s that are
21 working on developing new curves using the RAMA code.
22 So one of the ways this may be resolved for us is some
23 other plants going down the path and resolving the
24 dosimetry discrepancy. They just haven't gotten there
25 yet.

1 MEMBER WALLIS: Is your shroud cracked?

2 MR. BETHAY: We implemented the preemptive
3 shroud repair.

4 MEMBER WALLIS: Yes, that's what you said
5 earlier. Right.

6 MR. BETHAY: Right. And that repair was
7 done in the late '90s, I forget the exact date.

8 MEMBER WALLIS: This is the thing where
9 you have sort of --

10 MR. BETHAY: That's correct. There's four
11 tie rods --

12 MEMBER WALLIS: -- rods. Right.

13 MR. BETHAY: -- that grip over the top of
14 the shroud and they're tied to the gussets on the flex
15 shroud support plate at the bottom.

16 MEMBER WALLIS: Well, was it cracked at
17 that time or is cracked now?

18 MR. BETHAY: The shroud?

19 MEMBER WALLIS: Yes.

20 MR. BETHAY: We made the presumption that
21 all of the horizontal welds were fully cracked. And
22 the tie rod design, the four rods were put in our
23 structural replacement for the H-1 through 9 welds, I
24 believe, on the shroud.

25 MEMBER SHACK: But does having the tie rod

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 get you out of an inspection --

2 MR. BETHAY: That's correct.

3 MEMBER SHACK: Okay. So you don't really
4 know whether it's cracked or not.

5 MR. BETHAY: That's correct. The design
6 assumption --

7 MEMBER SHACK: The design assumption is
8 it's fully cracked.

9 MR. BETHAY: Right. And then just as
10 another point on that, you may be aware there has been
11 industry experience --

12 MEMBER WALLIS: Well, cracked means it
13 would fall off if you undid the tie rods?

14 MR. BETHAY: No.

15 MEMBER ARMIJO: Yes, you could disassemble
16 it.

17 MR. BETHAY: I suppose if all the welds
18 were all cracked, it would --

19 MEMBER SHACK: That's the presumption at
20 any rate.

21 MR. BETHAY: Yes. There has been industry
22 experience recently, though, at another, a similar
23 plant where they found some cracking in the upper
24 connecting hooks, I'll call them, of the tie rod
25 repaired. We're a similar design. The stress levels

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 in our upper tie rod connecting pieces were similar
2 levels of stress. So this upcoming outage that begins
3 Friday, as I said, we're going to go in and
4 preemptively replace that upper portion of the tie rod
5 repair to change a couple of sharp corners. It had
6 significant stress risers, to more rounded corners to
7 reduce the applied stress on those hooks.

8 It'll perform the same function. It's
9 essentially the same design. It relieves a
10 potentially overstressed condition in there.

11 So if we move on here to slide 69.

12 So our future actions, as we've been
13 discussing, is that we will benchmark our computer
14 code using Pilgrim or other BWR3 dosimetry data as
15 we're able to retrieve it. As I mentioned, we have a
16 commitment to submit that action plan to the Staff for
17 review by September of this year. And we've also
18 agreed to a license condition to submit these
19 calculations that fully comply with Reg. Guide 1.19
20 prior to startup from the 18th refueling outage, which
21 will be in 2011.

22 MEMBER ARMIJO: What do you mean by
23 benchmark?

24 MR. BETHAY: Is there a technical
25 explanation, Tim or Ray?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. PACE: Yes. This is Ray Pace.

2 The benchmark is just the dosimetry or
3 some other means to demonstrate that the calculated
4 value that's coming out of the RAMA code for us
5 matches the value that we're actually measuring. So
6 it's a calculated measure.

7 MEMBER ARMIJO: But now these two values
8 are not the same?

9 MR. PACE: Right now the two values are
10 not the same.

11 MEMBER ARMIJO: So how are you going to
12 get them to be the same?

13 MR. PACE: One thing that we might do, and
14 we're considering on doing, is pulling another capsule
15 next outage which has dosimetry in it. And it's in a
16 different location in the vessel. So we would be able
17 to look at that data and it would give us a second
18 data point. Understand that we only have one real
19 data point right now, which was a capsule pulled in RF
20 04. We're coming up to RF 016, so it was quite a
21 while ago. So a more recent capsule would give us
22 better information because it's been in the plant for
23 the duration. So that would be one means of obtaining
24 a benchmark.

25 The reg guide also allows us to look at

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 other similar plant data. And there is a plant that's
2 a sister plant of ours. And we will likely look at two
3 capsules that were pulled from that plant to see if
4 that helps us understand why the one capsule we have
5 has a bias in it.

6 We've done a root cause analysis to try to
7 determine the cause for the bias. We used the Traygo
8 methodology to do the root cause analysis and it did
9 not come up with a definitive answer. So we're still
10 looking. But we're confident we'll have a plan
11 together by September that will describe exactly what
12 the steps are that we're going through to solve the
13 problem.

14 MEMBER ARMIJO: But I guess you're
15 essentially collecting more data and there is no
16 guarantee, a priori, whether or not you're going to
17 get better agreement when you do the comparison with
18 the other samples?

19 MR. PACE: That's correct.

20 MEMBER ARMIJO: So --

21 MR. PACE: We can't be a 100 percent
22 confident that at this point in time to be able to
23 come up with a reasonable why the original capsule --

24 MEMBER ARMIJO: And you're not implying
25 that the original measurement from the original sample

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 is erroneous?

2 MR. PACE: We're not implying that at this
3 time. We've actually saved that piece of dosimetry and
4 actually recounted that dosimetry and it came out very
5 close to the first --

6 MEMBER ARMIJO: And at the same time
7 you're not implying that the physics in the computer
8 code is incorrect?

9 MR. PACE: That's correct.

10 MEMBER ARMIJO: It could be, somewhere.
11 Something's wrong.

12 MR. PACE: Yes. And there are a number of
13 things you can look at. We can look at our power
14 history to make sure that our power history is
15 correct. There is a tremendous amount of data or input
16 data that goes into this program. So we would,
17 obviously, go back and look at all the input data to
18 the program to make sure that's all correct. And it's
19 going to be a very, very large parameter. It's going
20 to take quite a while for us --

21 MEMBER BONACA: So you have to have a
22 solution by 2010?

23 MR. PACE: We have to have a solution by
24 2010.

25 CHAIRMAN MAYNARD: And right now you're

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 using the conservative number of the two?

2 MR. PACE: Yes.

3 MR. BETHAY: That's correct.

4 CHAIRMAN MAYNARD: So you're being
5 conservative now, but it's a current operational issue
6 as well as a license renewal so it's going to have to
7 be resolved prior to the period of extended operation?

8 MR. PACE: That's correct.

9 MEMBER SHACK: It has to be resolved by
10 the time you get to your end of your current P-T
11 limits?

12 MR. PACE: By the time we get to --

13 MR. BETHAY: Yes. You know, the fact is
14 that if we don't reach a satisfactory resolution, then
15 we can't start up from our RF 019 in 2011. So a great
16 incentive to figure this out.

17 MEMBER ARMIJO: You're motivated.

18 MEMBER SHACK: Yes, you're motivated.

19 MR. BETHAY: Well, I suppose if there are
20 no other --

21 MEMBER ABDEL-KHALIK: Let's just hold up
22 a little bit.

23 What do you expect at the end of this
24 benchmarking process?

25 MR. PACE: I expect we will find some

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 additional data either through our own capsule pull
2 next outage or from other plant data that will
3 benchmark against the RAMA code for us. And that we'll
4 be able to determine what happened -- based on that
5 data benchmarking, we'll be able to determine what
6 happened with that cycle 4 capsule and why there's a
7 difference that we see.

8 MEMBER ABDEL-KHALIK: So you know, in a
9 big picture then you'll either find out that the data
10 from that one sample is wrong or the code is wrong?

11 MR. PACE: That's correct.

12 MEMBER ABDEL-KHALIK: And what would you
13 do in these two scenarios?

14 MR. PACE: We'll make the appropriate
15 adjustments. We'll have the experts that have the RAMA
16 code make the adjustments to the RAMA code or the
17 input data or the power history, whatever that might
18 be, and rerun it. And demonstrate that we do in fact
19 have agreement with the capsule of the RAMA code is
20 wrong. And that will, of course, be reviewed by the
21 NRC because this code's been reviewed and approved for
22 use by the NRC. Or, if it happens to be a capsule
23 problem, we will identify it through the use of
24 additional data that we gain either from our capsule
25 pull or other plants that are similar to us. And then

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 we'll be able to demonstrate that it's a capsule
2 problem and why that problem exists.

3 There are some theories about why that
4 problems exists. And we would put those theories on
5 the table, if that is the case.

6 CHAIRMAN MAYNARD: It would appear to be
7 that you're definitely in regulatory space. So no
8 matter what you do, it's something that you're going
9 to have to come back to the NRC --

10 MR. BETHAY: Absolutely.

11 CHAIRMAN MAYNARD: -- their review and
12 approval on? It's not something you can do in house,
13 right?

14 MR. PACE: Absolutely.

15 MR. BETHAY: We'll have to submit a tech
16 spec amendment request prior to start up from RF 018
17 that the Staff that will have to review and approve.
18 And if they don't find a sound basis to review and
19 approve it, then obviously they won't.

20 MEMBER BONACA: I have a couple of
21 questions regarding the BWR vessel integrity program
22 from a different issue.

23 The BWR vessel integrity program I believe
24 B.1.8. You have to exceptions. One is 3 and 4. And
25 they are exceptions to do with the BWRVIP-18, which

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 means you cannot -- well there are inaccessible welds
2 inside the core spray and I believe there are some
3 inaccessible welds in the jet pump assembly. And
4 you're unable to inspect yet these welds because of
5 the location where they are. And the statement is
6 that you will not be able to be inspect these welds
7 until UT delivery system is developed. And apparently
8 and EPRI and GE center is developing this technology?

9 In reading this I was left with a question
10 of when? I mean, you know, BWRVIP-18 has been in
11 place for quite a while. A requirement is there for
12 inspection. You cannot inspect it so you're taking an
13 exception. And I was left hanging there with when
14 will this happen.

15 MR. PACE: That's basically up to the
16 BWRVIP to determine an appropriate priority for
17 developing the inspection tools that are required.
18 And, of course, we as utilities will feed input to the
19 VIP.

20 MEMBER BONACA: Yes. I imagine that you're
21 not the only utility with a BWR in the same situation.
22 I mean, here you have a BWRVIP-18 that's supposed to
23 bring a solution to an issue. But it cannot be
24 implemented because there is no technology to
25 implement to do what it's supposed to do.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. PACE: Right.

2 MEMBER BONACA: And there's an open ended
3 statement there in the SER that says they'll inspect
4 when the technology is available. Well, what happens
5 if technology is available 20 from now? Will you go
6 for 20 years without inspections or --

7 MR. GRIESBACH: I'm not familiar with that
8 particular statement. But for Pilgrim and other
9 plants, they've taken exception to inspecting those
10 areas that are inaccessible through other analyses.
11 Through probabilistic fracture mechanics analyses that
12 shows the risk of failure of those welds is within
13 acceptable limits. And those analyses have to be
14 redone for higher fluence levels when the toughness
15 changes. So you can continue to do analysis instead of
16 those inspections.

17 MEMBER BONACA: Okay. So --

18 MR. GRIESBACH: And I think credit is
19 being taken for that, for these analyses.

20 MEMBER BONACA: I mean in the inspection
21 report from the audit report, actually, you know it
22 leaves it hanging there that says they'll inspect it
23 when the technology will be available. And you're
24 saying now that this alternative is available to you
25 indefinitely until the end of the --

1 MR. GRIESBACH: If the criteria for the
2 weld failure probability of those regions can be shown
3 to be within acceptable limits, then you can continue
4 to not inspect those welds.

5 MEMBER BONACA: Yes, I'm done.

6 CHAIRMAN MAYNARD: Before lunch, I misled.
7 I said we had an hour, we actually have a half hour
8 scheduled for you after lunch here.

9 Are there any other questions, though --

10 MEMBER BONACA: I have one more question.

11 CHAIRMAN MAYNARD: Okay. Go ahead, Mario.

12 MEMBER BONACA: The other question has to
13 do with the -- inaccessible medium voltage cables. You
14 know, that was inspected and you have a problem, which
15 is acceptable apparently. And the question came up
16 regarding testing of the service water cables, which
17 are 480 volts. And the answer to that was that's not
18 a medium voltage cable because the voltage is too low.

19 So I was left hanging there with a
20 question in mind what do you do about the service
21 water inaccessible power cable? Do you ever inspect
22 that?

23 MR. BETHAY: Alan, do you want to mention
24 that or --

25 MR. COX: This is Alan Cox.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Of course, we inspect the same type of
2 cable in other applications, the same voltage level.
3 We would inspect the accessible portion of that cable.

4 MEMBER BONACA: Well how do you infer the
5 conditions of the cable since it is inaccessible, I
6 mean --

7 MR. COX: Well, I guess, we would infer
8 from the inspections at the other locations, I think
9 the industry data that we've looked at that backs up
10 this program has not identified that voltage level as
11 being susceptible to the water treating issue that
12 requires a special program for the other cable.

13 MEMBER BONACA: Okay. Again, this is an
14 issue where maybe I should Staff. Because, you know,
15 you read it and you're left hanging with a question of
16 what about that. Now, that may be the issue that that
17 voltage level you're not susceptible to treat.

18 MR. COX: Right.

19 MR. NGUYEN: My name Duc Nguyen from the
20 License Renewal Branch.

21 The question with the low voltage in an
22 inaccessible cable, what we do with it. Right now for
23 the GALL we define the medium voltage, the to 235
24 kilowatt. So at the Pilgrim, they have program right
25 now that it will test the cable. However, to address

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 the concern, the Staff also issued a generic letter
2 request all the licensee to address the low voltage
3 cable inaccessible. And based on that information the
4 Staff will require some kind of surveillance. And that
5 will carry over to license renewal period that is part
6 of the current licensing basis. And we will carry
7 over.

8 So that vehicle that we want to use
9 because if we challenge the applicant based on GALL,
10 they say why you require to rely on GALL
11 recommendation.

12 So to answer your question, yes, we
13 already issued generic letter to cover that.

14 MEMBER BONACA: All right. Thank you.

15 I have no further questions.

16 CHAIRMAN MAYNARD: John, I think you had
17 a couple of questions.

18 MR. BARTON: Yes, I've got a couple of
19 questions.

20 In the audit report there's some
21 discussion on aluminum and in outdoor environments.
22 And the conclusion in the audit report was that
23 aluminum exposed to outdoor air environment doesn't
24 have any applicable aging effects. Now I got a
25 problem with that. Since you guys are on salt water,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 I don't know how much aluminum you've got outside, but
2 I understand how you can conclude that there's no
3 aging effects with external aluminum exposed to salt
4 air environments.

5 And a related question to that one, is
6 some in the LRA in your application where you state
7 that salt deposits on high voltage insulators are not
8 an aging mechanism.

9 It seems to me I remember a while back
10 when you guys had a plant trip or something due to
11 salt buildup in your switchyard, and I'm sure you have
12 some aluminum components in the switchyard. Why
13 aren't these things a concern and why aren't there any
14 aging management in aluminum at the site that's
15 exposed to a salt environment.

16 MR. BETHAY: We can break that into two
17 pieces. Maybe, Bryan, do you want to take the first
18 piece and Brian Sullivan the second piece of that.

19 MR. FORD: The specific question on the
20 aging management programs. You were in the mechanical
21 section. There's only one mechanical component that's
22 made out of aluminum that's exposed to outside air.
23 That is the exhaust silencer on the station blackout
24 diesel generator, which is located over in the
25 switchyard on the land side of the plant. And, yes,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 we do have other aluminum components in the area and
2 we are not experiencing severe degradation that would
3 effect the structural integrity of it. So it's one
4 component, it's literally an exhaust silencer for the
5 diesel.

6 MR. BETHAY: Brian on the --

7 MR. SULLIVAN: The insulators in the
8 switchyard have all been replaced. They've been
9 coated with silguard and we haven't experienced a
10 plant trip in a number of years related to salt
11 deposits on the insulators. And we've had a very
12 aggressive repair and preventative maintenance program
13 ongoing in our switchyard to reduce switchyard related
14 events. Since we embarked in that program, we've not
15 lost power due to a switchyard related event.

16 MR. COX: This is Alan Cox.

17 One thing I might add to what Brian said,
18 the salt on the insulators in the switchyard typically
19 those are -- I think you actually called it an event,
20 and that's the way we consider it for license renewal.
21 If you have the right weather conditions, you can have
22 that event occur in a matter of hours or days. It's
23 not an aging effect, per se. It's more of an event
24 that's based on those conditions.

25 MR. BARTON: Unless you don't take care of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 it and it builds up over a long period of time?

2 MR. COX: Right. But, you know, we
3 haven't seen the history of that over a long period of
4 time. It's typically been associated with events and
5 weather conditions like that that create conditions
6 are conducive to that.

7 MR. SULLIVAN: Technology has advanced and
8 now we have our corona cameras that we monitor the
9 switchyard with. When operators make rounds of the
10 switchyard, if they hit a cracking that's the first
11 sign that you have a problem; debris on your
12 insulators. We'll go out with a corona camera,
13 identify the specific --

14 MR. BARTON: That responds.

15 MR. SULLIVAN: That's correct. And we'll
16 go and clean them.

17 MR. COX: Yes. A lot of those activities
18 are initiated independent of license renewal because
19 they have been problems under the current --

20 MR. BARTON: Okay. I understand. Fine.

21 I have another one. In several
22 applications that -- and this has been an issue that
23 goes back to when NRC first asked a question about
24 fuse holders. I've seen a lot of applicants come in
25 and say that they will have a program to monitor fuse

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 holders. And in your LRA you say that fuse holders
2 are an active device. Please explain to me how the
3 clips on a fuse are active devices. I don't understand
4 that.

5 MR. COX: Let me try it, and then I may
6 let Brian finish up on the end of that.

7 But for license renewal the scope of the
8 fuse holder program in GALL, the E5 program actually
9 says the supply to fuse holders that are outside of
10 active devices. And the thought behind that is if the
11 fuse holders that are in the switch gear, in the motor
12 control center cabinet or control panel are
13 maintained, inspected, I think in some cases actually
14 check the tension on these spring clips as part of the
15 normal maintenance of that active assembly. So for
16 fuse holders, what we did for license renewal, we
17 looked for fuse holders that were not included in
18 those active devices, such as switch gear. And if
19 there were any, and I don't know how many there were,
20 but we looked at the intended function of those that
21 are outside of those active license and found that
22 they weren't associated with intended function for
23 license renewal. And we didn't need to be subject to
24 aging management review for that purpose.

25 MR. NGUYEN: Again, my name Duc Nguyan.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Maybe I can add some value to the
2 applicant's statement. Because, you know, I am the
3 auditor at the Pilgrim for electrical.

4 The fuse and the fuse holder, the fuse is
5 active device because when it function, it can -- the
6 question with the fuse holder is a passive long live
7 device.

8 The Staff identify this issue in back in
9 2001. And we issued the -- in the interim staff
10 guidance 5. In there we specified any fuse that
11 belong to the recovery active assembly and under the
12 54.21 rule, it inside active assembly, it is
13 considered active. So it's not required aging
14 management review.

15 The only fuse holder outside the active
16 assembly by a fuse panel, because, see, require aging
17 management review.

18 Most of the fuse inside either MCC, mobile
19 control center power supply. Very few case the
20 outside. And it depend on design of the plant.

21 In Pilgrim they are either outside --
22 inside the active assembly or they did not perform the
23 licensing function. And this is consistent with
24 interim staff guidance number 5 that was issued to
25 applicant. And we conclude that because they didn't

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 have none on outside active assembly, then they are
2 not required aging management review.

3 MR. BARTON: Thank you.

4 I got one more. Also on your LRA you're
5 talking about a condensate storage tank and diesel
6 fuel tank. You described their foundations. But also
7 in there you talk about that they sit on sand beds.
8 And have you ever inspected the bottoms of these
9 tanks>

10 In the LRA you're proposing a one time
11 random ultrasonic test of the bottoms. How do you know
12 that that's going to be adequate? How do you know
13 there's no corrosion, degradation going on on the
14 bottoms of those tanks after all these years sitting
15 on a sand bed?

16 MR. COX: This is Alan Cox.

17 The condensate storage tank does have the
18 one UT inspection. But in addition, it has a visual
19 inspection on a periodic basis as part of our periodic
20 surveillance and permanent maintenance review.

21 MR. BARTON: That's going inside the tank
22 and looking?

23 MR. COX: Right. Right. So that the UT
24 is a confirmatory. You know if we see indications on
25 the visual inspections of rust or corrosion from the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 outside, we would look at it.

2 MR. BARTON: Would you expect to go in a
3 tank and look at the bottom, would you expect to see--
4 what is the tank made of? Is it carbon steel or
5 aluminum?

6 MR. COX: I think carbon steel.

7 MR. BETHAY: Coated. It's lined inside.

8 MR. BARTON: It's lined inside? All
9 right. Then you haven't done any inspection of the
10 lining?

11 MR. COX: We've gone into one of them a
12 couple of years ago. I forget the --

13 MR. FORD: This is Bryan Ford.

14 I believe we've went into both of them.
15 We're planning a tank relining in 2008 of both tanks.

16 MR. BARTON: Of both tanks?

17 MR. FORD: And during that time we were
18 planning on doing the UT of the bottoms of the tanks.

19 MR. BARTON: Okay. I'd be satisfied with
20 that.

21 MEMBER BONACA: Since you are talking
22 about tanks. I was reading they are diesel?

23 MR. COX: The diesel tanks.

24 MEMBER BONACA: You define diesel tank at
25 T.107.A you found leaking in 2001. And you're

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 monitoring the leakage and you will repair at some
2 point in the future. When are you going to repair it?
3 I mean, six years ago?

4 MR. BETHAY: Do you have the tank, the
5 number?

6 MEMBER BONACA: Yes. It's T.107.A. I
7 mean I was surprised by, you know, looking at this in
8 your operating experience description. And it seems
9 like to monitor a leakage.

10 MR. BETHAY: Bryan and I were just
11 discussing. We think that's a fire water storage tank
12 that has been repaired.

13 MEMBER BONACA: That's the fire water
14 storage tank.

15 MR. BETHAY: Yes.

16 MEMBER BONACA: 107.A.

17 MR. BETHAY: I believe that has been
18 repaired, but let us verify that.

19 CHAIRMAN MAYNARD: What we could do if you
20 could, when the Staff's up here, maybe have somebody
21 check on that.

22 MR. BETHAY: We'll do that.

23 CHAIRMAN MAYNARD: And perhaps get it by
24 the end of the meeting.

25 MR. COX: I did want to say one more thing

1 about the -- Mr. Barton asked about the fuel tanks. We
2 do have two fuel tanks that also sit on a sand
3 cushion. And they are subject to periodic inspections
4 and UT of the tank bottom surface under the diesel
5 fuel monitoring programming.

6 MR. BARTON: And you do it more than a one
7 time?

8 MR. COX: Right.

9 MR. BARTON: Okay. Fine. That's
10 excellent.

11 CHAIRMAN MAYNARD: Said?

12 MEMBER ABDEL-KHALIK: Have you had any
13 leaks inside the containment from things like recirc
14 pump seals?

15 MR. BETHAY: We've had leakage inside the
16 primary containment, yes sir, from packing leaks. I
17 don't recall from recirc pump seals offhand, but
18 certainly packing leaks and other such leakage inside
19 the containment.

20 MEMBER ABDEL-KHALIK: So is there a curve
21 around the edge of the floor inside the containment
22 between the floor and the steel or is it just butted
23 against the steel --

24 MR. BETHAY: It's just flat. I know some
25 designs have a fairly large curve that comes up the

1 side. Ours does not have that curve.

2 MEMBER ABDEL-KHALIK: Were some of these
3 leaks at sometime in the past significant enough that
4 water may have seeped between the concrete floor and
5 the inside surface of the containment?

6 MR. BETHAY: That's why -- we don't
7 believe so, but that's why we do the confirmatory
8 measurements that we've done and that we propose in
9 the future right at the surface and an inch down.

10 MEMBER ABDEL-KHALIK: Now how would you do
11 that? How would you confirm that you don't have any
12 water between the concrete and the --

13 MR. BETHAY: Well, we do the UT for
14 evidence of degradation.

15 MEMBER ABDEL-KHALIK: So there is no way
16 for the water to sort of penetrate below the depth
17 that which you're going to do the UT?

18 MR. BETHAY: I don't believe so. Unless
19 mechanistically that would happen.

20 MEMBER ABDEL-KHALIK: So there is direct
21 intimate contact between the concrete and the steel
22 over the entire surface --

23 MR. SMITH: IT's embedded.

24 MEMBER ABDEL-KHALIK: -- of that area on
25 the inside surface of the containment?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. BETHAY: That's correct. Yes.

2 MR. SULLIVAN: And that the surface is
3 coated with a coating to protect it above where the
4 concrete meets up to it.

5 MR. BETHAY: Gary Dyckman.

6 MR. DYCKMAN: I'm Gary Dyckman.

7 Inside the drywell the elevation 9 foot is
8 concrete poured against the concrete shell. And what
9 we did for evaluating the potential for any corrosion
10 if water were to get into that joint was to chip away
11 the concrete, perform the UT inspection. And the
12 logic behind that examination was that if water had
13 gotten into that joint that you would find evidence of
14 degradation in the upper layer where we chipped down
15 and did the UT.

16 MEMBER ABDEL-KHALIK: But if the water can
17 penetrate much farther down, it may be closer to the
18 bottom of that light bulb.

19 MR. DYCKMAN: Well, it's certainly
20 possible that that could do that. It would seem
21 unlikely. There is a joint at the top. The concrete is
22 bonded to the liner. It would seem unlikely to us that
23 that would happen. But right at the top where the
24 joint is if water penetrated there, we would have
25 expected to find some evidence of degradation. That

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 was the approach that we took.

2 MEMBER ABDEL-KHALIK: Thank you.

3 MEMBER BONACA: I have just one more
4 question regarding the torus. Reading material on the
5 audit, again, the comment is made that that in several
6 location, the thickness, the wall thickness of the
7 torus is below nominal, although still in excess of
8 minimal requirements. Where is this coming from? Is
9 it the original design of the torus that was that way
10 and the wall has always been that way or is it the
11 result of some corrosion taking place?

12 MR. BETHAY: Ray.

13 MR. PACE: This is Ray Pace.

14 I can answer that. Inside the torus most
15 of the problems that we have are below the water
16 level.

17 MEMBER BONACA: Yes.

18 MR. PACE: And really at the water level
19 is where we have the most problems where the surface
20 gets wetted. It is coated. It's a zinc-rich coating.
21 And after time some of the zinc gets depleted in some
22 local areas and then we get local corrosion. We have
23 to go in on a regular basis and we inspect the torus
24 pretty much every other outage right now we have a
25 coat inspectionist come in and we reapply coating over

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 those locations after we measure to make sure that
2 we're still well above minimal wall requirements.

3 MEMBER BONACA: So you do have an active
4 program to assure that you don't go any further below?

5 MR. PACE: Yes, we do.

6 MEMBER BONACA: I mean, because right now
7 you're claiming that in all locations that you have
8 measured you have excess margin with respect to the
9 minimum code criteria.

10 MR. PACE: Yes, sir.

11 MEMBER BONACA: But certainly you don't
12 want to have progression erosion of that?

13 MR. PACE: Right. And that's why we go in
14 every other outage and we restore the coating.

15 MEMBER BONACA: You're doing monitoring in
16 the same locations, for example where you measure --
17 are you measuring the same locations where you'd found
18 minimum thicknesses?

19 MR. PACE: What we're doing is we're
20 restoring the coating so then at that location we have
21 no more corrosion because we have the zinc-rich
22 coating on it. And we also look for other locations
23 that need to be repaired.

24 MEMBER BONACA: So you don't go back to
25 the same location where you found minimum thicknesses?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. PACE: Not necessarily.

2 MEMBER BONACA: Not necessarily. How do
3 you know that in the process of, you know, the fact
4 that you lost your coating and you're restoring it now
5 that you haven't lost further margin in thickness?

6 MR. PACE: The corrosion is very visible
7 and the coating that would remain with the application
8 of the new coating, we'd just look at it and just tell
9 that the coating is standing up and there are no
10 problems with this --

11 MEMBER BONACA: Now is this a specific
12 program you have? Is this a license renewal program
13 or is this --

14 MR. BETHAY: This is age old ongoing --

15 MEMBER BONACA: That's an ongoing --

16 MR. BETHAY: Is it IWE that dictates that?

17 MR. PACE: It is part of IWE.

18 MEMBER BONACA: IWE. Okay.

19 MR. PACE: It's primary containment.

20 MEMBER BONACA: Yes. Okay. And do you
21 have sister plants there that you are comparing this
22 experience with their margin?

23 MR. PACE: That's right. We compare with
24 Fitzpatrick mostly because their coating is the same
25 vintage as ours and we're constantly sharing data to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 make sure that we're maintaining the coating
2 appropriately.

3 MEMBER BONACA: Okay. Thank you.

4 CHAIRMAN MAYNARD: We need to be moving on
5 to the Staff presentation.

6 We'll have another shot. This is a
7 Subcommittee meeting. At the end we'll kind of go
8 through and if there's any still open questions,
9 whatever, that can be answered right away, we'll
10 include those when we have a full Committee meeting.
11 So we'll have another chance to ask questions on these
12 subjects, too.

13 So unless somebody has a burning question,
14 I just can't hold back.

15 Thank you very much.

16 MR. BETHAY: Thank you for the
17 opportunity. Thank you very much.

18 CHAIRMAN MAYNARD: And we'll turn it over
19 to Perry.

20 And I think, from the agenda, you're
21 covering the right items. I do want to make sure we
22 leave some time at the end to discuss the open items
23 from the Staff's perspective. I know it's on your
24 agenda here, so we'll leave some time for that.

25 MR. BUCKBERG: Thanks.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 I'll go through the script I wrote. The
2 introductions I made a little earlier.

3 My name is Perry Buckberg. I'm the
4 Project Manager for the Staff review of the program
5 license renewal.

6 Joining me today from Region I is Glenn
7 Meyer, the inspection team leader. Also joining me is
8 Dr. Jim Davis from NRR, who is the audit team leader.
9 And the technical staff is back over there, and
10 they've already spoken up a few times.

11 We'll be presenting the results of the
12 Staff's review.

13 I'll provide an overview of the plant and
14 the application followed by a discussion of the
15 scoping and screening results.

16 Glenn Meyer will discuss the results of
17 the license renewal inspections.

18 Dr. Davis will present the results of the
19 aging management review.

20 And I'll conclude with the TLAAs.

21 Displayed is some general information
22 regarding the plant and its license renewal. The
23 current operating license, as stated earlier, expires
24 in June of 2012.

25 A lot of this was covered earlier, so I'll

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 flip through.

2 The SER with open items was issued just
3 over a month ago on March 1st. In addition to the
4 open items, the SER includes three license conditions.
5 They are just the standard three license conditions
6 for all approved plants. They've been repeated in each
7 license.

8 MEMBER WALLIS: Is there a small number of
9 RAIs compared with the usual?

10 MR. BUCKBERG: It's less than some of the
11 recent plants.

12 MEMBER WALLIS: It looks rather small,
13 yes.

14 MR. BUCKBERG: But there's some recent
15 RAIs where we discussed the torus and neutron fluence.
16 Continued discussions on those, which go back to one
17 RAI, you know the hours put into it.

18 CHAIRMAN MAYNARD: It's sometimes hard to
19 compare just numbers. It also depends on what the
20 RAIs are for.

21 DR. DAVIS: Also the audit team is taking
22 a lot more of the issues and so there are fewer RAIs
23 because there are less of other staff there.

24 MEMBER BONACA: So much as being on site,
25 right?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. BUCKBERG: This slide shows the dates
2 of the audits and regional inspection for your
3 information.

4 During the scoping and screening
5 methodology audit, the audit team determined there
6 were no omissions of systems or structures within the
7 scope of license renewal. The Staff then concluded
8 there were no omissions following it review of Section
9 2.2.

10 Sixty mechanic systems were identified in
11 the application as being in scope, of which 100
12 percent were reviewed. The review of the security
13 diesel system became an open item. In addition there
14 were several components were brought into scope.

15 MEMBER BONACA: I had a question regarding
16 the audit. The audit is performed by the organization
17 that you're hiring to do the job, right?

18 DR. DAVIS: Yes. It was actually five
19 staff members and three contractors.

20 MEMBER BONACA: Okay. So it's a mixed
21 team.

22 DR. DAVIS: Mixed.

23 MEMBER BONACA: Okay. Thank you.

24 MR. BUCKBERG: The security diesel open
25 item was discussed a little earlier, and I'll

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 elaborate. The applicant included the security diesel
2 system in the scope of license renewal. There was
3 insufficient information in the application to verify
4 what is in scope. This issue was referred to the
5 regional inspector who verified the applicant's claim
6 on March 9th. That issue we consider settled at this
7 point.

8 MEMBER BONACA: On the issue of -- no,
9 this is the fire. Okay. I'll talk about it when we
10 get there.

11 MR. BARTON: And what was the issue here?
12 The inspection of the diesel fuel oil tank or
13 something like that?

14 MR. BUCKBERG: No. It was actually the
15 whole security diesel system. The physical location,
16 if there is any possibility for spatial interaction.
17 And since there were no drawings included, which was
18 mentioned a little earlier, we needed to dispatch
19 someone directly to the site. It was a formality that
20 I kind of overlooked. I thought there was a process in
21 place. I finally turned on the regional inspector
22 just before the SER was issued and we didn't get the
23 response in time. And we've closed it since.

24 MR. BARTON: Okay.

25 MR. BUCKBERG: Continuing with mechanical

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 systems. All listed components were brought into
2 scope as a result of the Staff's review.

3 MEMBER WALLIS: Now presumably it's only
4 the casing of the turbocharger or something? It's not
5 active --

6 MEMBER SHACK: It's not passive.

7 MEMBER WALLIS: The turbocharger is
8 active?

9 MR. BUCKBERG: It's an active --

10 MEMBER WALLIS: It's just the casing with
11 the passive --

12 MR. BUCKBERG: It's the casing and the
13 environment that were added in the scope.

14 MEMBER BONACA: You know, these issues for
15 example the emergency transfer skid has come back in
16 previous applications. Is the guidance clear enough?
17 I mean, why they didn't have it in scope? I mean why
18 did it take a review of the inspector to bring it in
19 scope? I thought that the guidance for this item is
20 very clear.

21 MR. BUCKBERG: These items were brought in
22 scope by the Staff, not by the inspectors.

23 MR. MARKS: This is Cliff Marks. I work
24 for ISO and I was the contractor on the scoping and
25 screening.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 There are sometimes components that are
2 not intuitively obvious whether they should be in
3 scope or not. And when we performed our review, these
4 were identified as having an attended function and
5 should be managed. And in one case, the correct
6 environment in which it exists wasn't identified. And
7 this is what we came with.

8 MEMBER BONACA: All right. So it was not
9 that the guidance wasn't clear. It was more that it
10 was an item --

11 MR. MARKS: No. The guidance I believe
12 was clear and during the review this was identified.

13 MEMBER BONACA: Okay.

14 MR. BUCKBERG: Thanks.

15 There are no omission of components within
16 the scope of license renewal for Sections 2.4, 2.5.

17 MR. BARTON: I had a question on 2.5.
18 Cable connections. Isn't there a question as to
19 whether cable connectors should be in scope or not?
20 License said no, they're active or something. Aren't
21 the cable connectors passive? I don't understand the
22 issue here.

23 MR. NGUYEN: My name is Duc Nguyen and I
24 am the responsible party over the electrical audit.

25 In application the applicants determined

1 that the cable commission have no aging effect. Okay.
2 And we disagree with that statement. And because in
3 the GALL we state that cable connection can have the
4 aging due to corrosion, due to -- thermal expansion,
5 different material have different thermal expansion.
6 The loser the bolt connection is aging effect.

7 We stressed the concern with applicant and
8 through II the applicant submit the aging management
9 program. And the Staff review and find it acceptable.
10 So that issue is closed.

11 And we also addressed in the SER Sections
12 3.6.2.3. If you look at that, you will see the Staff
13 evaluation in detail.

14 MR. BUCKBERG: Thanks.

15 In conclusion, the Staff determined that
16 the applicant's scoping methodology meets the
17 requirements of 10 CFR 54.4

18 I'm going to introduce Glenn Meyer from
19 Region I who is going to discuss license renewal
20 inspections.

21 MR. MEYER: Good afternoon, Chairman
22 Maynard and Committee members. I'm Glenn Meyer and I
23 lead the regional inspection for license renewal at
24 Pilgrim. Richard Conte, the Branch Chief in Region 1
25 is joining me.

1 There were two objective for the
2 inspection. We looked at scoping regarding
3 54.4(a)(2). We also looked at the implementation of
4 the aging management programs.

5 Next.

6 MEMBER WALLIS: When you walked down, did
7 you look on the floor in the bays of the torus?

8 MR. MEYER: Absolutely. IT was our
9 inspection that identified that.

10 MEMBER WALLIS: Yes. Do you have anything
11 to say about what you saw which differs from what we
12 heard this morning?

13 MR. MEYER: No. It was our raising of the
14 issue that prompted the RAI and led to the actions to
15 address it.

16 CHAIRMAN MAYNARD: As far as the amount of
17 water or moisture, the way it was characterized is
18 pretty close to your characterization, too?

19 MR. MEYER: I would say so. I would say it
20 looks a little better in the slides today than it did
21 when we looked at it, but that's reasonable.

22 MEMBER SHACK: It dried up a little bit.

23 Did you talk to the resident inspector?
24 Was he aware of the water in the torus room? Is that
25 something that --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. MEYER: I would have to say that water
2 in torus rooms is something that is not atypical,
3 having been a senior resident inspector. I mean, you
4 can see some evidence that there has been water in the
5 torus room. In this case where we were looking for
6 the monitoring of the drywell shell, and that was
7 potentially evidence that there had been evidence in
8 the inaccessible gap portion, it was particularly
9 important.

10 I don't know of any other sites that have
11 brought in experts to monitor the amount of water and
12 determine the depth of analyses that occurred here.
13 But it's not atypical.

14 MEMBER BONACA: A comment on the physical
15 conditions of the torus and really visually from the
16 pictures it looks in good shape.

17 MR. MEYER: I did not personally go in the
18 torus room, but from what the inspector said it was
19 typical of what you would see. There were some other
20 materials there that he felt inappropriate. There was
21 a corrective action I think initiated and it addressed
22 other issues in the torus room. But for the condition
23 of the equipment and the moisture, I wouldn't say it
24 was unusual.

25 MR. CONTE: I believe the licensee has

1 now, or the applicant has now has put bottles
2 underneath those drains so that anything that comes
3 out of those drains will be collected in water bottles
4 and distinguish from the ground water on the floor
5 since the inspection.

6 DR. DAVIS: The audit team was very
7 surprised when we heard this news. Because we would
8 have asked a number of questions about water in the
9 torus room because of the drywell shelf issue. And we
10 were under the understanding that there -- Dan and I
11 were under the understanding that it was dry. I
12 almost fell off my chair when I heard that there was
13 water on the torus room floor, and that's why there
14 were a lot of internal meetings and a lot of RAIs that
15 resulted as a result of this finding. It was thanks
16 to the regional inspection got this information.

17 MEMBER SHACK: But those drains then
18 weren't feeding into a collection thing before?

19 MR. MEYER: I would say that our inspector
20 looked for -- these are referred to as buckets.

21 MEMBER SHACK: Buckets.

22 MR. MEYER: He looked for buckets. He
23 didn't identify what the buckets were. So it's open to
24 interpretation as to whether they existed before and
25 whether they were there.

1 You know, he mentioned his observation.
2 Pilgrim believes that the buckets were there and had
3 been there. I don't know how we'd resolve that.

4 MR. FORD: This is Bryan Ford with
5 Entergy.

6 When you do a tour of the torus room
7 outside the radiation area and don't crawl on your
8 stomach underneath the torus, you can't see the
9 buckets that collect from these drains. So the
10 inspector when he was down there with his tour didn't
11 see them. The person who he was with hadn't seem them
12 himself. So he didn't know. When he raised the issue
13 in the inspection, we wrote a corrective action
14 document. We assigned somebody to go down there and
15 put buckets under them. He crawled under the torus,
16 found the buckets that were already there and labeled
17 saying "Do not remove." And he came back out with his
18 new buckets.

19 So the buckets have been there since 1987.
20 '87, I believe. We have twice every outage documented
21 that a V2R examine going in and looking to make sure
22 everything is dry.

23 MEMBER SHACK: Okay. That is documented?

24 MR. FORD: And in several cases they've
25 said in the buckets. You know, in some cases they

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 just say it's dry, no evidence of leakage. But in a
2 few cases they say in the buckets.

3 The buckets were there when we went in and
4 crawled under the torus and looked.

5 And as Steve said, they showed no evidence
6 of previous watering.

7 MR. MEYER: In the scoping and screening
8 area, our inspection looks at non-safety systems,
9 structures and components whose failure could affect
10 safety systems, structures and components. Primarily
11 that involves spatial and structural interaction.
12 Spatial as in the vicinity and liquid could affect a
13 system. And structural non-safety related parts of
14 piping that are directly connected that could affect
15 the seismic design.

16 We reviewed drawings and program
17 procedures. We went in the field and looked at the
18 systems.

19 Are conclusion is that the spatial
20 interaction part was acceptable. They had taken a
21 conservative spaces approach and it did address all
22 the applicable SSEs. Nonetheless, in the structural
23 area we found that there were some incorrect
24 boundaries. They had made assumptions based on drawing
25 notations that they believed indicated the seismic

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 boundaries, but that was in fact true. So after
2 identifying that, they did reevaluate, added the
3 components that needed to be added and amended to the
4 application. And we did reinspect that area and
5 concluded that they had done a thorough job.

6 Next.

7 In the aging management area, as we've
8 discussed, one of the primary findings that we had was
9 concerning the drywell, the flow switch that had
10 failed and that had not been repaired, the water on
11 the torus floor and the inconclusive monitoring. I
12 think Entergy has addressed.

13 There were six other areas where we felt
14 there were concerned that Entergy addressed to our
15 satisfaction during the inspection. And they're
16 documented in the inspection report.

17 The typical approach was to look at the
18 programs, what they had done, records of and evidence
19 of effectiveness and walkdowns and discussions with
20 personnel.

21 MR. BARTON: Before you go off that slide.
22 In your inspection report you mentioned that several
23 of the programs that -- you talk about all the
24 programs you looked at. In several instances you said
25 that as a result of your looking at the programs, the

1 applicant will expand and provide inspection
2 acceptance criteria in some of these programs. How
3 will you guys follow up and assure yourselves that
4 these things are done and that you're satisfied with
5 what they've done to their programs?

6 MR. MEYER: Okay. The inspection program
7 provides another round of inspections before the
8 period of extended operation. And although the
9 procedure is being -- it's in development. But, yes,
10 I firmly believe that as part of that inspection we'll
11 look at the report to see the issues that were
12 addressed, to look at other commitments and then
13 confirm that their actions have been acceptable.

14 MR. BARTON: Okay. Thank you.

15 MR. MEYER: Okay. So, next slide.

16 So inspection conclusions. We concluded
17 that the scoping area and the aging management
18 programs support a conclusion that aging effects will
19 be managed. The drywell shell monitoring has been
20 addressed under an SER open item.

21 And there was one other program that we
22 looked at that we didn't feel there was enough key
23 parameters or critical elements to reach a
24 determination. We call that a determinant. But I
25 think has been looked more thoroughly by the audit.

1 So that's the conclusion of the
2 inspection.

3 From a regional perspective, I'd also like
4 to address current performance. Pilgrim Station is in
5 the licensee response column, which represents the
6 lowest level of regulatory interaction. That is based
7 on all their performance indicators being green and
8 all the findings also being green.

9 The end-of-cycle or annual assessment
10 letter did not establish any substance crosscutting
11 issues.

12 And we expect to do the baseline program
13 in the next period.

14 Performance indicators and findings.

15 That concludes my remarks. Any questions?

16 MR. BARTON: Yes. You did some plant
17 walkdowns. Did you walkdown with some of the system
18 engineers when you did some of the walkdowns?

19 MR. MEYER: I did not myself, but my team
20 members do.

21 MR. BARTON: You did.

22 MR. MEYER: Yes.

23 MR. BARTON: Well, has the team determined
24 that the -- the applicant takes credit for system
25 walkdowns or a system walkdown program and a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 preventative maintenance program. Do you feel
2 comfortable that the system walkdown program is
3 adequate or --

4 MR. MEYER: Yes. I believe that the system
5 walkdowns typically have been done in the last, say,
6 ten years in response to the maintenance rule. And
7 they have developed to the point, and I think they are
8 also planning to further develop to put more aging
9 management aspects into the program. But thus far we
10 felt that the systems engineers were knowledgeable and
11 that they did a credible job when they have guidance,
12 and their application of that guidance has been
13 satisfactory. And we believe that that leads to a
14 generally effective program of identifying problems in
15 the field and addressing them.

16 MR. BARTON: Okay.

17 MEMBER BONACA: I had a question I would
18 like your impressions. They have many problems with
19 exceptions. And typically, you know, those exceptions
20 have been acceptable to the NRC. For example, in the
21 fire protection program there are a lot of exceptions
22 regarding the frequency of inspections, the monitoring
23 or whatever activity.

24 Years ago we made some comments to the
25 Staff that in reviewing GALL, you know, we should

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 probably eliminate some of the prescriptiveness of
2 GALL since a range of time, for example for
3 inspections, seems to be acceptable. Do you feel that
4 still GALL forces to a lot of prescriptive steps that
5 you have to evaluate individually to accept exceptions
6 or is there room for improvement still?

7 MR. MEYER: I think the question could be
8 better answered by Dr. Davis.

9 We look at the field implementation and
10 the exceptions and whether they are found to be
11 acceptable is pretty a foregone conclusion when we go
12 in.

13 MR. IQBAL: This is Naeem Iqbal from NRR.
14 The Pilgrim program is based on their
15 approved fire protection program that we reviewed in
16 1978 SER. The GALL recommendation are based on most
17 recent NFPA codes. When we review the license renewal
18 application we pull all the old SERs and review the
19 program.

20 So the GALL recommend like six month
21 versus the refueling cycle for the CO₂ system. So
22 there's a difference of like one year, but at that
23 time we approved it --

24 MEMBER BONACA: The reason why I asked the
25 question is that we've always tried to improve the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 efficiency of the process. And if you have a lot of
2 exceptions that the licensee has to make because
3 you're prescribing six months and he has eight months,
4 then all you have to do is to say it and then the
5 exception is granted, then the best thing to do is
6 maybe provide them more latitude and so they'll have
7 less exceptions and yet you'll have an acceptable--

8 MR. IQBAL: Yes. In some cases some of
9 the applicants they don't have those frequencies. So
10 we asked to enhance their program to follow the GALL.

11 DR. DAVIS: The frequency tend to follow
12 some type of a national standard.

13 CHAIRMAN MAYNARD: Could you state your
14 name for the record again?

15 MR. IQBAL: Naeem Iqbal.

16 MEMBER BONACA: I understand. You know,
17 but still GALL has a flexibility to include that.
18 And, you know, that would eliminate a need for the
19 licensee to make an exception.

20 DR. DAVIS: Right.

21 MR. CHANG: This is Ken Chang.

22 MEMBER BONACA: It would facilitate your
23 life because it's within the acceptable range and it's
24 easier to address.

25 MR. CHANG: I'd like to give that question

1 a little more general response.

2 In the 2005 GALL update SRP license
3 renewal update and generation of the basis document we
4 incorporate a lot of plan specific programs into GALL
5 programs. And also we eliminated some of the
6 exceptions being frequently used into the GALL. But
7 now since 2005, September -- or 2005 GALL already
8 issued, the next update of the GALL, we don't know
9 when. So in my License Renewal Branch we instituted
10 a collection of exceptions, plant-specific programs or
11 what we call the --let's say why -- frequently
12 encountered problems. We collect those. We asked the
13 team members to write up a smaller card, let's call a
14 cue card.

15 Jim Davis is a collection of all the cue
16 cards.

17 Until we update the GALL next time, all
18 the experience we learned, we collected in a central
19 location and people can use it. Now my audit team
20 members of this plant and other plants can use it.

21 We plan to continue this process to take
22 care of those exceptions, enhancements so make it more
23 standard. At least we have a standard set of
24 questions and standards areas to look into it. That's
25 a goal. It may not be addressing your question that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 fast, but we are in the direction.

2 MEMBER BONACA: I think this does. I think
3 it is the right thing to do.

4 DR. DAVIS: We'd identified a real strong
5 weakness in the GALL report in the last several
6 audits, and that is the code addition that you use.
7 Because when they go into a new interval within 12
8 months the applicant submits to the NRC which code
9 addition they're going to use. We put in the 2001 one
10 addition with the 2002 and 2003 addenda in GALL. And
11 nobody's using that yet.

12 MEMBER BONACA: Right.

13 DR. DAVIS: So everybody has to have an
14 exception. So we made a big mistake, and I was the
15 one that's did it. So I'm the one -- but in the future
16 we've got to address that so that we're not everybody
17 take an exception.

18 MEMBER BONACA: Yes. Right.

19 DR. DAVIS: And there's an easy way to
20 take care of it.

21 MS. LUND: This is Louise Lund.

22 I can't resist putting on management's
23 spin on it as well. We also look at -- we don't have
24 a schedule for updating the GALL at a regular interval
25 inasmuch as we have to weigh, you know, the benefit

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 with the amount of resources. Because it a hugely
2 resource intensive effort when we do upgrade the GALL.
3 But as Ken Chang was just saying, you know, we do
4 recognize that there are improvements that can be made
5 and we do tend to track those. So when we get the
6 opportunity to and it looks like the balance between
7 putting the resources towards as versus the benefit,
8 it would be good that we are staged and ready to do
9 that.

10 MEMBER BONACA: Right. Thank you.

11 MR. CHANG: And I have to say that we are
12 better off on BWRs than in PWRs. Because in the last
13 four audits it's all BWRs. So those consistent
14 experience that we're trying to collect is there.

15 Now we start to audit some PWRs, we do
16 likewise. So we have PWR experience, we have BWR
17 experience. Hopefully my life will be easier.

18 MR. BUCKBERG: I was going to introduce
19 you. Dr. Davis will discuss the safety audit.

20 DR. DAVIS: This next slide might a little
21 confusing. It was confusing to me. Because when we
22 were at the audit we had 13 programs consistent with
23 GALL and we added one more program consistent with
24 GALL. So we have 14 programs consistent with GALL.
25 Since then several of the programs we've asked to make

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 enhancement to. So the numbers keep changing a little
2 bit. But somewhere between 12 and 14 programs are
3 consistent with GALL.

4 During the audit we had six programs that
5 were plant specific and we added another electrical
6 program after the audit. So seven programs are plant
7 specific.

8 Of the 40 aging management programs that
9 we looked at, 30 programs are existing programs and 10
10 are new programs.

11 During the AMP audit we scared Ken Chang
12 a little bit. When he left we had about 50 open items
13 out of 165 questions. We managed to close all of them
14 by Friday when we left.

15 One was the E6 issue. And we closed it
16 but then we made it an RAI because it was going to
17 take more time than we had there to resolve it.

18 MR. BARTON: What's the difference between
19 165 questions during the AMP audit and 329 audit
20 questions?

21 DR. DAVIS: Those are total questions.
22 329 is the total. Because on the AMR review we had
23 164 questions. So we had 165 on the first audit, 164
24 on the second audit.

25 And then the AMR review we had one issue,

1 which they did a weld overlay. We asked the
2 Headquarter staff to do a flaw evaluation to see if
3 they'd done their flaw evaluation correctly, just to
4 check it. So we closed that one in an RAI.

5 MEMBER SHACK: Where was the weld overlay
6 since they have a whole new recirculation system,
7 right?

8 DR. DAVIS: I don't recall exactly.

9 MR. BUCKBERG: It's a nozzle. I think it's
10 a CRD nozzle or something.

11 DR. DAVIS: It was a nozzle repair.

12 MR. PACE: This is Ray Pace from Pilgrim.
13 We have one weld overlay that's recent on the N10
14 nozzle. It was a CRD return line that was cut and
15 capped and there was a problem with the weld of the
16 cap to the nozzle.

17 MR. BUCKBERG: Okay. Thank you.

18 DR. DAVIS: This is an interesting issue
19 because to do a weld overlay, and that's a code case.
20 The code cases aren't valid for the extended
21 operation. So that one got a little bit tricky.
22 Because 5055(a) does not allow you to extend code
23 cases past the current interval. So what we did was
24 we had to make a commitment to do a code repair. And
25 then when they get within 12 months of the next

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 interval, they can come in for relief from the code or
2 they can use an approved code case.

3 There were 36 commitments made during the
4 audit. And commitments basically are to implement a
5 new program or to enhance a procedure to conduct some
6 type of an inspection, like the tank bottom inspection
7 UT to perform a code repair or it goes into the
8 tracking system. So anytime they're making a change,
9 we request that they give us a commitment.

10 MR. BARTON: How come on these
11 commitments, I noted someplace that the commitments --
12 no commitments were being implemented to June 8, 2012,
13 which is the start of their extended period. Why
14 wouldn't some of these be implemented as they --

15 DR. DAVIS: They are.

16 MR. BARTON: Okay.

17 DR. DAVIS: They are.

18 MR. BARTON: Somewhere it wouldn't be
19 until June 8th and I wondered why. But you said they
20 will be implemented. Okay.

21 DR. DAVIS: Yes. This is one of my boss,
22 Ken Chang's pet peeves. Is if you have 44 commitments
23 and you have one day to do them all, you're not
24 probably going to finish them.

25 MR. BARTON: Exactly.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 DR. DAVIS: And so I've learned from
2 working with Ken that I ask the applicants, you know
3 you can't do them all on the last day. You've got to
4 schedule them. And of course they're going to
5 schedule them. We had them actually put them in the
6 plan of when they're going to start them. And some of
7 them are two years ahead of time, some are a year
8 ahead of time. But they can't all be on the last day.

9 If you're going to do an inspection of
10 four tanks, you don't want to be doing them one day.

11 Now we had a couple of open items that I'd
12 like to discuss. And they've already been discussed,
13 so I'll just touch on them again.

14 The fire protection program, they're not
15 adequately addressing the aging effects of
16 inaccessible seals. And this was one of the easier
17 ones we had to resolve, because they have no
18 inaccessible seals. So that item is closed.

19 MEMBER SHACK: How about the sampling in
20 the program, there was a discrepancy on that? The
21 difference between the GALL, 10 percent versus --

22 DR. DAVIS: Naeem, can you answer that?

23 MR. IQBAL: I think the program they're
24 doing 25 percent, so they're doing more than the GALL
25 requirement.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER SHACK: Yes, there was 25 percent
2 of all versus 10 percent of each type I thought was
3 the difference. They were doing more, but they were
4 only guaranteed to do one of each type although they
5 did more, at least as I understood the issue.

6 MEMBER BONACA: That's right.

7 MR. COX: Alan Cox with Entergy.

8 And I think the answer to that lies in the
9 number of seals that we're dealing with here. We're in
10 the hundreds, even up to the thousands of seals of
11 each type. So if you do 20 percent on a completely
12 random basis, which is the way the program is set up,
13 you're doing 20 percent of 3,000 seals and you're 99.9
14 percent sure that you're going to get at least 10
15 percent of --

16 MEMBER SHACK: Okay. You just worked
17 through a statistically likelihood of meeting the
18 requirement.

19 MR. COX: Right. Very unlikely that
20 you're not going to have at least a very
21 representative sample of every type.

22 MEMBER SHACK: Your literally doing these
23 seals at random. Someone sits there with a random
24 number generator and plucks seals out of the air?

25 MR. COX: Yes. My understanding is it's a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 computer program that does exactly that.

2 MEMBER SHACK: A true sampling program. I
3 can't believe it.

4 DR. DAVIS: The next one was the
5 containment inservice inspection. And we paid a lot of
6 attention to this because we have the interim staff
7 guidance on the corrosion of the containment shell.
8 And we were very concerned about any evidence of
9 leakage because the interim staff guidance says that's
10 one of the things that you do is if you have no
11 evidence of leaking, then there's a pretty good chance
12 that you're not getting corrosion.

13 When we found out that there was water on
14 the torus room floor that caused a lot of internal
15 meetings to occur and a lot of RAIs, additional RAIs
16 to go. And then a number of conversations with the
17 applicant. And as they have shown you, they've done
18 quite a big of work to resolve this.

19 We had a few additional issues in the last
20 week, and we've resolved those. Things like --

21 MEMBER WALLIS: This switch that was
22 inoperative, that was the six gallons per minute?

23 DR. DAVIS: Yes.

24 MEMBER WALLIS: That's a lot of flow to
25 set the setpoint at.

1 MEMBER SHACK: Bellows failure.

2 MEMBER WALLIS: Yes, it's a real failure
3 they're looking for.

4 DR. DAVIS: But they haven't seen any
5 evidence of leaking.

6 MEMBER WALLIS: Is this something that
7 goes into a bucket?

8 DR. DAVIS: No. I think that goes into the
9 rad waste system.

10 MR. BETHAY: Right.

11 MEMBER WALLIS: Okay.

12 DR. DAVIS: This is a zone 3 seismic area
13 and we were a little bit concerned about what happens
14 if you have a seismic event.

15 MEMBER WALLIS: Yes, I was going to ask
16 about that. I mean, all this business about -- we
17 haven't about seismic. But this is a seismic area,
18 isn't it?

19 DR. DAVIS: Right. Zone 3.

20 MEMBER WALLIS: What sort of earthquakes
21 have they had there?

22 DR. DAVIS: I'm not really sure that
23 they've had any recently.

24 MEMBER WALLIS: The earth has shaken in
25 New England over the past few decades.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. FORD: This is Bryan Ford with
2 Entergy.

3 We have had a couple of earthquakes. We
4 had a very, very small one outside of Plymouth just a
5 year and a half ago that barely felt at the plant.

6 I want to say our seismic design is based
7 upon a earthquake that happened 1860 is the one that
8 defines it for the area.

9 MEMBER WALLIS: There's a ground shaking
10 event when some people came from England and landed in
11 Plymouth, too.

12 DR. DAVIS: We were concerned about that
13 and what would happen if the leakage would increase as
14 the result of earthquake, or the 100 flood. And in
15 our discussions they've got drains that would handle
16 that. And they would have a flood in the torus room.

17 MEMBER WALLIS: You worried about tsunami
18 in Cape Cod Bay --

19 MR. BETHAY: If I could, Jim, I think Dr.
20 Ulm has some interesting thoughts on that if you could
21 indulge Dr. Ulm.

22 DR. ULM: So I think as far as earthquakes
23 are concerned, as we discussed this morning, the four
24 millimeter cylinder does not do anything in terms of
25 damaging the structural performance of the slab,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 foundation slab when an earthquake occurs.

2 The only question which one could raise is
3 the question what would be if the pressure in the
4 fluid face or in the water below the foundation rises
5 so to increase the pressure.

6 So if you look at typical values of this
7 pressure increase and you increase this by, let's say
8 a factor of five, which actually would lead to
9 liquefaction, typically the type of pressure increase
10 which you have because you're under undrained
11 conditions, you would basically expect over that
12 period of time of an earthquake to see five times that
13 much -- to increase of the hydraulic head -- five
14 times as much liquid coming through the hole.

15 Now if you take duration typically of an
16 earthquake, ten seconds, seven seconds, five seconds,
17 depending on that, so it would be pretty short.
18 However, if you look at the aftermath until the water
19 actually dissipates, the water pressure below the
20 foundation dissipates to become homogeneous again,
21 that may take some time. And if you look at the soil
22 which is below, so this granule material, it may take
23 up to three hours that you go back to normal pressure
24 level.

25 In other words, what would you expect

1 altogether is maybe something like one-third more of
2 the water which you see under normal operating
3 conditions if you call them normal operating
4 conditions of the water coming in there, which is
5 something like six liters per day.

6 DR. DAVIS: So we've hopefully we've all.
7 So we spent a lot of effort and a lot of concern.

8 It's also interesting to note that P.T.
9 Kuo who is a seismic engineer, and he had the original
10 design code in his office. So he looked -- he
11 generated some questions about the design of the base
12 mat.

13 And I think that finishes the audit
14 section.

15 CHAIRMAN MAYNARD: Okay. Before we go on,
16 let's take a short break. Let's take a ten minute
17 break and then we'll come back and finish up with your
18 presentation. And then we'll have time for discussion
19 among the members here.

20 So we'll come back at 15 'til.

21 (Whereupon, at 2:32 p.m. a recess until
22 2:43 p.m.)

23 CHAIRMAN MAYNARD: I'll go ahead and call
24 the meeting back into session. And Perry --

25 MEMBER SHACK: Mr. Chairman, can I

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 interrupt for just one thing that came up when we were
2 on the seismic issue. You mentioned you had the Cape
3 Anne earthquake, and it sort of dawned me that your
4 design basis was probably wrong before in LANL and
5 EPRI curves and that sort of thing. When you compute
6 your seismic CDF of 2.3 times ten to the minus five
7 you must use a recurrence frequency. Do you have any
8 idea what that recurrence frequency is for your
9 earthquake?

10 DR. DAVIS: No.

11 MEMBER SHACK: That number just comes up.

12 DR. DAVIS: Yes. Just doesn't leak to the
13 front of --

14 MR. BETHAY: If you'd like, we can get
15 somebody to step out and make a call and find out what
16 the recurrence frequency is.

17 MEMBER SHACK: I'm just curious.

18 MR. BETHAY: Okay. We'll find that out
19 for you.

20 CHAIRMAN MAYNARD: Okay. Perry, TLAA.

21 MR. BUCKBERG: Okay. For the record, I'm
22 Perry Buckberg. I'll be presenting Section 4 Staff
23 review.

24 The applicant included the TLAAs shown in
25 the license renewal application. The six TLAAs could

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 not be accepted as originally evaluated due to the
2 unacceptable performance calculation, as all discussed
3 earlier in detail.

4 All six TLAA's are related to open item 4.2

5 CHAIRMAN MAYNARD: How do you from
6 regulatory space expect that to be handled? They're
7 probably not going to have an answer by next August or
8 September, or do you expect it to be resolved or are
9 you carrying this as purgatory item or --

10 MR. BUCKBERG: It's going to be a
11 condition, license condition. I believe there's a plan
12 right now in place. We haven't worked it through yet
13 completely. That's what we expect.

14 MR. MITCHELL: Yes. This is Matthew
15 Mitchell, Chief of the Vessels and Internals Integrity
16 Branch, NRR.

17 That is what we understand that the
18 applicant's proposal is going to be is to establish
19 concrete fixed fluence limits in relation to these
20 various TLAA's that will then be monitored with a
21 license condition wherein the applicant will have to
22 come in with an influence evaluation acceptable to the
23 staff to demonstrate that those previously established
24 fluence criteria limits are met when they do their
25 updated Regulatory Guide 1.190 compliant analysis.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIRMAN MAYNARD: Okay.

2 MR. MITCHELL: We understand that's the
3 proposed path. We will evaluate that when we see the
4 details of the applicant's proposals in response to
5 the open item.

6 CHAIRMAN MAYNARD: Okay.

7 MR. BUCKBERG: Some background in neutron
8 fluence. The Staff finds the RAMA, which stands for
9 radiation analysis modeling application, methodology
10 for calculating fluence acceptable provided adequate
11 benchmark and can be performed. The applicants
12 calculations were deemed not acceptable by the Staff
13 because the only available dosimetry sample was not
14 acceptable as a benchmark.

15 The applicant will establish and submit
16 for industry review specific neutron fluence criteria
17 which must be met to verify the acceptability of the
18 bounding TLAA analysis. The applicant will, in
19 accordance with their proposed license condition,
20 complete an updated neutron fluence evaluation and
21 submit it for Staff review and approval prior to
22 entering the PEO, period of extendEd operation. The
23 Staff will confirm that all neutron fluence criteria
24 associated with the identified TLAA's have been met
25 based on this updated applicant neutron fluence

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 evaluation. That's the plan as we understand it right
2 now.

3 Section 4.3, metal fatigue, to change the
4 subject that is. Components are designed to either
5 ASME B31.1 code for piping or for vessel components
6 ASME Section 3. Through the audit commitments 31 and
7 35 were added to address effects of fatigue.

8 Section 4.4, EQ of electrical equipment.
9 The Staff reviewed the applicants TLAA on the
10 environmental qualification of electrical equipment
11 and concluded that the evaluation was acceptable.

12 Conclusions. On the basis of its review of
13 the LRA, with the exception of open item 4.2 and
14 pending resolution of open items 2.3.3.6, 3.0.3.2.10
15 and 3.0.3.3.2 the staff determines that the
16 requirements of 10 CFR 52.29(a) have been met.

17 Questions?

18 CHAIRMAN MAYNARD: Does anyone have any
19 questions for the Staff?

20 What I plan to do is if there's anymore
21 questions for the Staff, any other burning questions
22 that we need to raise, and then we'll go around the
23 room and just kind of talk about, input as much as
24 anything, for the full Committee meeting which doesn't
25 occur until like August/September time frame. So a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 little bit of time there.

2 So, with that, any questions for the
3 Staff?

4 MEMBER ARMIJO: I had one more
5 clarification. Now, the licensee presented
6 information, you know something on the order of a
7 dozen UT measurements had been made, but they didn't
8 provide any numbers. Did you actually see the
9 numerical values of the containment shell and were
10 these close to the nominal --

11 DR. DAVIS: They all were nominal.

12 MEMBER ARMIJO: They were nominal? Okay.

13 DR. DAVIS: In the shell.

14 MEMBER ARMIJO: Yes.

15 CHAIRMAN MAYNARD: Okay. Any other
16 questions? Any other for the applicant?

17 I'll tell you what I'd like to do is to
18 take a few minutes, go around any general comments.
19 And I think one of the things we need to accomplish
20 out of this is to identify for when this comes to the
21 full Committee any specific items that you believe we
22 need to focus on. I believe, obviously, the fluence
23 issue is going to need to be discussed. I believe
24 that the moisture is going to need to be discussed in
25 detail. And if there's any of the other issues that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 you'd like to see, I'd like to get that identified now
2 to give both the Staff and the applicant something to
3 be prepared for us.

4 MEMBER ABDEL-KHALIK: I just a follow up
5 question to the gentleman from MIT who provided some
6 information. He indicated that the calculated seepage
7 rate, the estimated seepage rate is between 3.2 and
8 6.4 kilograms per meter square per day. And based on
9 a wetted area in each bay of about, the worst case, of
10 about 20 square meters, that corresponds to about 20
11 to 30 gallons per day. And presumably if the water
12 doesn't cool very much in these bays, that you're
13 evaporating this water as it seeps out, can you
14 actually evaporate 30 gallons per day in that area?

15 MR. BETHAY: Yes. I think the calculation
16 that Franz did was an extremely conservative one. You
17 know, just by observation you go down and look, I
18 would say it's a few gallons of water on the floor.
19 It's clearly an equilibrium. So it is evaporating
20 whatever is coming in in bay 10, as I showed you,
21 which is the worst one.

22 When you go down there it's always about
23 that amount of water on the floor. So whether the
24 calculation is very conservative and the actual end
25 leakage at that point is significantly, it has reached

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 a state of equilibrium that the puddle doesn't seem to
2 get any bigger, it doesn't get a whole lot smaller.

3 MEMBER WALLIS: So it's not leaking very
4 much and it's not evaporating very much? You just see
5 a puddle which is essentially static.

6 MR. BETHAY: And I would agree with you,
7 sir.

8 MEMBER WALLIS: It's nothing like 30
9 gallons a day. It couldn't be.

10 MR. BETHAY: Agree. I think that's a very
11 conservative assumption.

12 MR. BARTON: What's the temperature in the
13 torus room?

14 MR. BETHAY: It varies. Of course during
15 the year I would say the other day, Monday when I was
16 down there, it was 75 degrees. It was comfortable in
17 scrubs.

18 MEMBER BONACA: The condensation dripping
19 all over the place.

20 CHAIRMAN MAYNARD: Well, Said, maybe
21 that's something for the full Committee to come back
22 and have some more discussion.

23 MEMBER ABDEL-KHALIK: Right. I mean,
24 calculations can be so conservative that they become
25 meaningless. And the question is what's a realistic

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 number.

2 MR. BETHAY: Okay. Bryan, let's take that
3 action to refine --

4 MEMBER WALLIS: I don't see how you can
5 calculate it. Because you don't know anything about
6 the cracks. You just know how much water is there.

7 MEMBER SHACK: I mean you back calculate
8 the crack size.

9 MEMBER WALLIS: You calculate the crack
10 size.

11 MEMBER ABDEL-KHALIK: As I indicated
12 before you can do a calculation where you use all the
13 amount of material, that white stuff that has
14 accumulated, to come up with an integral amount for
15 the total amount that has -- right.

16 DR. ULM: Since I was the one who made
17 these conservative estimates, so let me say how I did
18 come to them.

19 So my calculation was based on the
20 following. It was felt that a previously dried area,
21 there was observed reoccurrence of water in roughly a
22 time frame of one to two days. And looking on the
23 pictures which we have, when you look at the maximum
24 amount of area which was touched, I said let's say the
25 maximum amount what you can have -- maybe half of it.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Half of it. So I speak about the orders of magnitude
2 here.

3 So the orders of magnitude to which I came
4 up then here is a comparison with an amount of water
5 which normally seeps through concrete. And this is
6 roughly 300 times more per unit surface than what you
7 observe there. And so I came to the conclusion that
8 it's a very localized phenomenon.

9 And then I said, okay now let me calculate
10 what would be the worst, the biggest size of cylinder
11 which I can get if the whole area -- so the 20 square
12 meter, would be flooded with a half quarter to half an
13 inch of water in there and let me calculate on that
14 basis the amount of the cylinder size, which that was
15 the 4 millimeter.

16 In the report which is with Entergy, I
17 said let's say this is an absolute upper bound and I
18 would expect actually that the size of the real one is
19 in the sub-millimeter scale, so it's below the
20 millimeter size. But I want to give here the worst
21 case scenario to say, let's say, in order to come to
22 a conclusion about whether or not a four millimeter
23 cylinder will effect the seismic stability of it and
24 structural performance of the base mat.

25 So that was the idea to that equation.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER SHACK: Yes, but a four millimeter
2 cylinder is a little phony. I mean what you're sort
3 of saying is you can't have cracked this thing up all
4 that much in order to come up with an equivalent level
5 size that would fill a four millimeter cylinder. I
6 mean it's not just broken up very much, is my
7 conclusion which I gained from it, so --

8 DR. ULM: And it's very concentrated.

9 MEMBER SHACK: It's a pretty integral
10 thing.

11 MEMBER BONACA: It seems to me that if a
12 room was dried up, to raise the inflow of the water it
13 seems to be low enough that you could see, first of
14 all, the -- where it's coming from location wise and
15 second, you could also judgment on the rate at which
16 it's coming in. And, has anybody intended to do that?

17 MR. BETHAY: Yes. If you noticed in the
18 very first photograph that I showed -- Steve Bethay.

19 The very first photograph I showed of bay
20 the photograph on the right showed a tinted
21 enclosure. That's exactly why that was tented.
22 There's a small berm that was built around one of the
23 bolts. It was dried out completely excavated of
24 water, dried out completely. Tented over, you know,
25 condensation or nothing added to. And then what Franz

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 calculated was based on how long it took water to
2 reappear in that area. That's correct.

3 MEMBER ARMIJO: And it did happen, right?

4 MR. BETHAY: It did happen.

5 MEMBER ARMIJO: The water did reappear?

6 MR. BETHAY: Yes, sir. Yes, sir.

7 And Franz' calculation, correct me, but he
8 based it on the theoretical permeability of concrete
9 would have such a rate coming through. The rate that
10 we saw we obviously much greater than the theoretical
11 permeability of concrete. So we know there's some flow
12 path.

13 MEMBER WALLIS: Well, it's probably not
14 seeping in everywhere. It's probably seeping in from
15 a few places. And I think if you actually carefully
16 examined it or put in some traceable dye or something,
17 you could probably figure out where it's coming from,
18 if you wanted to. It's not seeping in from everywhere.
19 It's seeping in from a few places where it's probably
20 where the concrete was joined in the manufacturing of
21 the bed and in the base mat.

22 MR. BETHAY: And that's exactly the goal
23 of the commitment that we have to lift the base
24 plates, look under them, see what we see and follow
25 the trail from there.

1 MEMBER WALLIS: Right.

2 CHAIRMAN MAYNARD: Mario, I'll start with
3 you. Comments, thoughts --

4 MEMBER BONACA: Regarding whatever today
5 or --

6 CHAIRMAN MAYNARD: Yes, what you heard
7 today and then also to focus on anything in addition
8 to what I brought up earlier that what needed to be
9 discussed at the full Committee.

10 MEMBER BONACA: Well, I think I was
11 positively impressed by the presentation. I think the
12 issues have been dealt and with the communication is
13 good.

14 I think that the open items can be closed.
15 I mean, they're on their way to being dealt with, most
16 of them.

17 And regarding the main Committee meeting,
18 I think that the emphasis should be again on what we
19 have today on the torus room, that's important. I
20 think that's on the part of the licensee.

21 Again, we will have much of a summary of
22 licensee committees or whatever. It is good. Because
23 we don't need to have a lot of information. Mostly
24 just look at the issue of water coming in and the
25 issue of the containment shell. Both of them will be

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 of interest to the Committee.

2 Insofar as the Staff, I certainly
3 appreciate their presentation from the inspection,
4 from the inspector. And I think that's important.
5 That's going to be of interest to the whole Committee.

6 And pretty much the format of today,
7 again, we didn't have a lot of slides from the Staff
8 with, you know, items such-and-such, numbers that were
9 included. It not very important for the Committee
10 itself. But for example those insights from the
11 walkdowns and the inspections, those are very
12 important.

13 I think that's pretty where I am.

14 CHAIRMAN MAYNARD: Said?

15 MEMBER ABDEL-KHALIK: I think the only
16 question that remains in my own mind is the issue
17 benchmarking. And it is not clear to me how the
18 benchmarking process itself will be done and what the
19 outcome of the process will be. And therefore in the
20 full Committee presentation I think it might be a good
21 idea to outline how this benchmarking process will be
22 done and what sort of an acceptable outcome of that
23 process from the Staff's perspective would be.

24 I mean in a big picture they'll come back
25 and say either the code is wrong or the data was

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 wrong. And I'm not sure if either one of these would
2 be acceptable to you. So, just what the process will
3 be and what the projected outcome will be that would
4 satisfy your condition.

5 MR. LOIS: This is Lambrose Louis and
6 we're at the Systems Branch. And I'm involved with
7 the fluence issue.

8 Benchmarking in this case is to be able to
9 demonstrate that a specific dosimetry from inside the
10 vessel, or some other location, can be accurately
11 calculated using the RAMA code. That's benchmarking,
12 published with benchmarking.

13 In Regulatory Guide 1.190 there are
14 specific objectives for the benchmarking as well as
15 uncertainty limits within which it is acceptable such
16 a benchmarking.

17 The code has been based on adequate
18 benchmarking for BWR4s. Mainly we had enough data to
19 decide that this was sufficiently accurate code. The
20 code does a very good job. Actually it's one of a
21 kind based on different principles than the
22 conventional codes that have been in use for the last
23 50 years, 40 years, whatever it is, on discrete
24 ordinance. And so it produces higher accuracy than
25 the conventional codes.

1 So we don't really have much of a problem
2 as to the performance of the code. The question is
3 whether we can get an accurate measurement or well-
4 known location and be able to reproduce that. It's
5 not as simple as it sounds. It's a very complicated
6 calculation. But, of course, it is being done
7 everyday in plants and is part of the requirements.

8 I don't have a problem that the licensee
9 will be able to provide such a proof, so to speak.

10 MEMBER ABDEL-KHALIK: You know, I hope
11 you're right. I just would like to see the process of
12 how they will go about doing that.

13 MR. LOIS: Well, of course, the specific
14 means of approving that is up to the licensee.
15 There's quite a variety of ways they can do it.

16 MEMBER ABDEL-KHALIK: That's it. Thank
17 you.

18 CHAIRMAN MAYNARD: Sam?

19 MEMBER ARMIJO: Oh, I agree with what
20 Mario and Said said. I think the water issue on the
21 floor, it has been handled very well. I think it's
22 pretty convincing that that they know where the source
23 is and at the rates of which the water comes up. So
24 I'm pretty comfortable that.

25 I think the full Committee should hear

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 that story.

2 In the case of the fluence, something is
3 wrong, with all due respect to the Staff. If the
4 code's good and the symmetry's good, then the inputs
5 are bad. Something is bad going on there. You
6 shouldn't be off that much. And I just worry that it
7 might open up other issues, this discrepancy might
8 lead to other issues related to the plant that we're
9 not aware of.

10 MR. LOIS: Again, this is Lambrose Louis.

11 What conventionally through experience we
12 know to be wrong is the location of the capsule,
13 traditionally. We have had this problem in the past.
14 And we have disqualified a number of capsules from
15 other plants because of very wide discrepancies
16 between calculated the measured value, which
17 eventually we're able to identify them, but they were
18 not in like, direct location.

19 As you know --

20 MEMBER ARMIJO: That kind of information
21 would be very helpful.

22 MEMBER SHACK: You might just point what
23 the accuracy required for that location is?

24 MR. LOIS: Well, what we require in the
25 Commission paper, it's plus or minus 20 percent one

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 sigma. However, recently -- recently in the last
2 several years, five or ten years, the actual
3 performance of most calculations is in the
4 neighborhood of ten percent.

5 MEMBER SHACK: Yes. But I mean what is the
6 physical location of the specimen you need?

7 MR. LOIS: In the inside of the pressure
8 vessel.

9 MEMBER SHACK: No.

10 MR. LOIS: I'm sorry.

11 MEMBER SHACK: How accurately do you have
12 to know the location of your dosimetry.

13 MR. LOIS: Oh, very accurately. We're in
14 a location, obviously, where the --this extremely
15 steep gradient of the fluence. And that makes it
16 extremely important that one knows precisely where the
17 location is.

18 A quarter of an inch, for example, will
19 throw you off a 100 percent, or nearly.

20 MEMBER ABDEL-KHALIK: That qualitative
21 description in some way if it could be worked into the
22 Staff's presentation or the licensee's for the whole
23 Committee would be helpful. Because it seems like a
24 big discrepancy and there's no --

25 MR. LOIS: Yes. The number is large.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 However, the cause of it could be relatively small in
2 terms of inches, let's say, if the location of the
3 capsule was not accurately known.

4 MEMBER ABDEL-KHALIK: That's it.

5 CHAIRMAN MAYNARD: Graham?

6 MEMBER WALLIS: Yes. This looks like a
7 pretty straightforward license renewal. The thing
8 that was interesting was, of course, the water on the
9 floor which took up 60 percent of the slides. And the
10 thing that surprised me was it seems to have been
11 initiated by the inspection. I would think if it was
12 a characteristic that's somehow different in this
13 plant, something notably different about this plant,
14 that it would have been part of the application. It
15 would have been cleared up at that stage and wouldn't
16 have required the inspectors to raise the question,
17 which seems to be what happened. Maybe I got the story
18 wrong. But it looks as if it was the inspectors who
19 raised the question about what about all this water
20 that's been on the floor over all -- and then it
21 turned out it had been over many years. I would have
22 expected that to have been cleared in the application.
23 Not to have to have been cleared up afterwards.
24 Otherwise, it seems very straightforward license
25 renewal. No issues.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 CHAIRMAN MAYNARD: Bill?

2 MEMBER SHACK: No. It was a good
3 presentation today. I think it did clarify some of
4 the things and sort of made me confident that the
5 problem is as described and it's not part of the
6 drywell shell problem that effects our judgment.

7 I think that the Staff has a well defined
8 process for how to resolve the fluence question. And
9 they will provide the evidence, and if they don't,
10 they won't get an improvement for the method. So I'm
11 not too concerned.

12 CHAIRMAN MAYNARD: Tom?

13 MEMBER KRESS: I agree with most of what
14 I hear. I would like to add a comment on the fluence
15 issue. I don't see that big of a difference from
16 BWR4s and 3s. I don't see why the validation data for
17 RAMA from BWR4s couldn't be applied to say it's valid
18 for BWR3s.

19 I'd like to see more discussion on why
20 that data isn't happening.

21 MR. LOIS: I can respond to that, Dr.
22 Kress.

23 This is Lambrose Lois again.

24 You'll be surprised at the kind -- the
25 type of reactor makes some difference. We've seen

1 that -- I've seen that because I have reviewed other
2 methodologies and product lines.

3 For example, between BWR -- I mean PWR,
4 you think well the Westinghouse and Combustion were
5 the same, yet as each one population of the data were
6 different.

7 The same thing from, obviously, with the
8 only vendor we've seen for PWRs between PWR4s and the
9 remaining of the data that were available.

10 Now in this particular case with the BWRs,
11 unfortunately, we didn't have the number of data we
12 had for PWRs.

13 MEMBER KRESS: One data point, that's all.

14 CHAIRMAN MAYNARD: Yes, one data point.

15 Anything else, Tom?

16 MEMBER KRESS: No, that's good.

17 CHAIRMAN MAYNARD: Okay. John?

18 MR. BARTON: I think you hit the important
19 issues that you want to bring before the full
20 Committee and there really only two issues.

21 As far as the presentations, I think the
22 applicant made a terrific presentation. It's probably
23 one of the best I've seen as far as presenting your
24 application and what your issues are and the ability
25 to answer the questions. I thought that was very good.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 As far as the application itself goes, I
2 thought it was well prepared. It was one of the
3 easiest ones I think to read and go through. Not a
4 lot of flip flopping back and forth to find out. It
5 was well organized.

6 That's about it. I thought it was a
7 pretty good application. It's one of the better ones
8 I've reviewed.

9 CHAIRMAN MAYNARD: Well, I agree with the
10 comments that have been made. I think both the Staff
11 and the applicant presentations hit the important
12 issues, key issues and answered the questions that had
13 answers to them at this time. So I believe that was
14 good.

15 I think that maybe for the full Committee
16 meeting there will be more members. I think it's
17 possible it could get a few more questions relative to
18 the chemistry around the site. And I think maybe some
19 more concrete questions could potentially come out.
20 So I think both the Staff and the applicant could be
21 prepared for that.

22 MEMBER KRESS: I'm glad they measured the
23 sulphur content.

24 CHAIRMAN MAYNARD: And I'm wondering on
25 the water in the torus room, of whether this is really

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 unique or whether we're starting to get more
2 sensitive. It's not uncommon to have water on the
3 floor in some of these areas. And I don't know, it
4 may actually be something that's positive that both
5 the Staff -- that the Staff is getting more sensitive
6 to these things. I don't know without having gone
7 into a number of these. I think it is good that it got
8 brought up and it deserves a good thorough
9 presentation. I think it may that we're getting more
10 sensitive on some of these things, too.

11 DR. DAVIS: It's in the interim staff
12 guidance for the shell, and that's one of the reasons
13 we really took a careful look at it. Because that's
14 a strong indication that you may be having a problem.
15 And also if you have no water on the torus floor, then
16 that's a good strong indication that you don't have a
17 problem with the shell.

18 MR. BARTON: I mean, this is not the only
19 plant that's got water on the floor. So I think
20 everybody got interest really aroused here because of
21 the drywell issue in other plants. And you wonder
22 about okay, how is this related to that. And I think
23 that's what really raised the interest in this issue.

24 DR. DAVIS: That's right.

25 CHAIRMAN MAYNARD: Okay. If there is no

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 other questions or comments --

2 MS. LUND: Dr. Maynard, I just want to
3 make a quick comment. This is Louise Lund.

4 And then also, I think this also points
5 out the value of a license renewal inspections that
6 are performed, you know. And it gives us an
7 opportunity to identify these and they get to pull on
8 the thread of where the water's actually coming from.

9 So, that's -- you know, they did an
10 outstanding job in doing that.

11 MEMBER SHACK: I just wonder how many
12 variations we'll find on this drain design that GE put
13 into these things. Yes, we've see Nine Mile, we've
14 seen Oyster Creek and this one doesn't look like
15 either one of those.

16 MR. BARTON: And some of the MODs
17 resulting in blocks the drains.

18 MEMBER WALLIS: I'd like to know what a
19 nuclear grade bucket looks like.

20 MEMBER SHACK: They're only white plastic.

21 CHAIRMAN MAYNARD: Just as we get all this
22 figured out, then we switch to a different model --

23 DR. DAVIS: And it costs \$1,000.

24 CHAIRMAN MAYNARD: If there's nothing
25 else, we're adjourned. Thank you very much.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

(Whereupon, at 3:12 p.m. the Subcommittee meeting was adjourned.)

CERTIFICATE

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

Name of Proceeding: Advisory Committee on
Reactor Safeguards
License Renewal Subcommittee

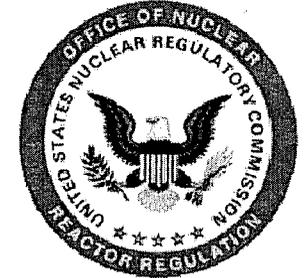
Docket Number: n/a

Location: 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.



Charles Morrison
Official Reporter
Neal R. Gross & Co., Inc.



Pilgrim Nuclear Power Station License Renewal Safety Evaluation Report

Staff Presentation to the ACRS

Perry Buckberg, Project Manager
Office of Nuclear Reactor Regulation

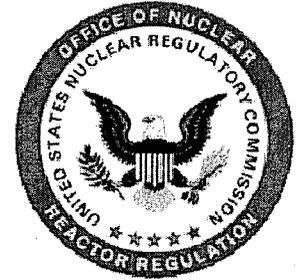
April 4, 2007

Introduction



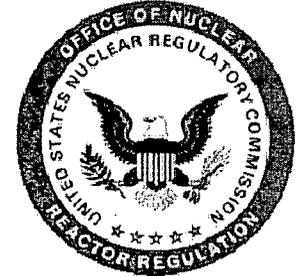
-
- Overview
 - Section 2: Scoping and Screening Review
 - License Renewal Inspections
 - Section 3: Aging Management Review Results
 - Section 4: Time-Limited Aging Analyses (TLAAs)

Overview



-
- LRA Submitted by Letter, January 27, 2006
 - GE BWR3 - MARK 1 Containment
 - 2028 MWth, 690 MWe
 - Op License DPR-35 Expires June 8, 2012
 - Located in Plymouth, MA

Overview



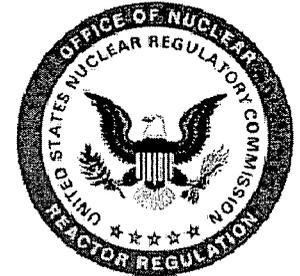
- SER Issued March 1, 2007
- Four (4) Open Items
- No Confirmatory Items
- Three (3) License Conditions
- 91 RAIs Issued, 329 Audit Questions
- ≈82% Consistent With Draft GALL Report, Revision 1
- Minor Components Brought Into Scope

Review Highlights



-
- **AMP GALL Audit**
 - May 22, 2006
 - **Scoping and Screening Methodology Audit**
 - June 6 - June 9, 2006
 - **AMR GALL Audit**
 - June 19, 2006
 - **AMP/AMR Status Briefing**
 - July 17 - 19, 2006
 - **Regional Inspections**
 - September 18 - 22, 2006
 - October 2 - 6, 2006
 - December 6 - 7, 2006

Section 2: Scoping and Screening Review



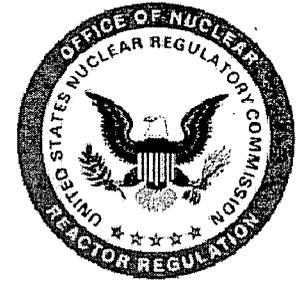
Section 2.1 - Scoping and Screening Methodology

- On-site Audit - June 6 – June 9, 2006
- Staff Audit And Review Concluded That The Applicant's Methodology Satisfies The Rule (10 CFR 54.4(a) and 10 CFR 54.21)

Section 2.2 – Plant-Level Scoping

- No Omission Of Systems Or Structures Within The Scope Of License Renewal

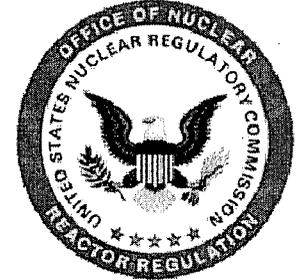
Section 2: Scoping and Screening Review



Section 2.3 – Mechanical Systems

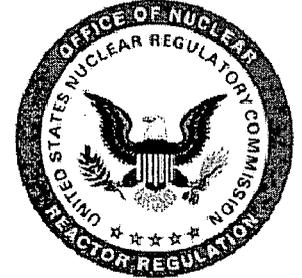
- 60 Mechanical Systems
- 100% Reviewed
- On-site Review Of Mechanical Systems
- Review of the Security Diesel System was Referred to the Regional Inspection Team
- Minor Components Brought Into Scope

Security Diesel



-
- Open Item 2.3.3.6: Security Diesel
 - LRA Did not Include System Drawings
 - Referred to Regional Inspector to Determine System Components in Scope
 - Staff Considers the 3/9/2007 Inspector Input Adequate to Close the Open Item

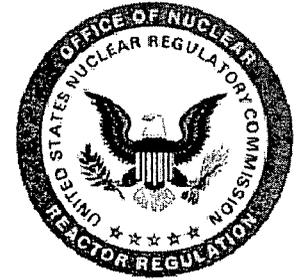
Section 2: Scoping and Screening Review



Section 2.3 – Mechanical Systems

- Components Brought Into Scope
 - Turbocharger (Emergency Diesel)
 - Turbocharger (Station Blackout Diesel)
 - Diesel Fuel Oil Emergency Transfer Skid
 - Outdoor Transformer Fire Suppression Systems

Section 2: Scoping and Screening Review



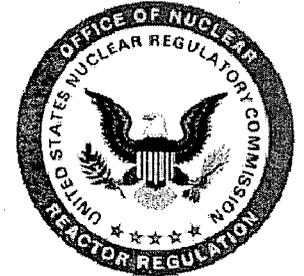
Section 2.4 – Containment, Structures, and Supports

- No Omission Of Structures Or Supports Within The Scope Of License Renewal

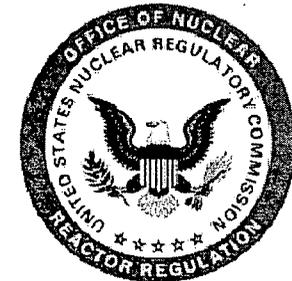
Section 2.5 – Electrical and Instrumentation & Control

- No Omission Of Electrical And Instrumentation & Control Systems Components Within The Scope Of License Renewal

Section 2: Scoping and Screening Summary



- The Applicant's Scoping Methodology Meets The Requirements Of 10 CFR Part 54
- Scoping And Screening Results, As Amended, Included All SSCs Within The Scope Of License Renewal And Subject To AMR

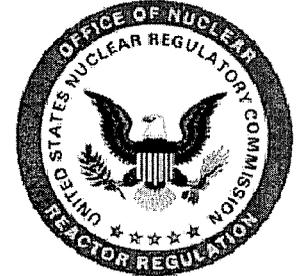


License Renewal Inspections

Glenn Meyer

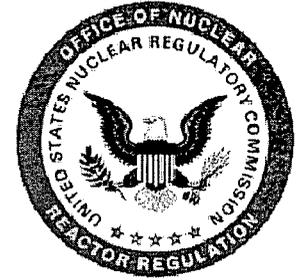
Region I

Scoping and Screening



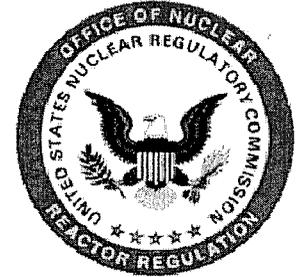
-
- 54.4(a)(2) - Non-safety SSCs Whose Failure Could Impact Safety SSCs
 - Spatial and Structural Interactions
 - LRA Drawings and Procedures Reviewed
 - Plant Walkdowns Performed

Scoping and Screening Conclusions



- Spatial Interaction - Acceptable
- Structural Interaction – Corrected
- Scoping and Screening Acceptable for License Renewal

Aging Management



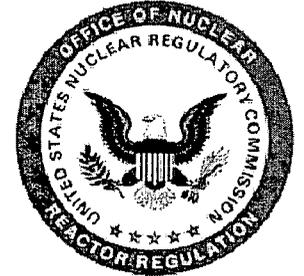
- Reviewed 26 AMP Programs
- Reviewed Programs, Evaluations, and Records
 - Program Procedures
 - Operational Experience Information
 - Prior Pilgrim Issues
- Performed Plant Walk Downs
- Interviewed Cognizant Personnel

Inspection Conclusions



- Scoping and Aging Management Programs Support Conclusion That Aging Effects will be Managed
- Drywell Shell Monitoring – SER OI 3.0.3.3.2
- Instrumentation Circuit Testing Program

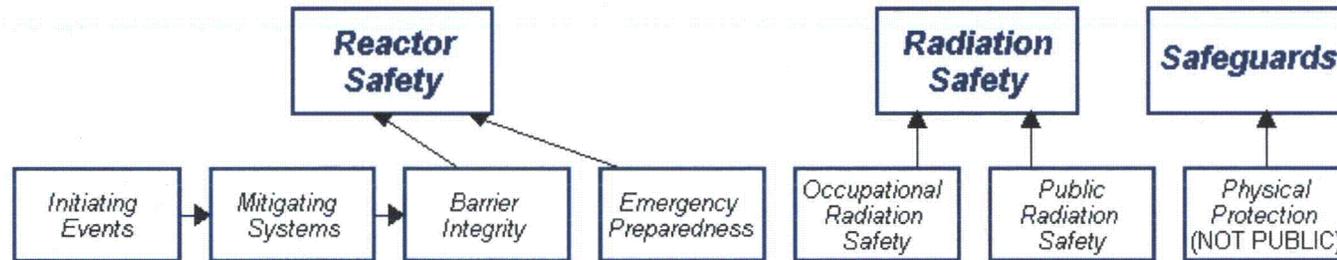
Current Performance



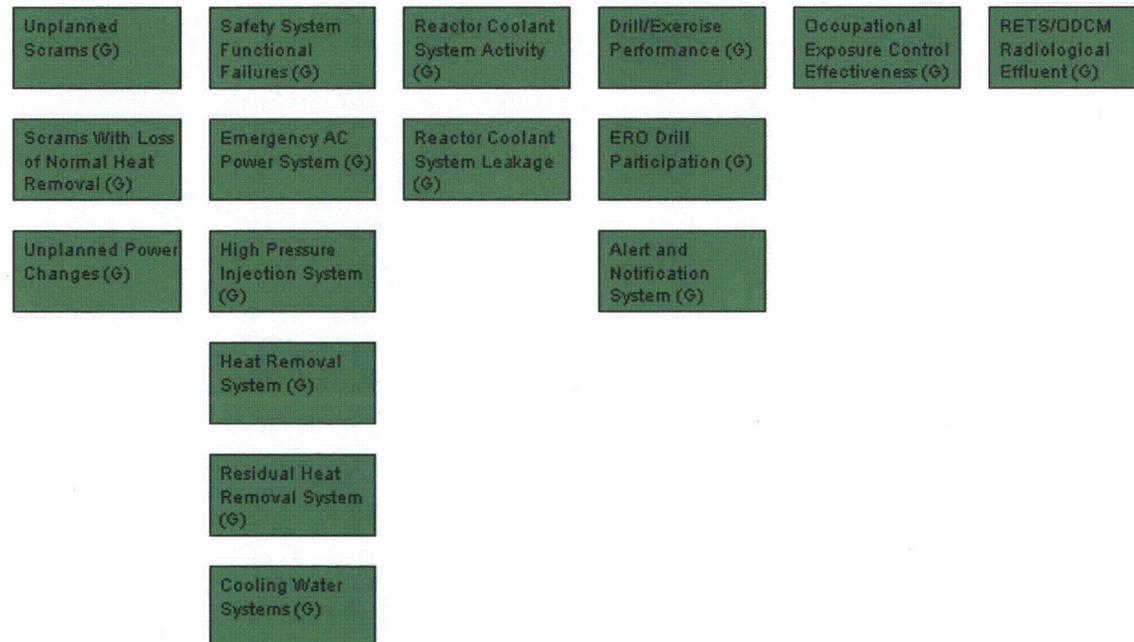
-
- Licensee Response Column (Column I) of the NRC's Action Matrix – Green PIs and Findings
 - No Cross-cutting Issues
 - Reactor Oversight Process Baseline Inspections



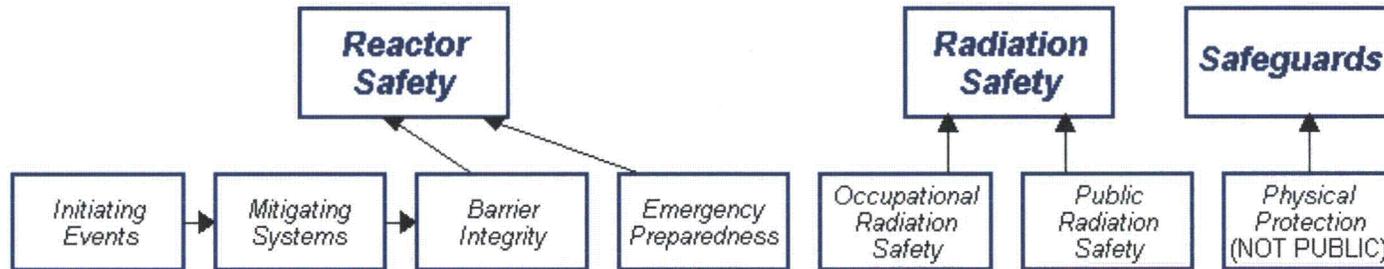
Performance Indicators



Performance Indicators



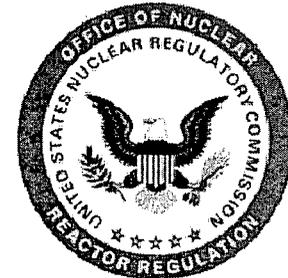
Inspection Findings



Most Significant Inspection Findings

	Initiating Events	Mitigating Systems	Barrier Integrity	Emergency Preparedness	Occupational Radiation Safety	Public Radiation Safety	Physical Protection (NOT PUBLIC)
4Q/2006	No findings this quarter	G	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter
3Q/2006	No findings this quarter	No findings this quarter	No findings this quarter				
2Q/2006	G	G	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter
1Q/2006	No findings this quarter	No findings this quarter	No findings this quarter				

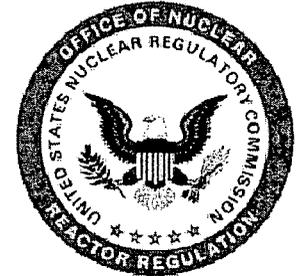
Miscellaneous findings



Pilgrim Nuclear Power Station Safety Audit

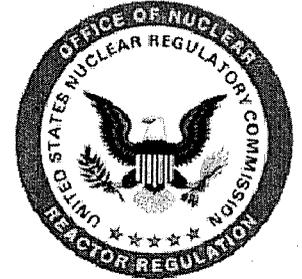
Dr. James A. Davis
Audit Team Leader

Aging Management Program Audit



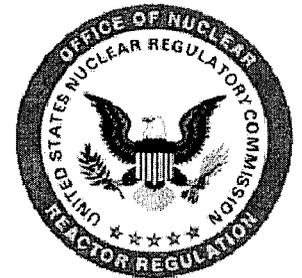
- 40 AMPs in the LRA Reviewed by Staff
 - 14 Programs Consistent with GALL
 - 19 Programs Consistent with GALL with Exceptions or Enhancements
 - 7 Programs are Plant Specific
 - 30 Programs are Existing Programs
 - 10 are New Programs

AMP Audit (Continued)



-
- 165 Questions During AMP Audit
 - All Questions Were Resolved

Aging Management Review Audit



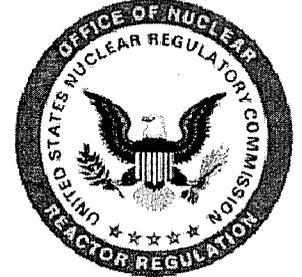
- 164 Questions Closed
 - Includes One Converted To RAI (Flaw Evaluation)

Commitments



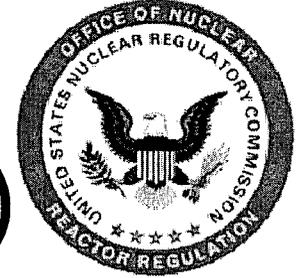
-
- 36 Commitments at the End of the Audit
 - 8 Additional Commitments After Regional Inspection and Result of RAIs

Fire Protection Program (B.1.13.1)



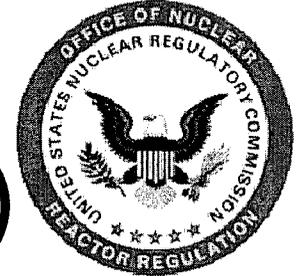
-
- Open Item 3.0.3.2.10:
 - Applicant did not Adequately Address how to Manage the Aging Effects of Inaccessible Seals.

Containment Inservice Inspection Program (B.1.16.1)



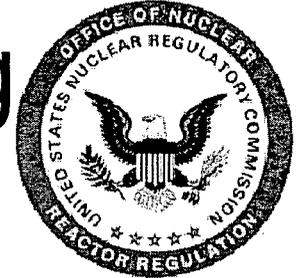
- Open Item 3.0.3.3.2:
 - Regional Inspection Documented:
 - Inoperative Bellows Rupture Drain Flow Switch
 - Drain Monitoring Inconclusive & Undocumented
 - Water on Torus Room Floor

Containment Inservice Inspection Program (B.1.16.1)



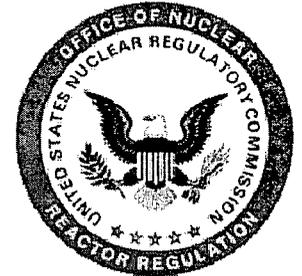
- Open Item 3.0.3.3.2:
 - Applicant Actions
 - Replace Flow Switches
 - Drywell UT Data
 - Performance Evaluation of Torus Basemat
 - Verify Condition of Torus Hold Down Bolts and Grout

Section 4: Time-Limited Aging Analyses (TLAA)



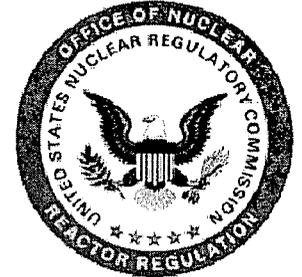
-
- 4.1 Identification of TLAA
 - 4.2 Reactor Vessel Neutron Embrittlement
 - 4.3 Metal Fatigue
 - 4.4 Environmental Qualification Analyses of Electrical Equipment
 - 4.5 Concrete Containment Tendon Prestress
 - 4.6 Containment Liner Plate, Metal Containment, and Penetrations Fatigue Analysis
 - 4.7 Other TLAA
 - 4.7.1 Reflood Thermal Shock of the Reactor Vessel Internals
 - 4.7.2 TLAA in BWRVIP Documents

Section 4.2: Reactor Vessel Neutron Embrittlement



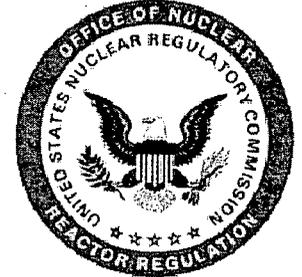
-
- Six TLAA's Affected by Neutron Fluence
 - Reactor Vessel Fluence
 - Pressure-Temperature Limits
 - Upper Shelf Energy
 - Adjusted Reference Temperature
 - Circumferential Weld Inspection Relief
 - Axial Weld Failure Probability
 - TLAA Analyses was Submitted and Deemed Not Acceptable

Neutron Fluence



-
- Open Item 4.2
 - RAMA Methodology Used to Calculate Neutron Fluence
 - Dosimetry Data was not Available with Which to Benchmark the Calculated Results.
 - Result - Fluence Calculation Not Acceptable Per Reg Guide 1.190 -Lead to Open Item 4.2

Neutron Fluence



-
- Open Item 4.2
 - Applicant's Submittal IAW Described Plan
 - Applicant Completes Fluence Evaluation and Verifies TLAA Basis
 - The Staff Will Review Submittal for Acceptance

Section 4.3: Metal Fatigue



- Commitments 31 and 35 Will Ensure That Either
 - Projected 60 yrs Cycles Enveloped by Design Cycles
 - Refined CUF ≤ 1 for PEO
 - Aging Effects Will be Managed for the Components
 - Repair Or Replace the Affected RPV Locations
- Based on These Commitments, the Staff Accepted the Evaluations in accordance with 10 CFR 54.21(c)(1)(i), (ii) and (iii)



Section 4.4: Environmental Qualification (EQ) of Electrical Equipment

- Applicant's EQ Program consistent with GALL AMP X.E1, "Environmental Qualification of Electrical Equipment"
- Staff Concluded The EQ Program Is Adequate To Manage The Effects Of Aging On The Intended Function Of Electrical Components
- The Staff Accepted the Evaluation in Accordance with 10 CFR 54.21(c)(1)(iii)

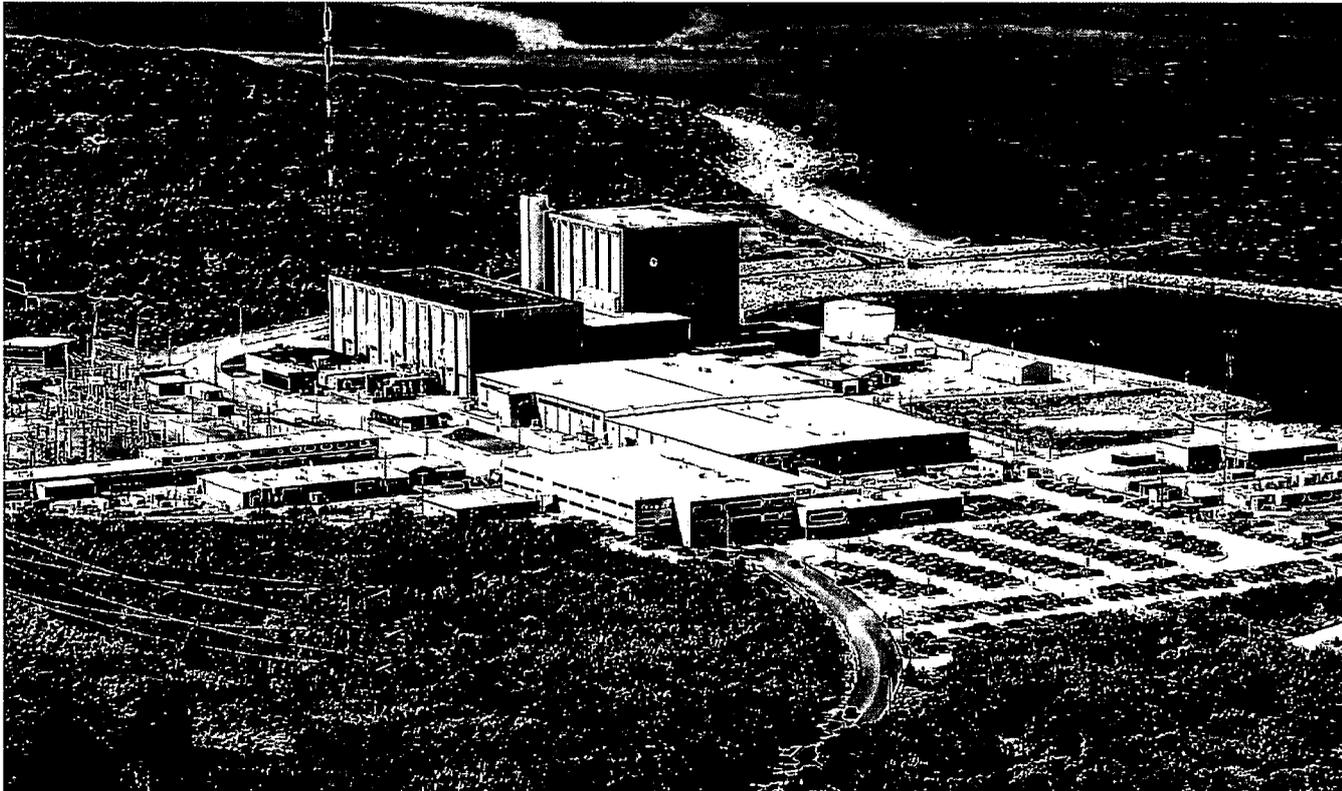
Conclusions



- On the basis of its review of the LRA, with the exception of Open Item (OI) 4.2, and pending resolution of OIs 2.3.3.6, 3.0.3.2.10 and 3.0.3.3.2, the staff determines that the requirements of 10 CFR 54.29(a) have been met.

Pilgrim Nuclear Power Station

ACRS License Renewal Subcommittee Presentation
April 4, 2007



ACRS OFFICE COPY
RETAIN FOR THE LIFE OF THE COMMITTEE

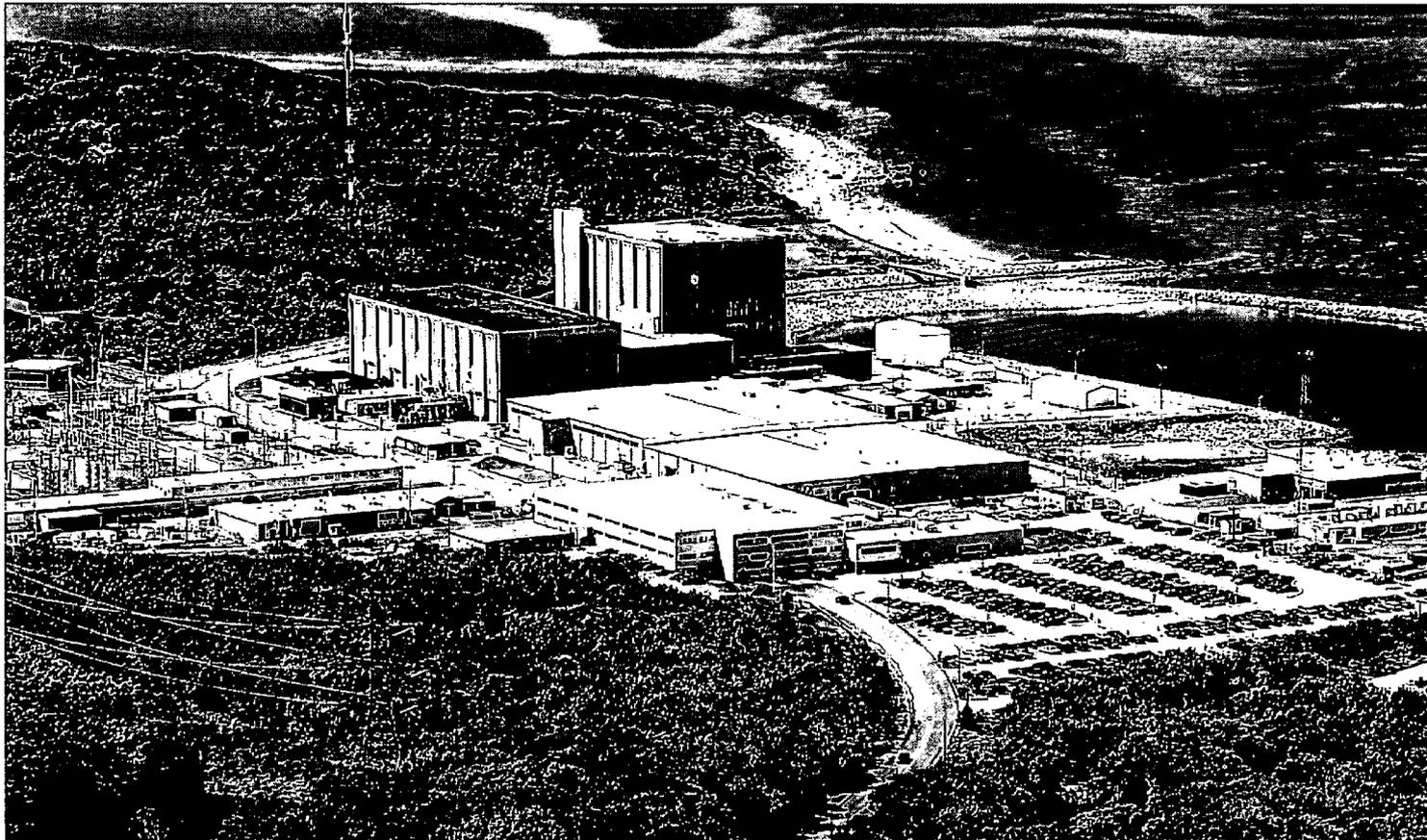
ACRS OFFICE COPY
RETAIN FOR THE LIFE OF THE COMMITTEE



ACRS OFFICE COPY
RETAIN FOR THE LIFE OF THE COMMITTEE

Pilgrim Nuclear Power Station

ACRS License Renewal Subcommittee Presentation
April 4, 2007



Pilgrim Personnel in Attendance

Bob Smith	General Manager Plant Operations
Steve Bethay	Director of Nuclear Safety Assurance
Brian Sullivan	Director of Engineering
Bryan Ford	Licensing Manager
Ray Pace	Mechanical Engineering Design Supervisor
Alan Cox	Entergy LR Project Manager
Fred Mogolesko	Pilgrim LR Project Manager
Other support personnel	

Agenda

- Pilgrim Description and Current Status
- Pilgrim Licensing History/Highlights
- License Renewal Project
- Cost-Beneficial SAMAs
- Pilgrim SER Open Items
 - Security Diesel Generator
 - Fire Barrier Penetration Seals
 - Containment Inservice Inspection
 - Neutron Fluence
- Questions

Pilgrim Description

- Located in Plymouth, Massachusetts on Cape Cod Bay
- ~ 40 miles south of Boston
- Sited on 1600 Acres
- BWR-3
- Mark I Containment
- General Electric (NSSS), Bechtel (AE and Constructor)
- 2028 MWt Thermal Power; ~ 690 MWe
- Open Cycle Condenser Cooling
- Owned and Operated by Entergy
- Staff: ~ 655

Current Plant Status

- Coastdown began February 1, 2007
- 2007 RFO-16 begins April 6, 2007
- NRC PIs & Inspection Findings All Column 1

Pilgrim Licensing History/Highlights

- Construction Permit August 26, 1968
- Operating License June 8, 1972
- Full Power License September 15, 1972
- Commercial Operation December 9, 1972
- License Transfer to Entergy July 13, 1999
- Appendix K Power Uprate (1.5%) May 8, 2003
- LR Application Submitted January 25, 2006
- Operating License Expires June 8, 2012

Pilgrim Licensing History/Highlights

(continued)

- 1977- Replaced Core Spray safe-ends and piping inside primary containment with IGSCC-resistant material
- 1978 -1982 Mark I containment modifications
- 1984 - Replaced recirculation piping to address IGSCC concerns
- 1986 -1989 Safety enhancement modifications (SSW-RHR cross-tie, Direct Torus Vent to Main Stack, Station Blackout Diesel Generator)
- 1991 - Hydrogen water chemistry
- 1995 - Replaced ECCS suction strainers

Pilgrim License Renewal Project

- LRA Prepared by experienced, multi-discipline Entergy team (corporate and on-site)
- Pilgrim and VY LRAs first applications submitted following issuance of Rev. 1, SRP and GALL
- Incorporated lessons learned from previous applications
- Peer review conducted (10 Utilities)
- LRA internal reviews (OSRC, SRC, QA)

Pilgrim License Renewal Project

(continued)

- Commitments in the LRA refined as needed during audit/inspection process (40 aging management programs)
- Commitments tracked - Pilgrim commitment tracking system
- 40 aging management programs
 - 14 programs in place w/o enhancements
 - 16 programs require enhancement
 - 10 New Programs

Aging Management Program Implementation

Cost-Beneficial SAMAs

- Evaluating Cost-Beneficial SAMAs
 - SAMA 30 Procedures to cross-tie AC buses
 - SAMA 34 Procedures to cross-tie DC buses
 - SAMA 53 Containment venting within narrow pressure band
 - SAMA 56 Redundant DC power to DTV valves
 - SAMA 57 Use of diesel fire pump fuel transfer pump
 - SAMA 58 Power SR Division A load center bus loads via NSR Bus, SR Division B loads via NSR Bus, when SR 4kV unavailable post-trip
 - New Portable power source to SR 125 vdc Battery
- None are age-related
- SAMA Details

Pilgrim Draft SER Open Items

- OI 2.3.3.6 Security Diesel Generator
- OI 3.0.3.2.10 Fire Barrier Penetration Seals
- OI 3.0.3.3.2 Containment Inservice Inspection
- OI 4.2 Reactor Vessel Neutron Fluence

Security Diesel Generator

OI 2.3.3.6

- Region 1 Confirmatory Item
 - Determine whether security diesel components are within the scope of license renewal
- Requested Support Provided

Fire Barrier Penetration Seals

OI 3.0.3.2.10

- Concern on aging management of inaccessible seals
- All penetration seals are included in the inspection program

Containment Inservice Inspection

OI 3.0.3.3.2

- Potential for corrosion in the inaccessible area of the steel containment shell, base mat and sand pocket region
- Inspection Observations
 - Rupture drain flow switch
 - Surveillance documentation
 - Torus room floor water

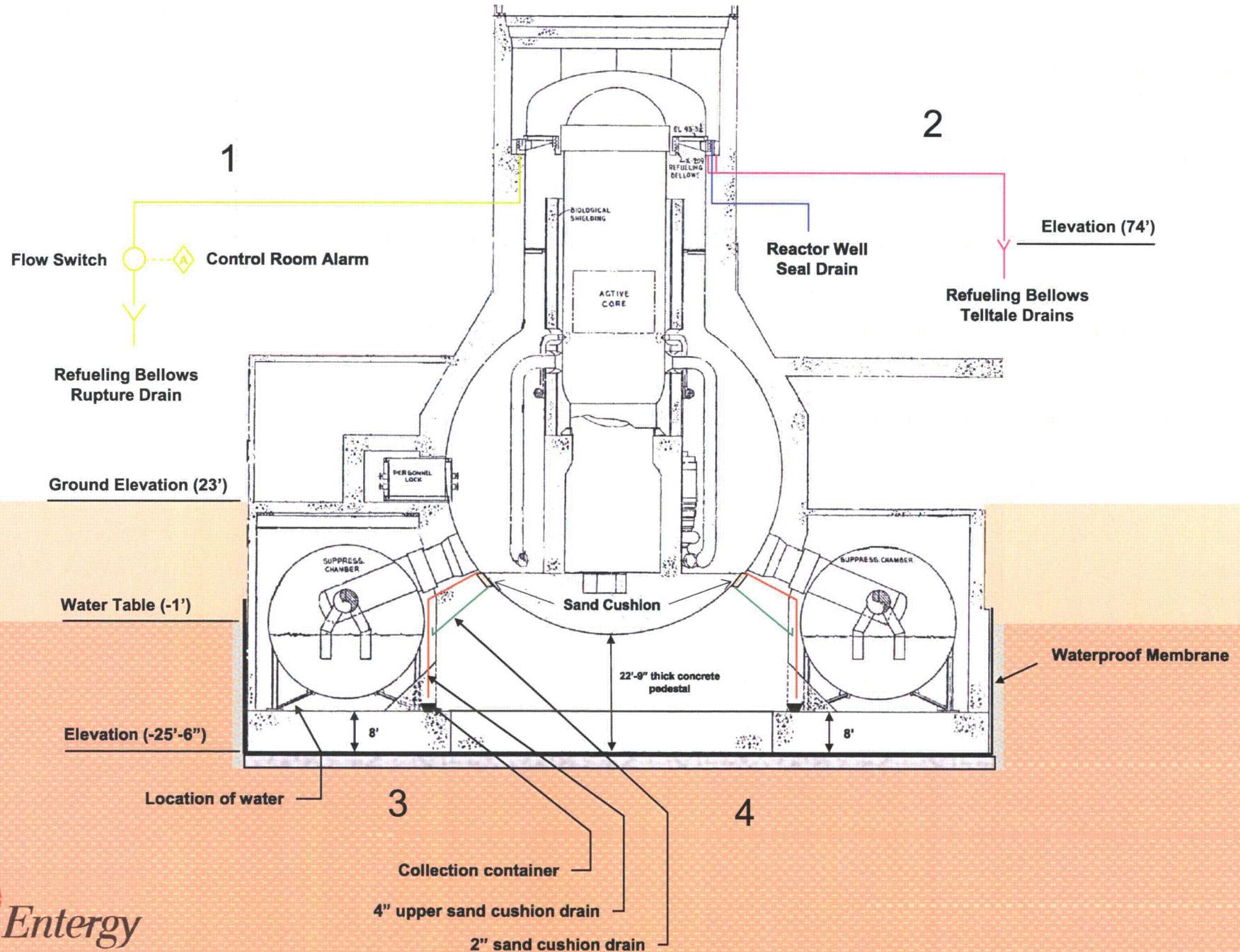
Containment Inservice Inspection

Drywell Shell Condition and Monitoring

- Design minimizes potential for undetected water intrusion
- Diverse methods of prevention and identification of potential water leakage into air gap
- No Refueling Bellows leakage
- No water intrusion into drywell air gap
- No drywell shell degradation
- Confirmatory inspections performed and planned

Containment Inservice Inspection

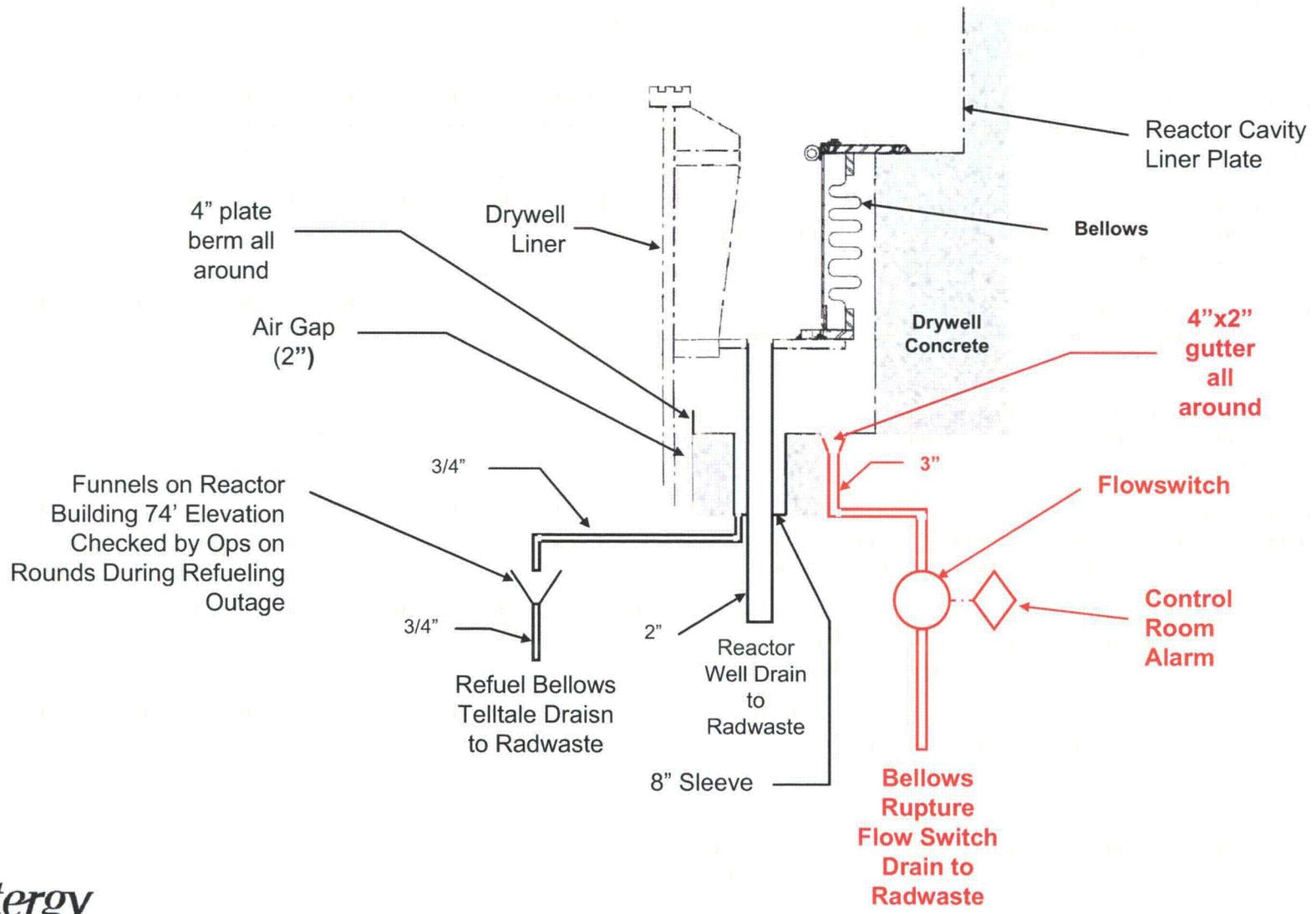
Drywell Shell Condition and Monitoring



Containment Inservice Inspection

Drywell Shell Condition and Monitoring

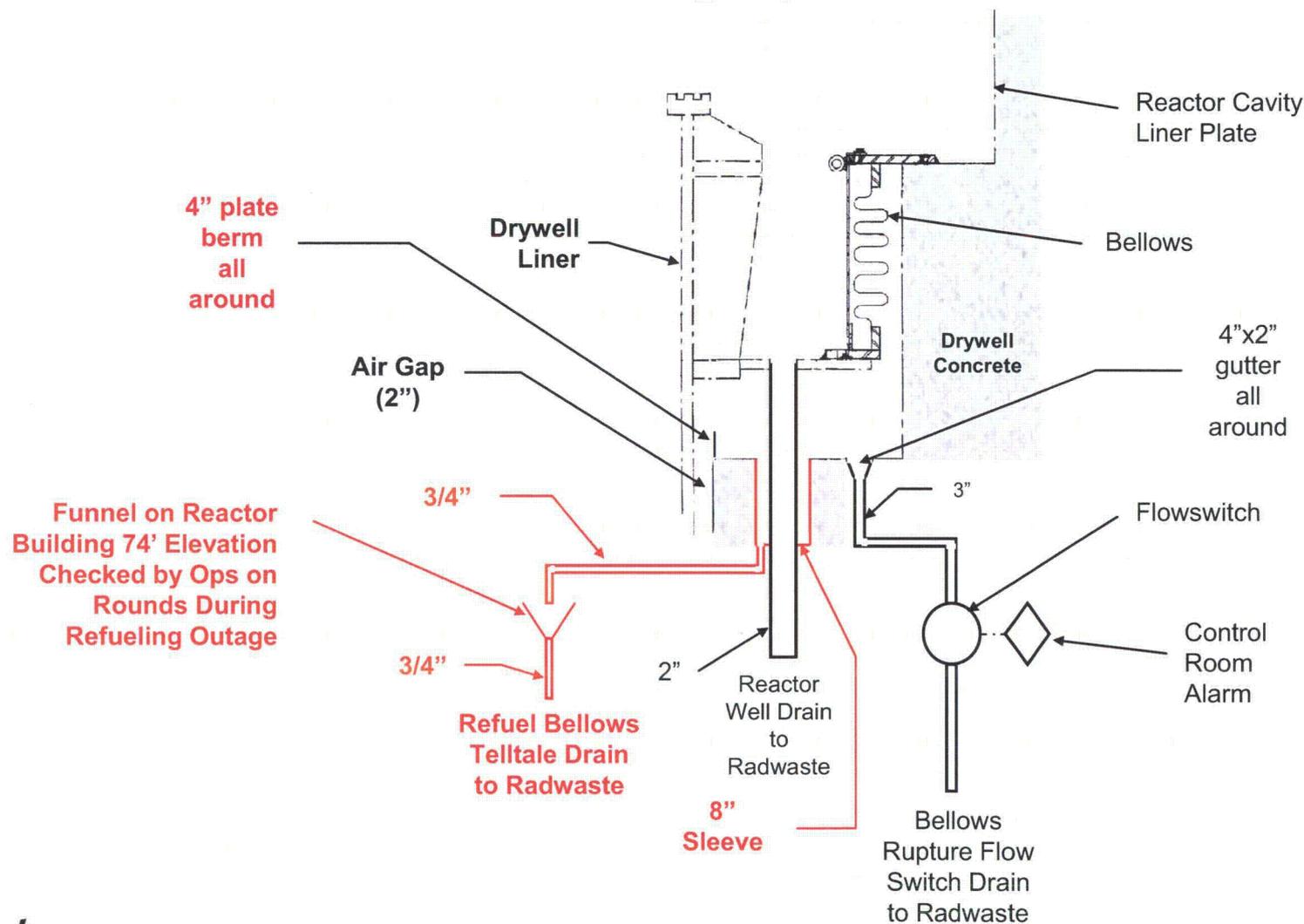
3" instrumented drain line alarms in control room



Containment Inservice Inspection

Drywell Shell Condition and Monitoring

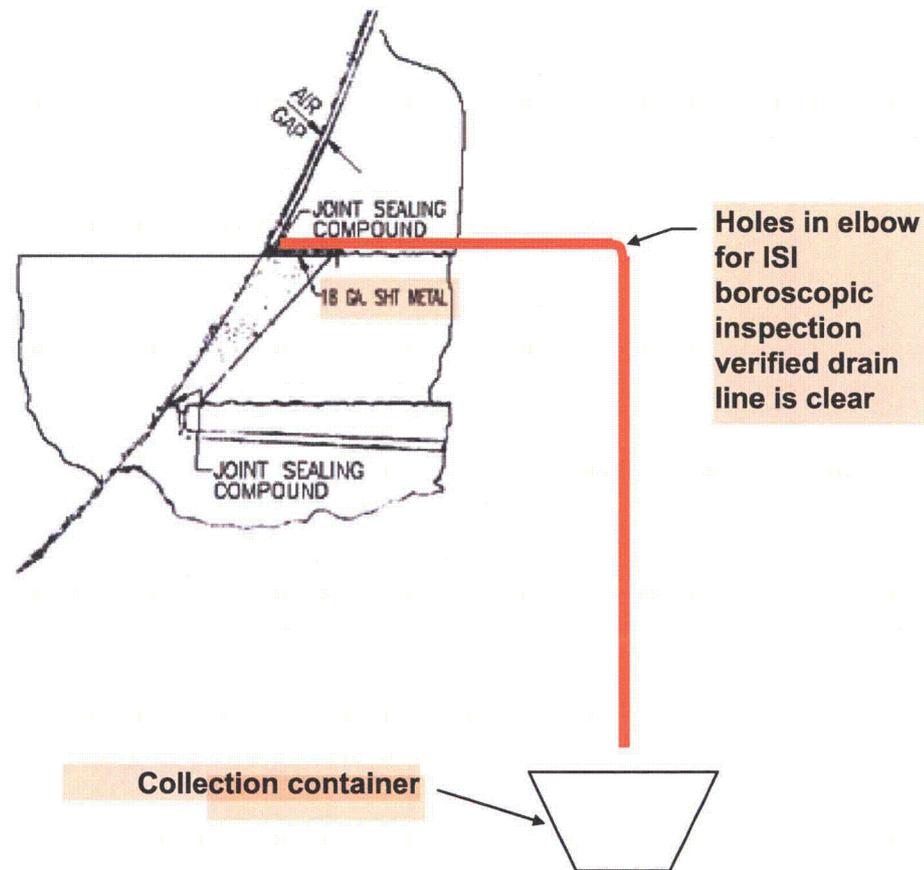
Four 3/4" drain lines which exit to 74' floor drains checked during operator tours



Containment Inservice Inspection

Drywell Shell Condition and Monitoring

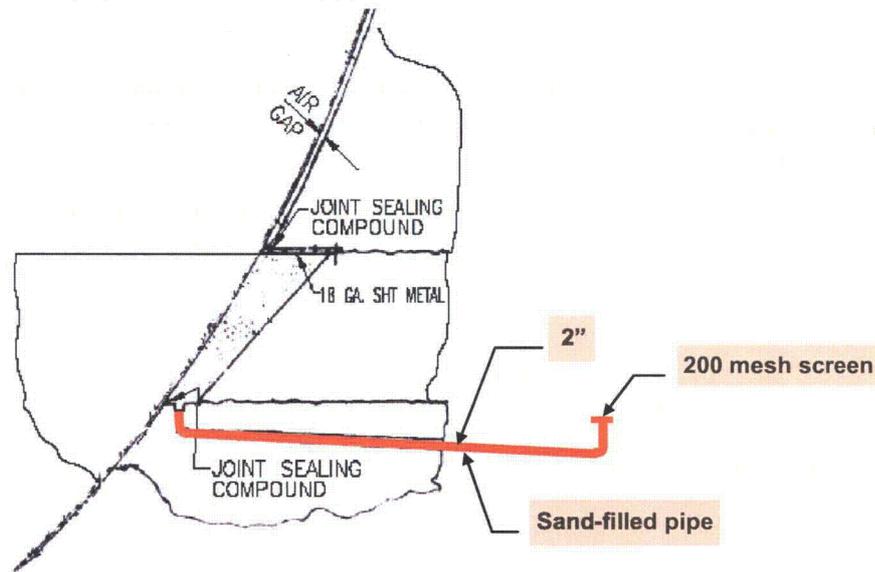
Four 4" upper sand cushion drains drain into collection devices and are monitored at beginning and end of each RFO



Containment Inservice Inspection

Drywell Shell Condition and Monitoring

Four sand cushion drains provide further detection capabilities



Containment Inservice Inspection

Drywell Shell Condition and Monitoring

Past Inspections

- Limited confirmatory UT
 - UT at twelve locations at 9'-2" elevation
 - UT at four locations at 9'-1" elevation
 - Concrete chipped out to a depth of 1"
 - UT at six locations at 72' and 83' elevations
- Verified upper sand cushion drains unobstructed and dry
- All inspections identified no corrosion

Containment Inservice Inspection

Drywell Shell Condition and Monitoring

Future Inspections

- UTs at 12 Locations at 9'-2" Elevation
 - Prior to Period of Extended Operation
 - Once within first 10 years
- UTs at 4 Locations at 9'-1" Elevation
 - Prior to Period of Extended Operation
 - Once within first 10 years
- UT at 72' Elevation Adjacent to SFP
 - Conducted every 40 months by IWE

Containment Inservice Inspection

Water on Torus Room Floor

Containment Inservice Inspection

Water on Torus Room Floor

Aspects Evaluated

- Source of water
- Integrity of concrete and anchor bolts
- Structural adequacy of the reactor building
- Inspection and monitoring of water, concrete, and Torus hold down anchor bolts

Containment Inservice Inspection

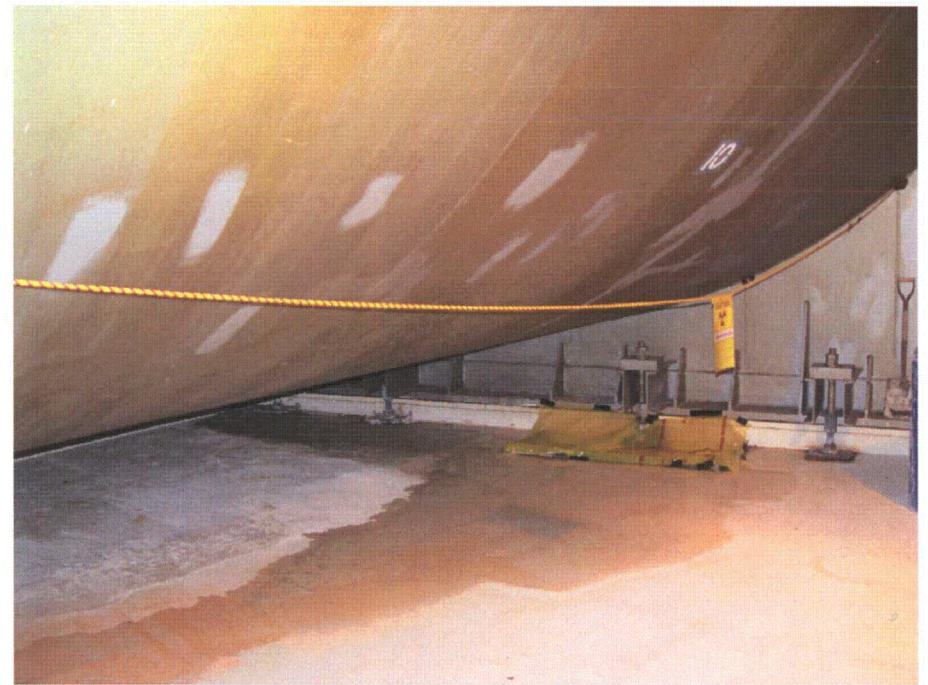
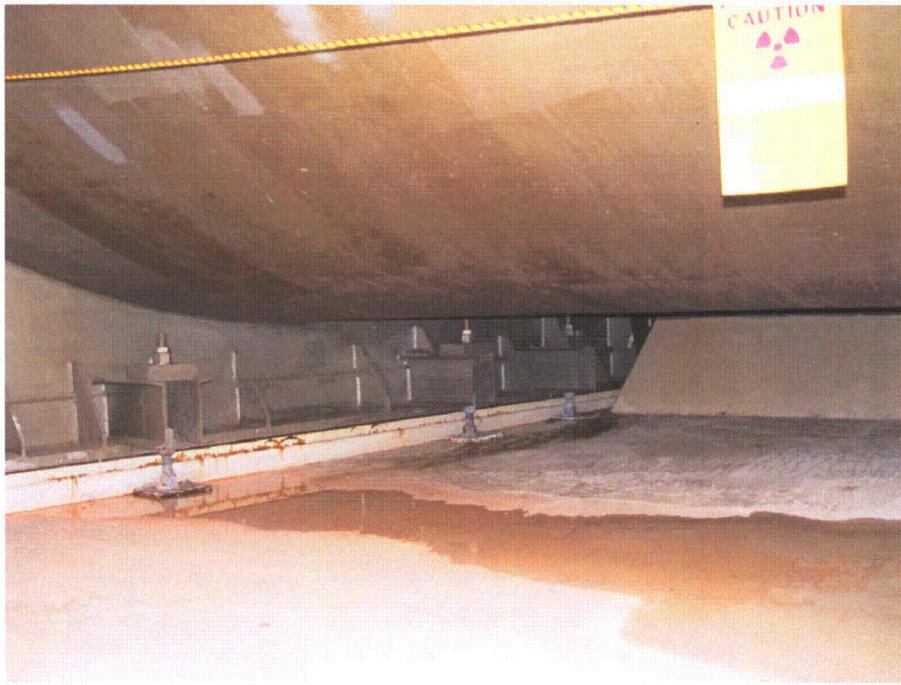
Water on Torus Room Floor

- Water on torus room floor was initially identified in late 1970's and early 1980's.
- Multiple Engineering Evaluations

Containment Inservice Inspection

Torus Room Floor

Bay 10



Containment Inservice Inspection

Water on Torus Room Floor

Evaluation

- The source is ground water seepage under hydraulic pressure.
- Low seepage rate is counteracted by evaporation.
- Non aggressive, benign water chemistry.
- No structural distress evident
 - No cracks other than hairline
 - No evidence of structural settlement
- Grout around Williams Anchor Bolts performs no structural integrity function.

Containment Inservice Inspection

Water on Torus Room Floor

- Current Status
 - Water re-analyzed to demonstrate non aggressiveness.
 - Review over last 6-weeks shows minimal water on torus floor.
 - Seepage, mostly in Bay 10 estimated at $\frac{1}{4}$ " to $\frac{1}{2}$ " over 100 square feet.
 - Independent Assessment to demonstrate full functional capability of torus base-mat conducted.
 - Professor Franz Ulm of MIT's Department of Civil Engineering

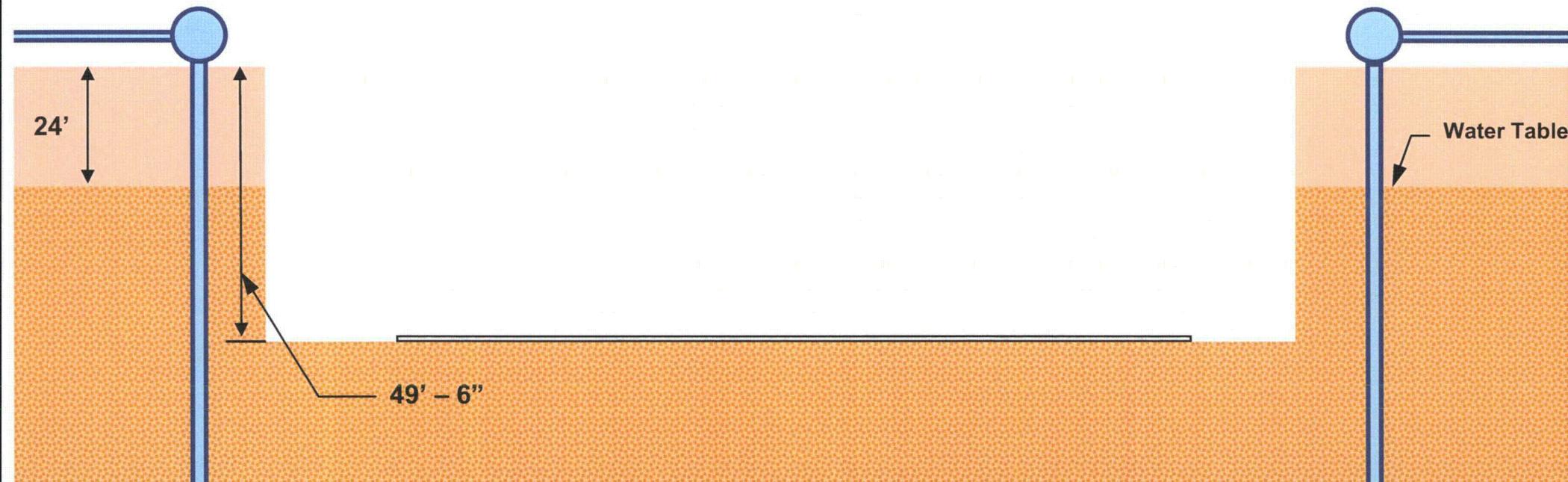
Reactor Building Site Preparation



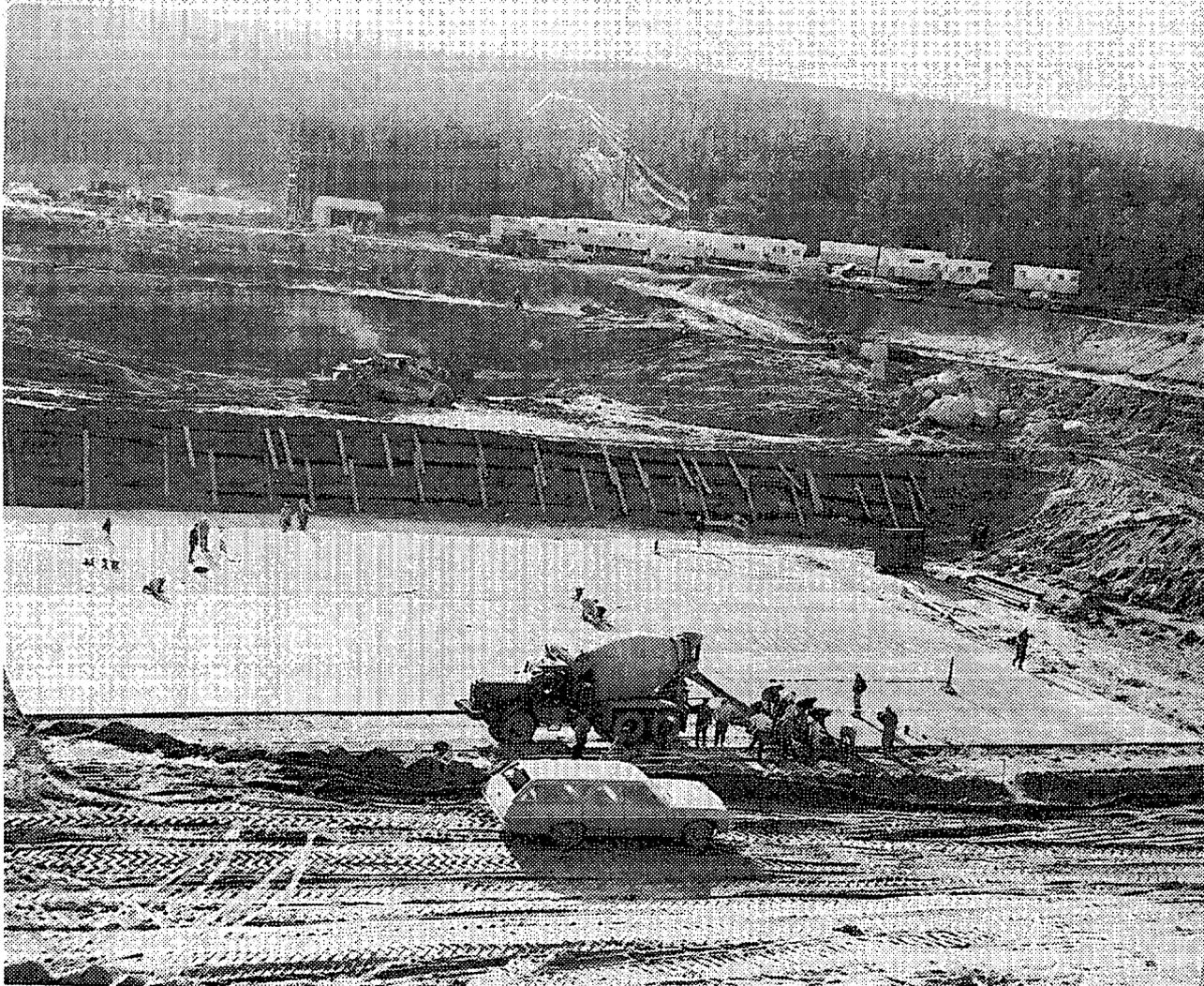
Reactor Building Site Preparation



Place 3" Work Slab



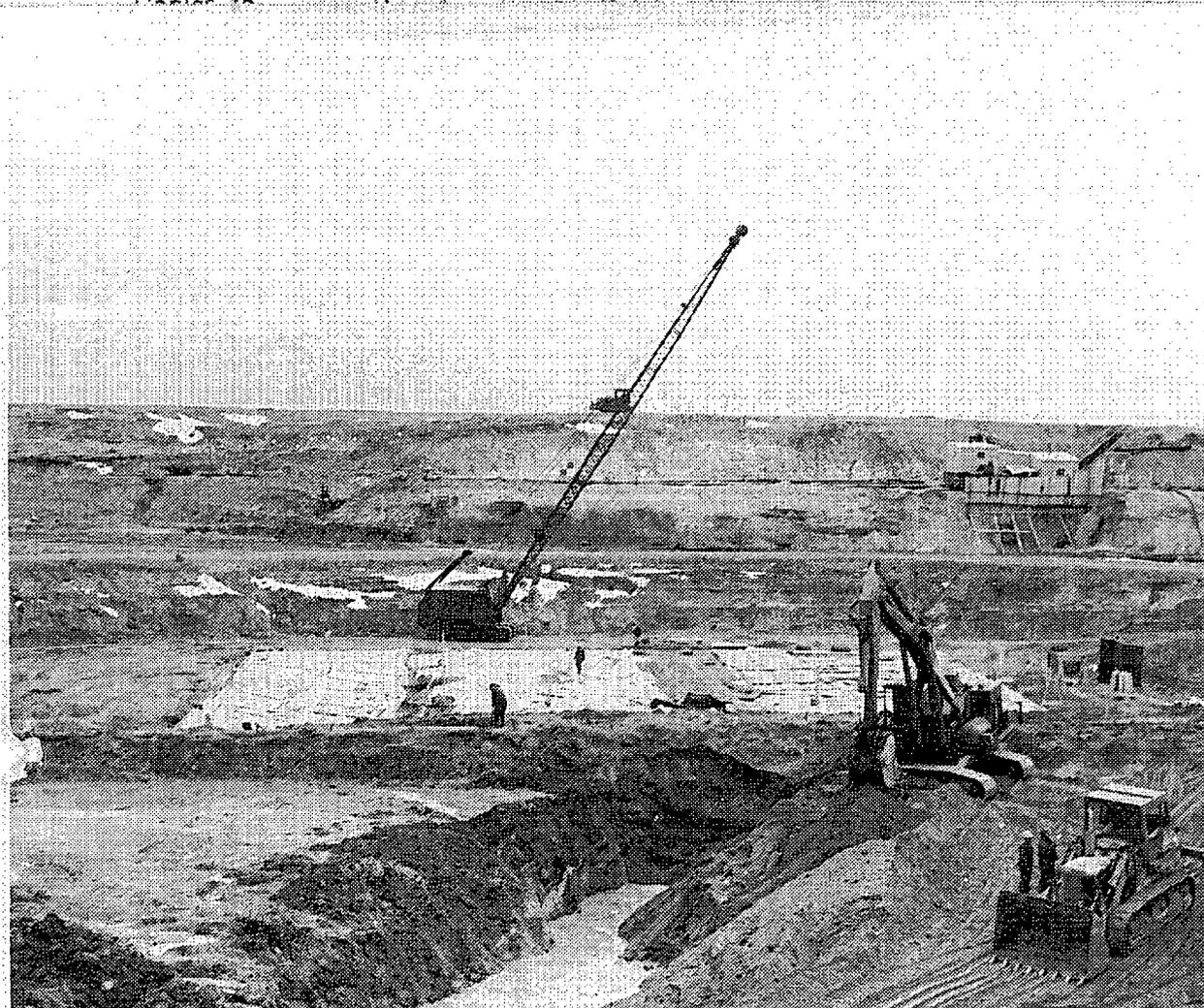
Place 3" Work Slab



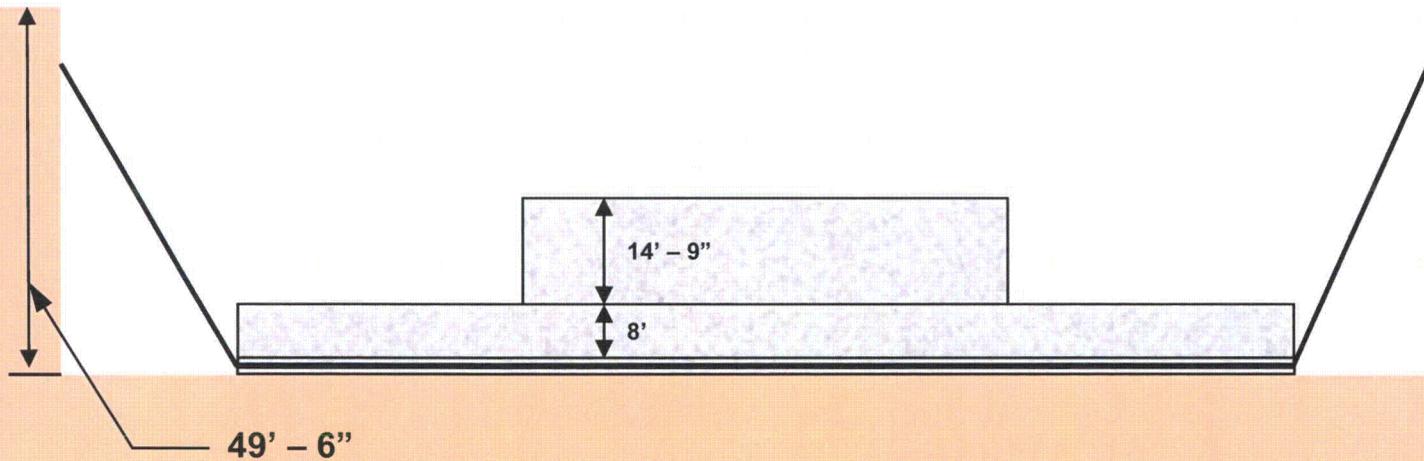
Foundation Membrane



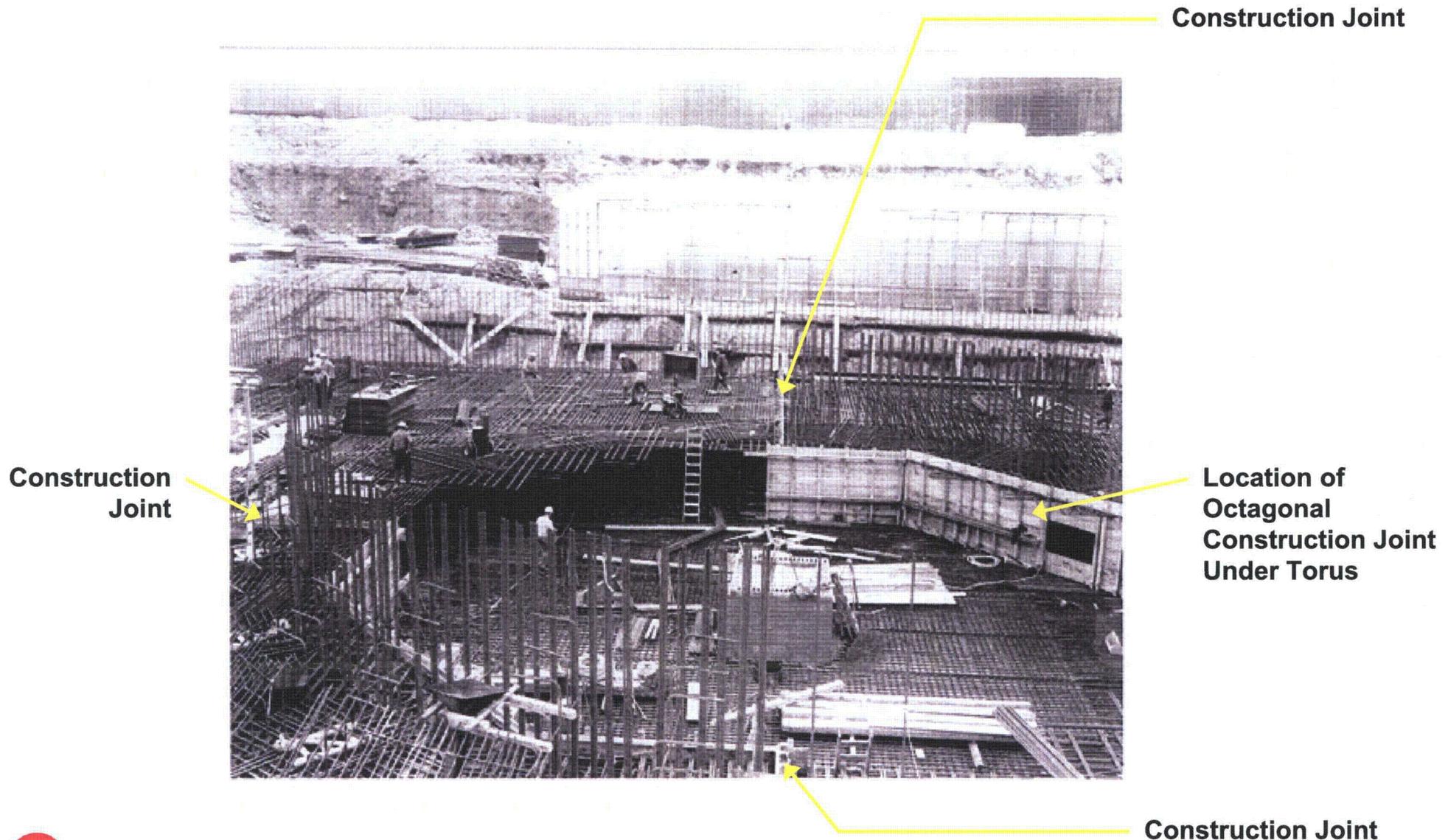
Foundation Membrane



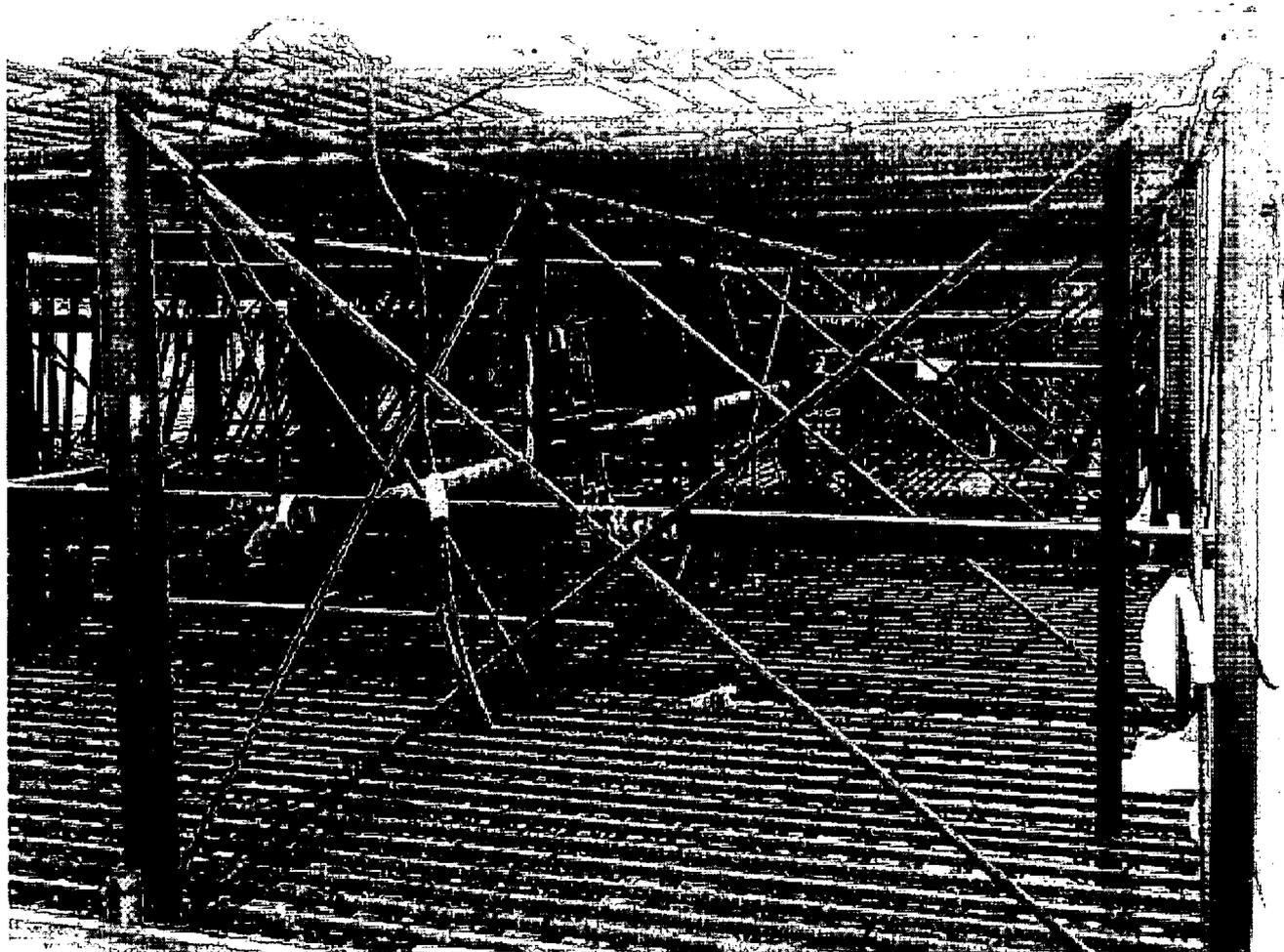
Base Mat Construction



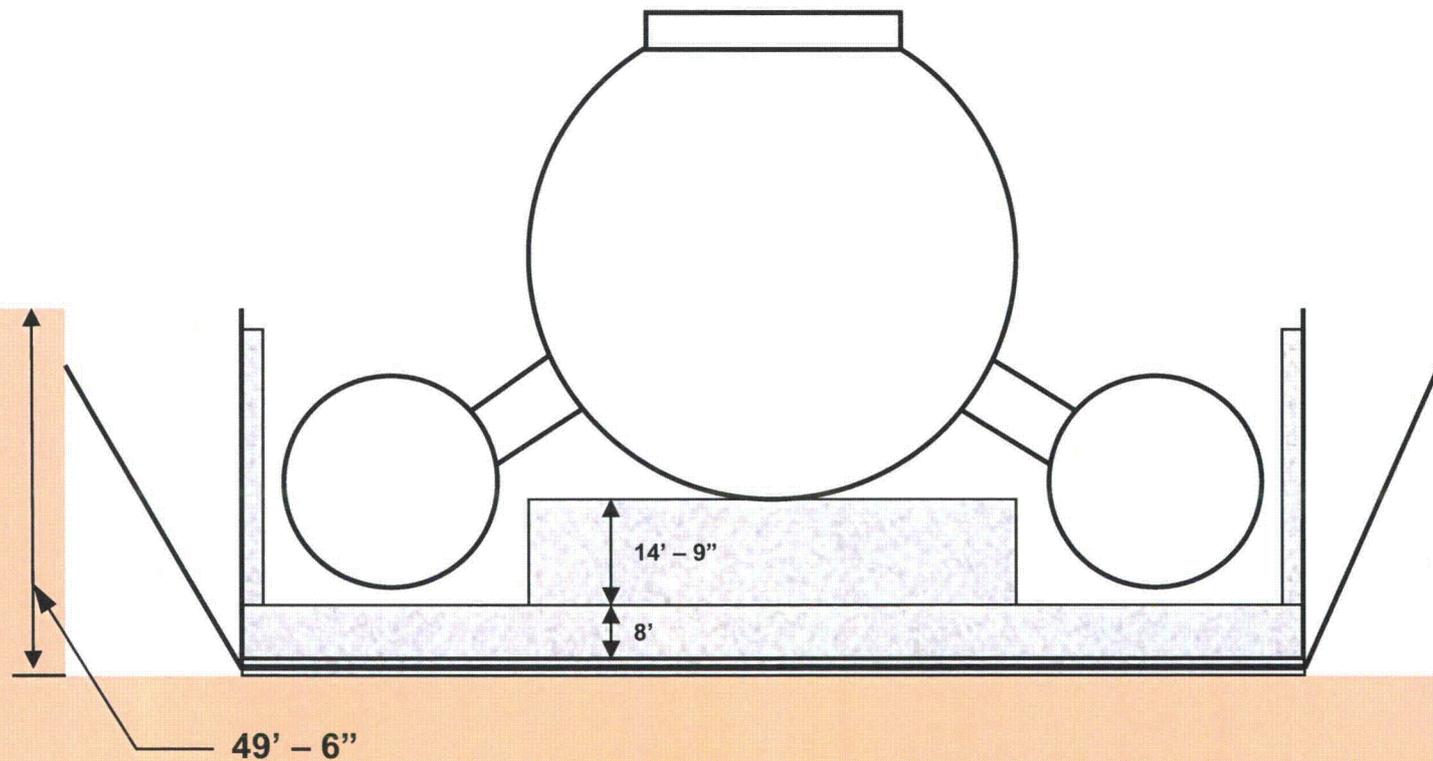
Reactor Building Base Mat Rebar



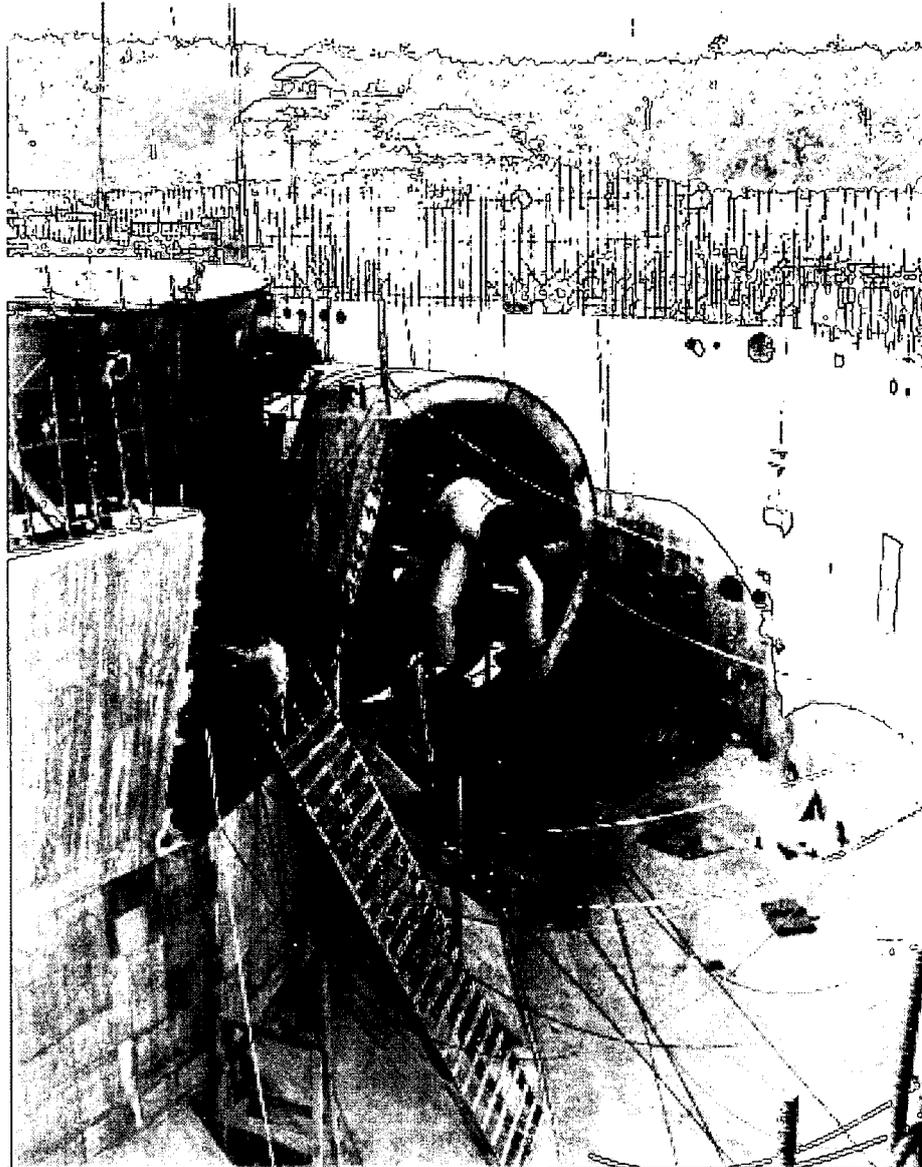
Reactor Building Base Mat Rebar



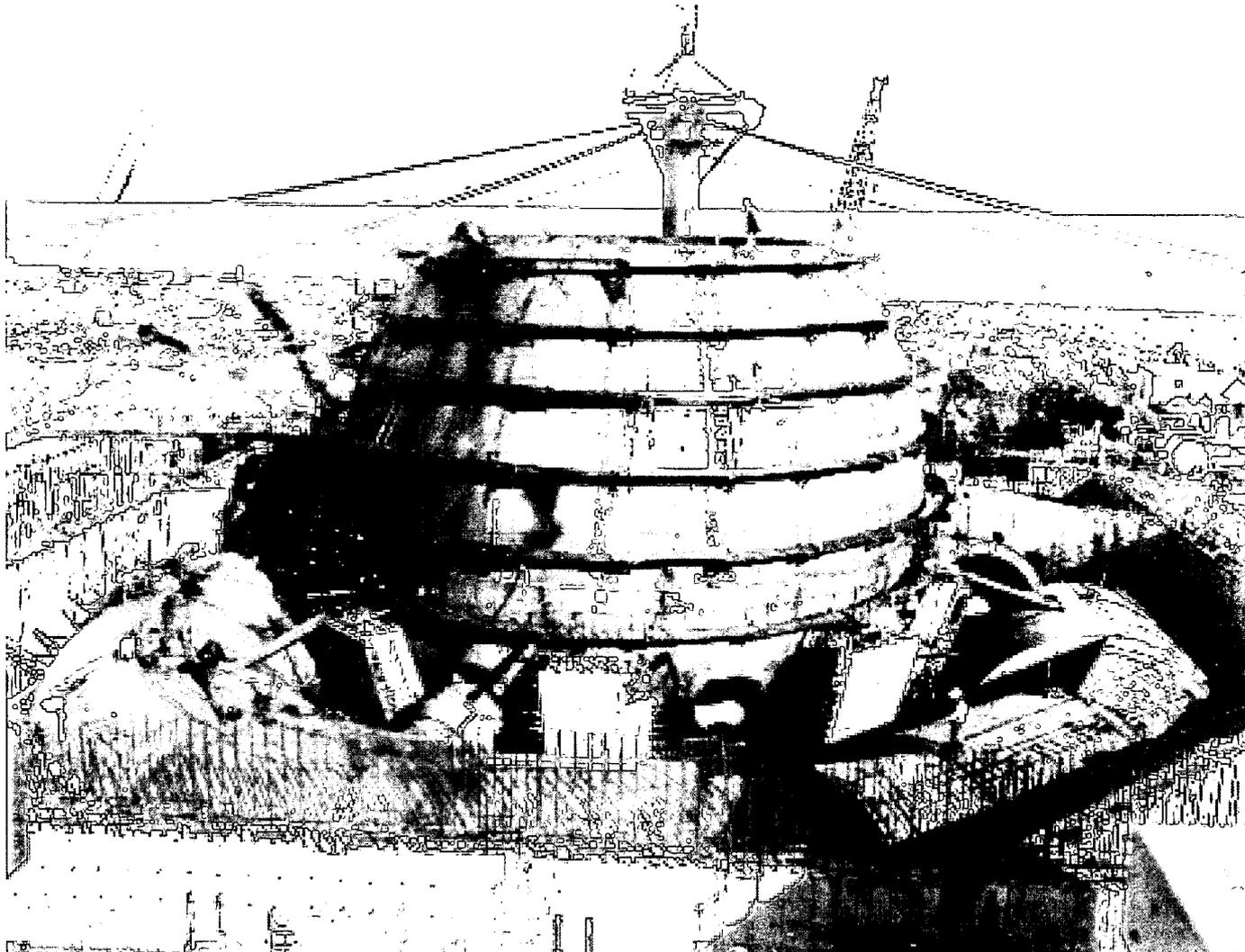
Drywell & Torus Construction



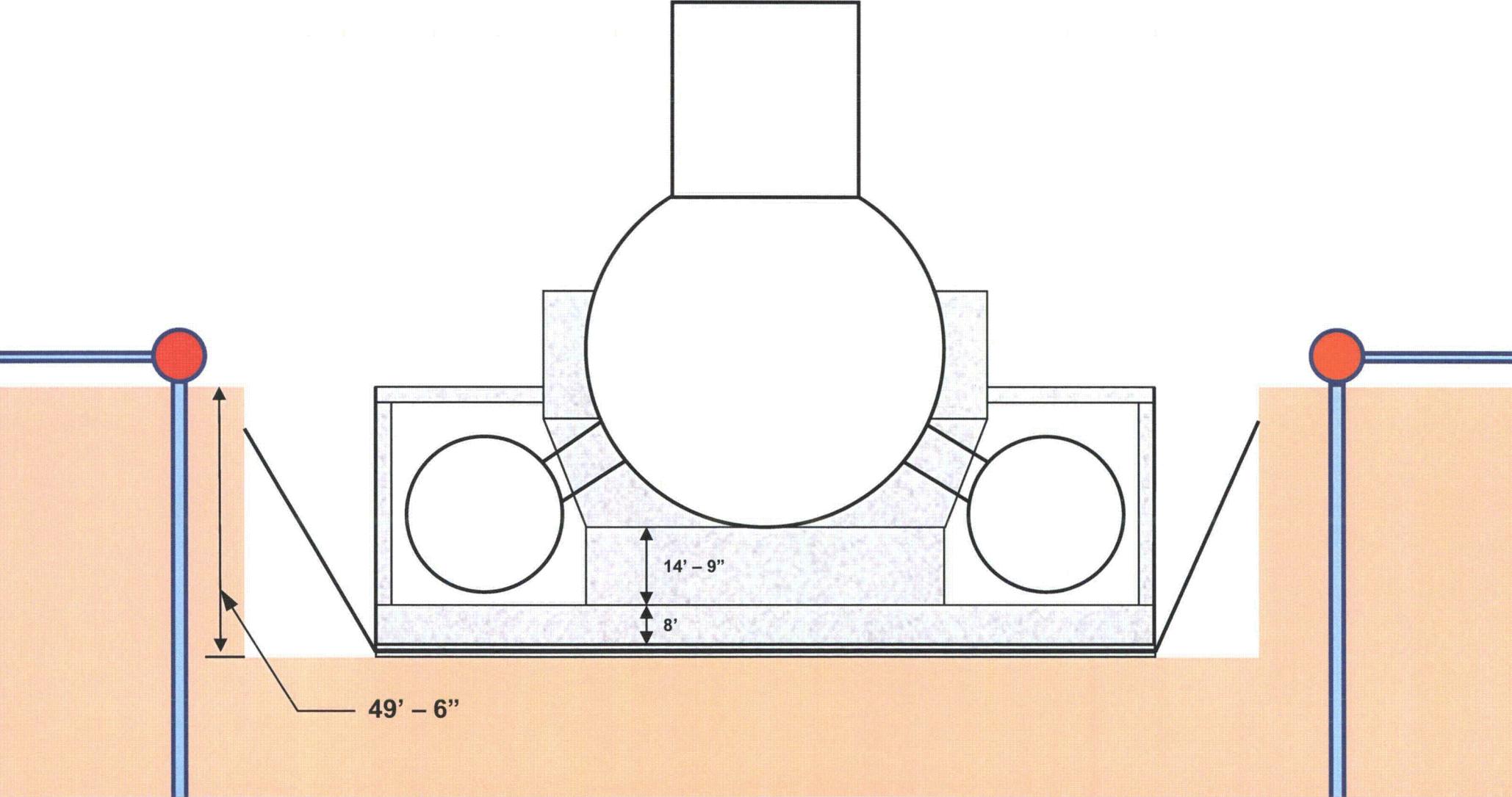
Torus Construction



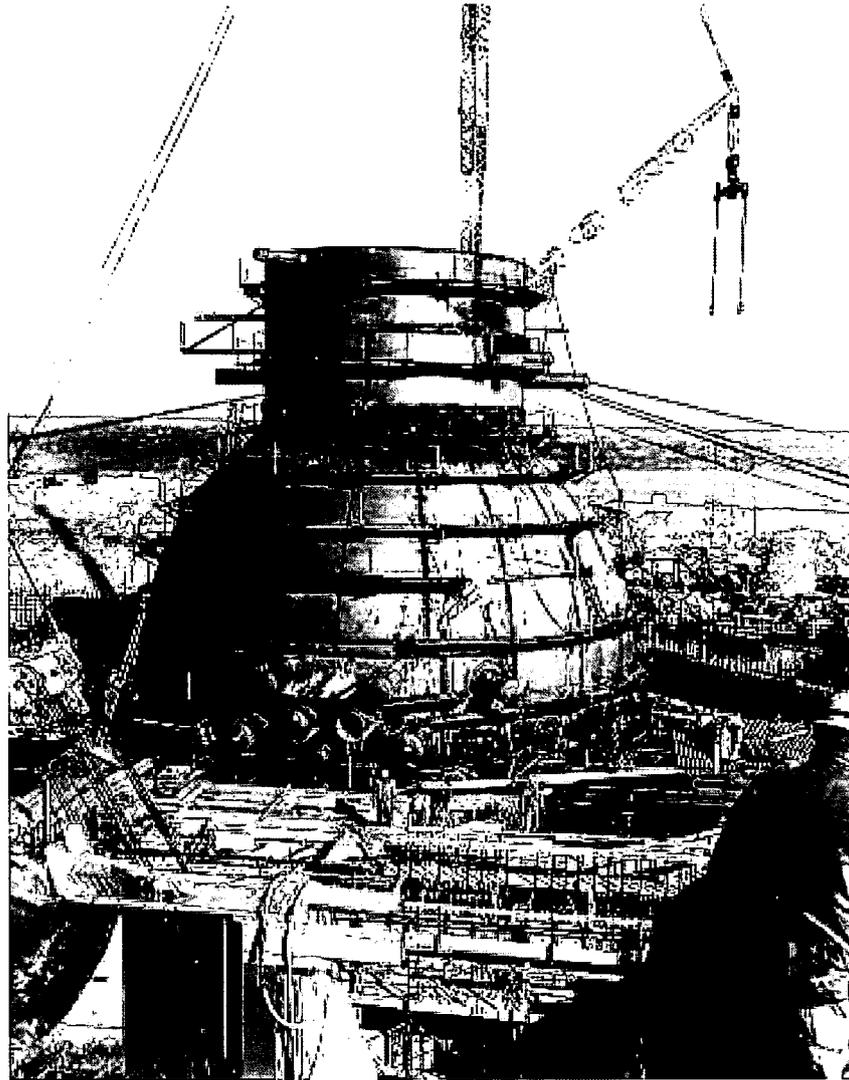
Drywell & Torus Construction



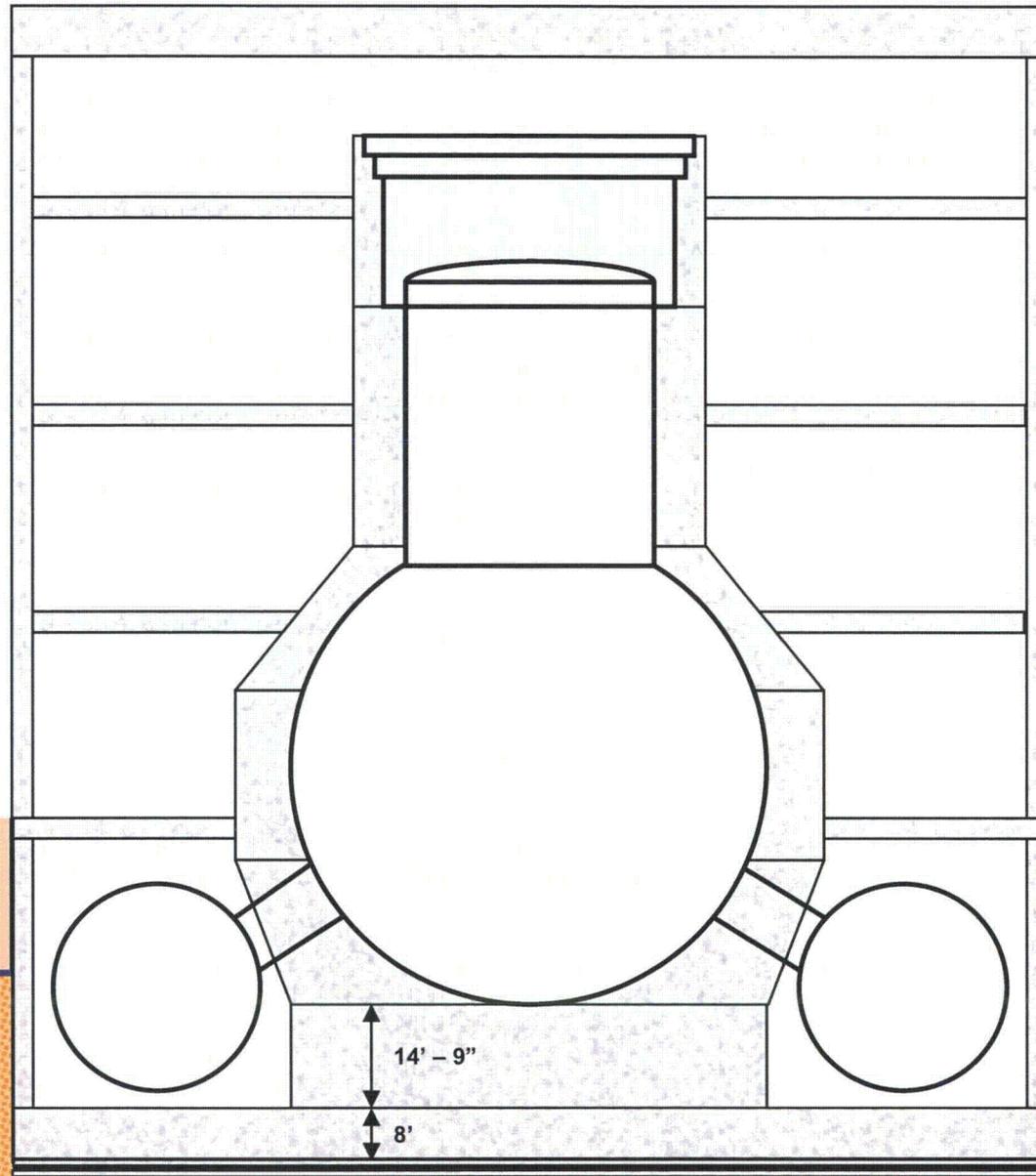
Drywell Construction



Drywell Construction



Completed Reactor Building



49' - 6"

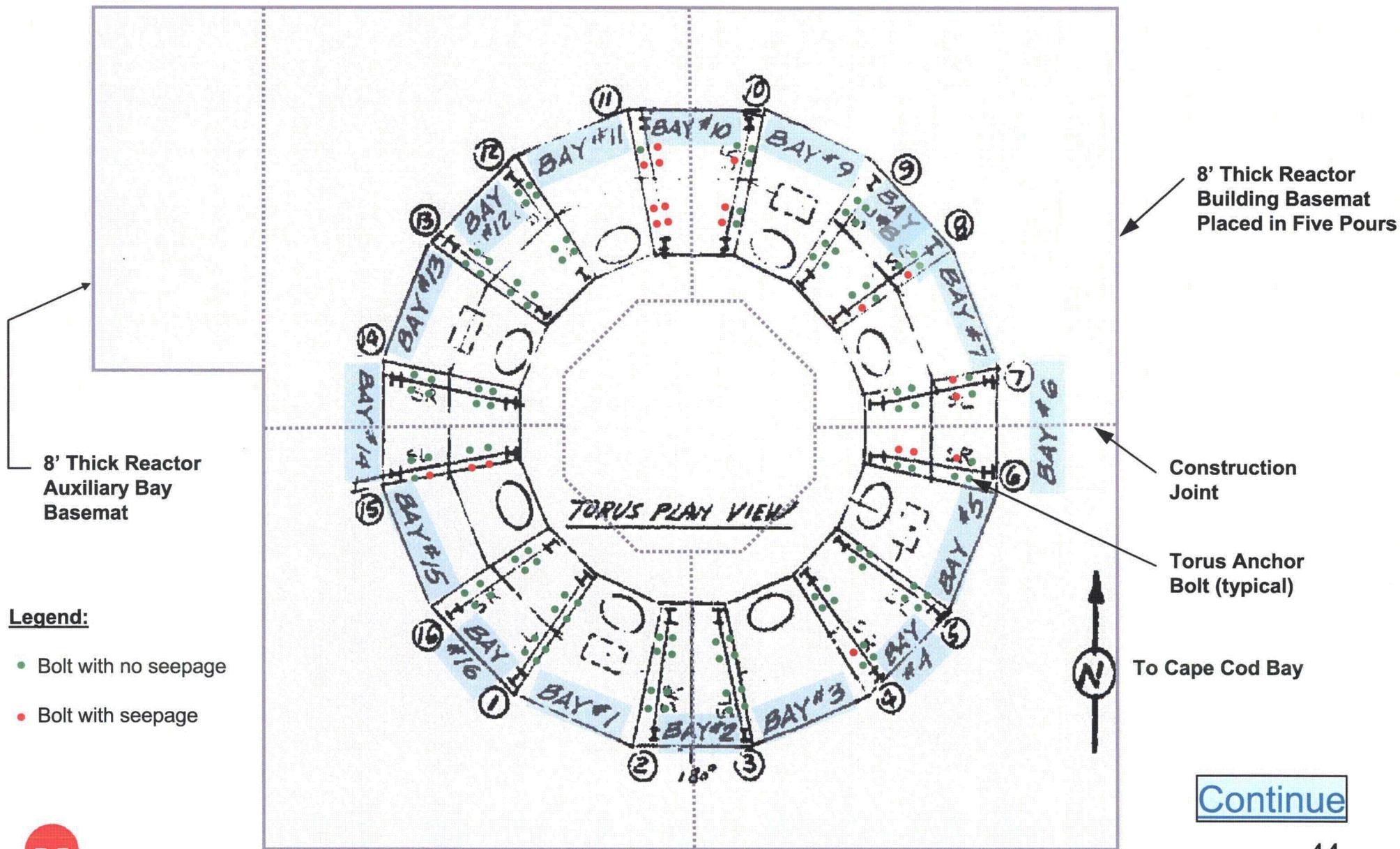
24' Water Table

14' - 9"

8'

Containment Inservice Inspection

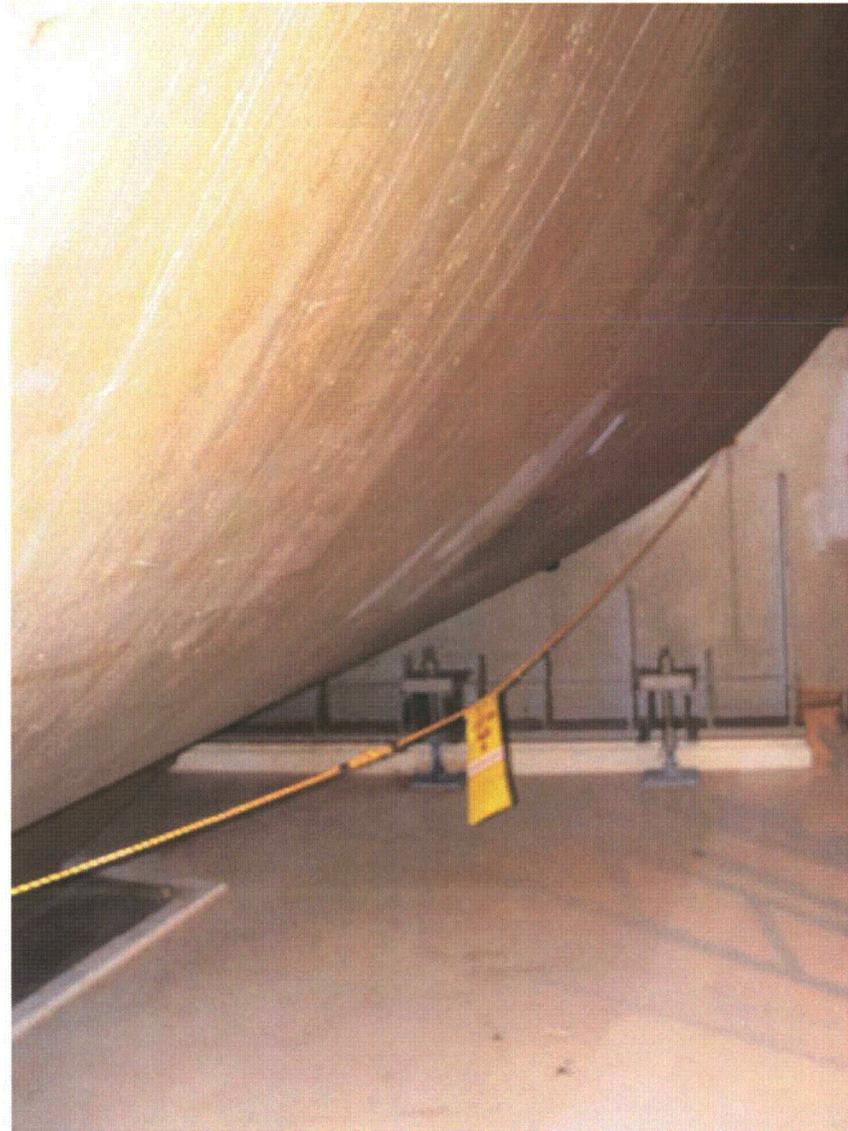
Torus Room Floor



Containment Inservice Inspection

Torus Room Floor

Bay 1



Back

Containment Inservice Inspection

Torus Room Floor

Bay 2

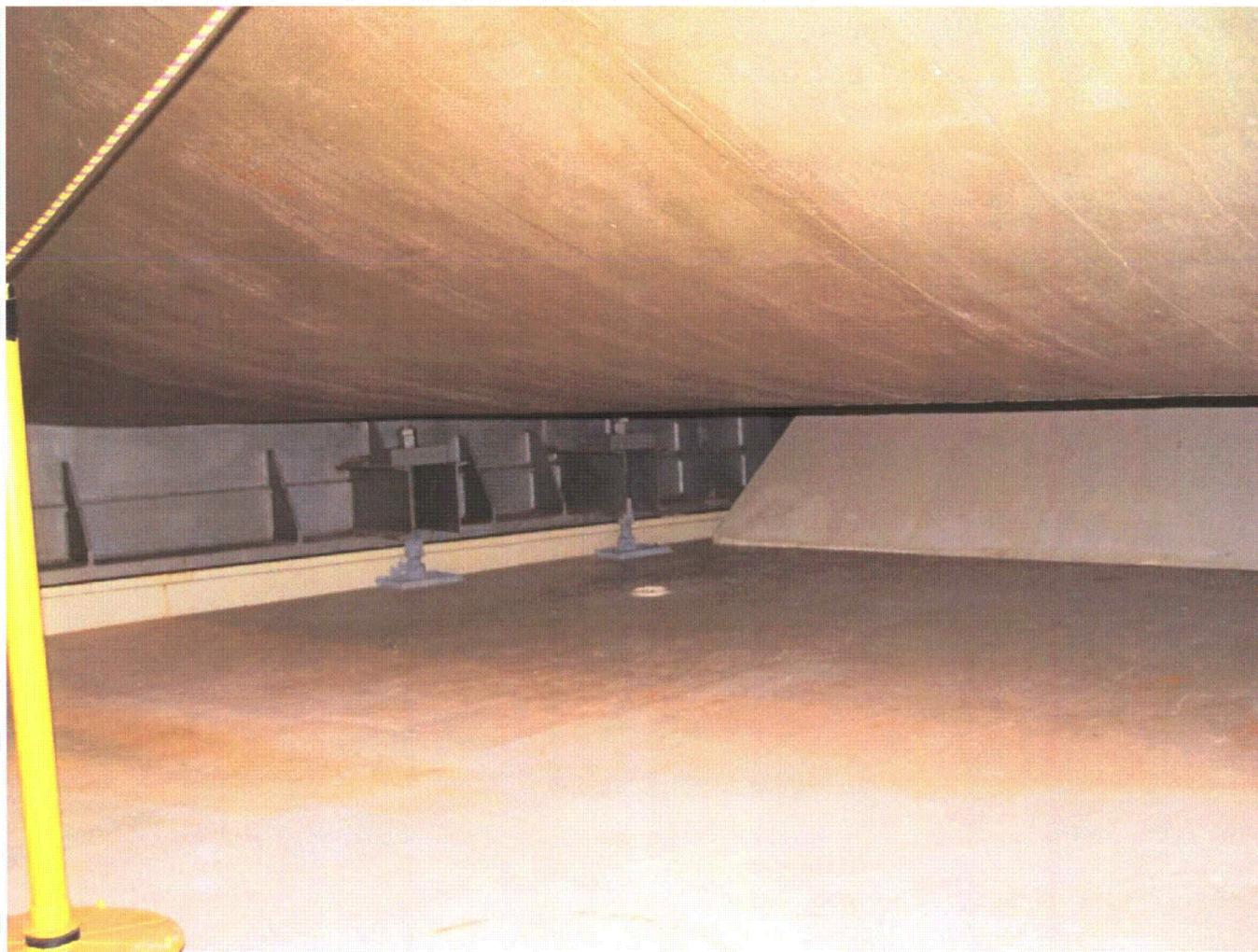


Back

Containment Inservice Inspection

Torus Room Floor

Bay 3



Back

Containment Inservice Inspection

Torus Room Floor

Bay 4

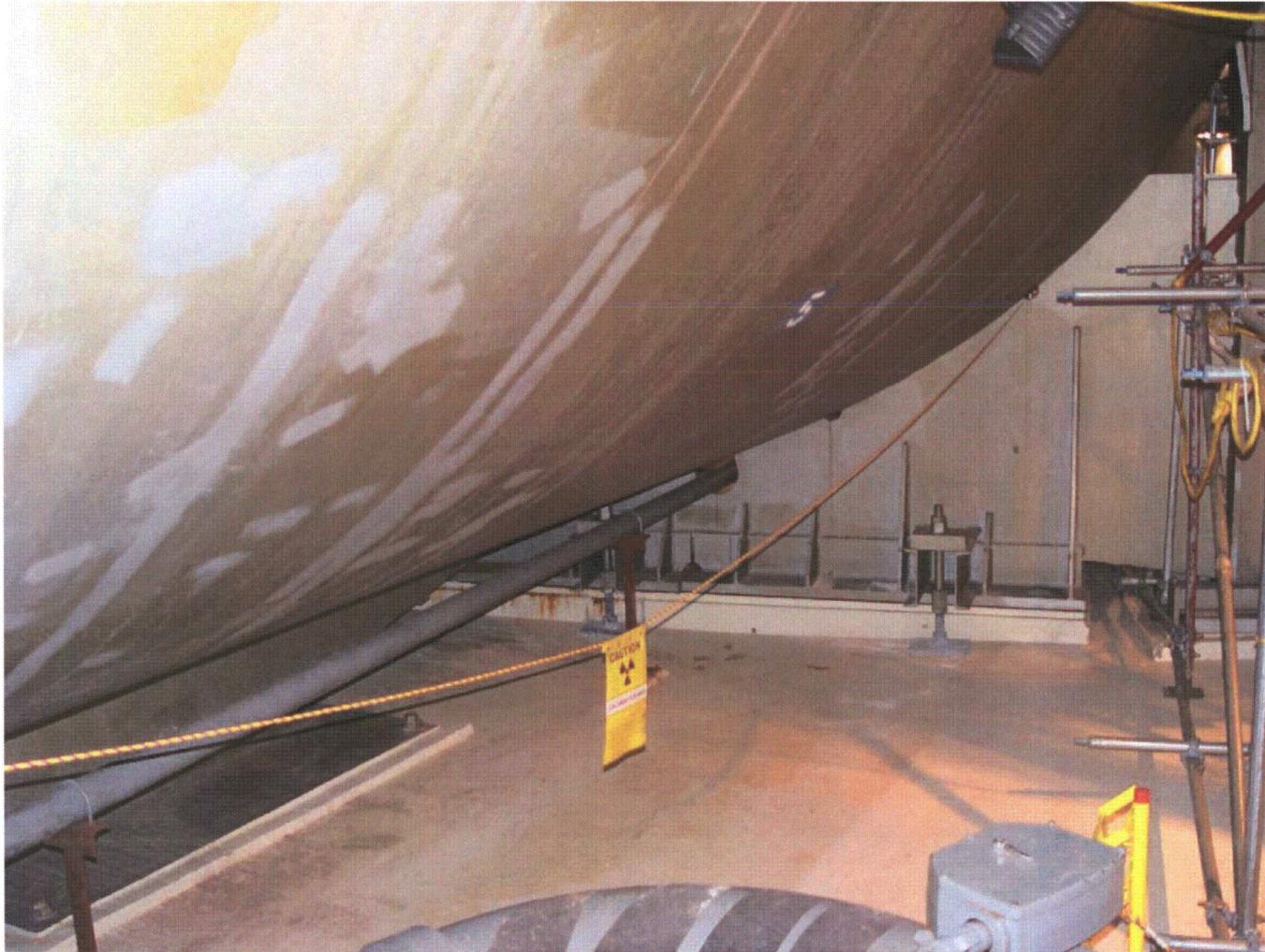


[Back](#)

Containment Inservice Inspection

Torus Room Floor

Bay 5



Back

Containment Inservice Inspection

Torus Room Floor

Bay 6

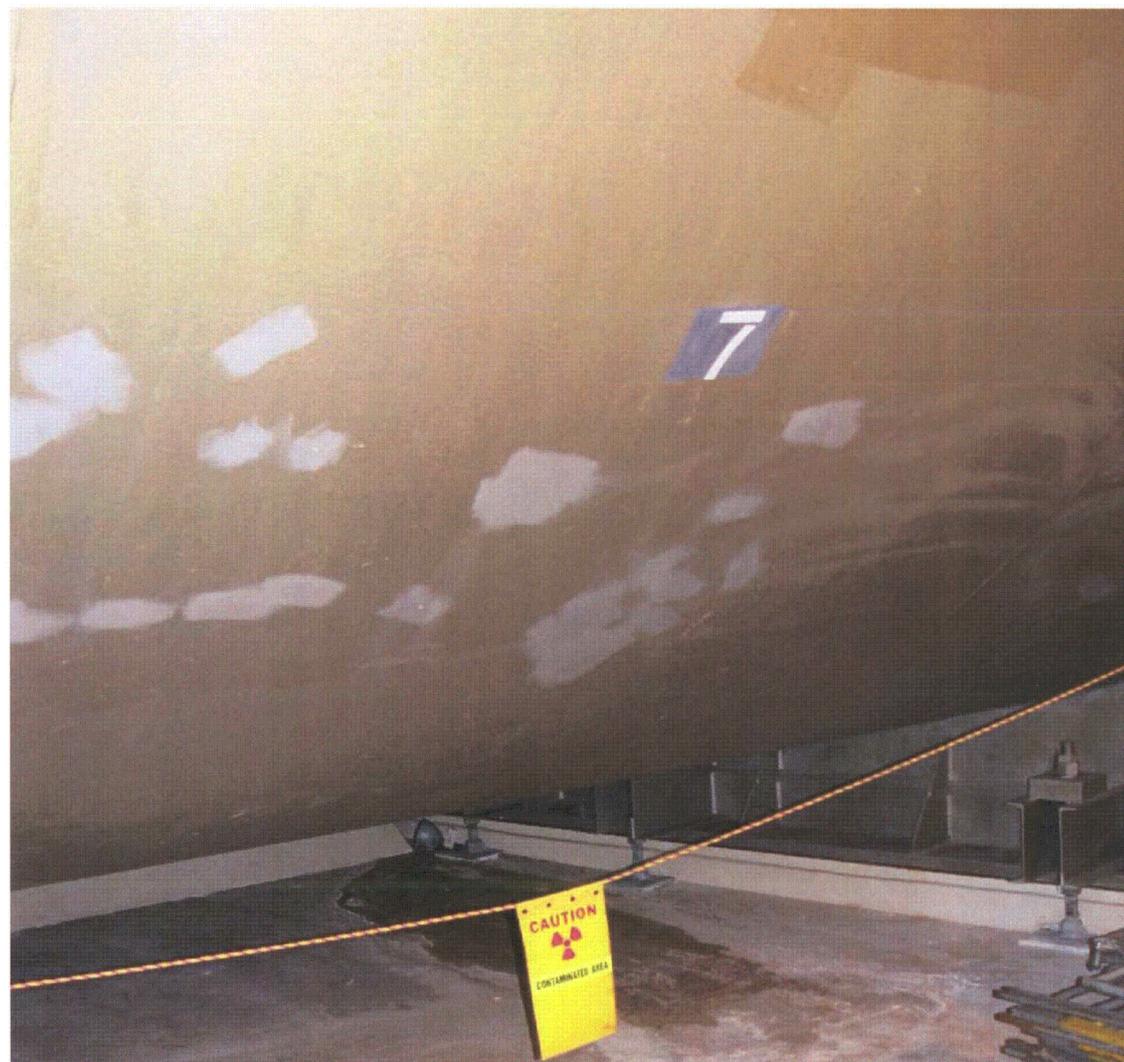


Back

Containment Inservice Inspection

Torus Room Floor

Bay 7

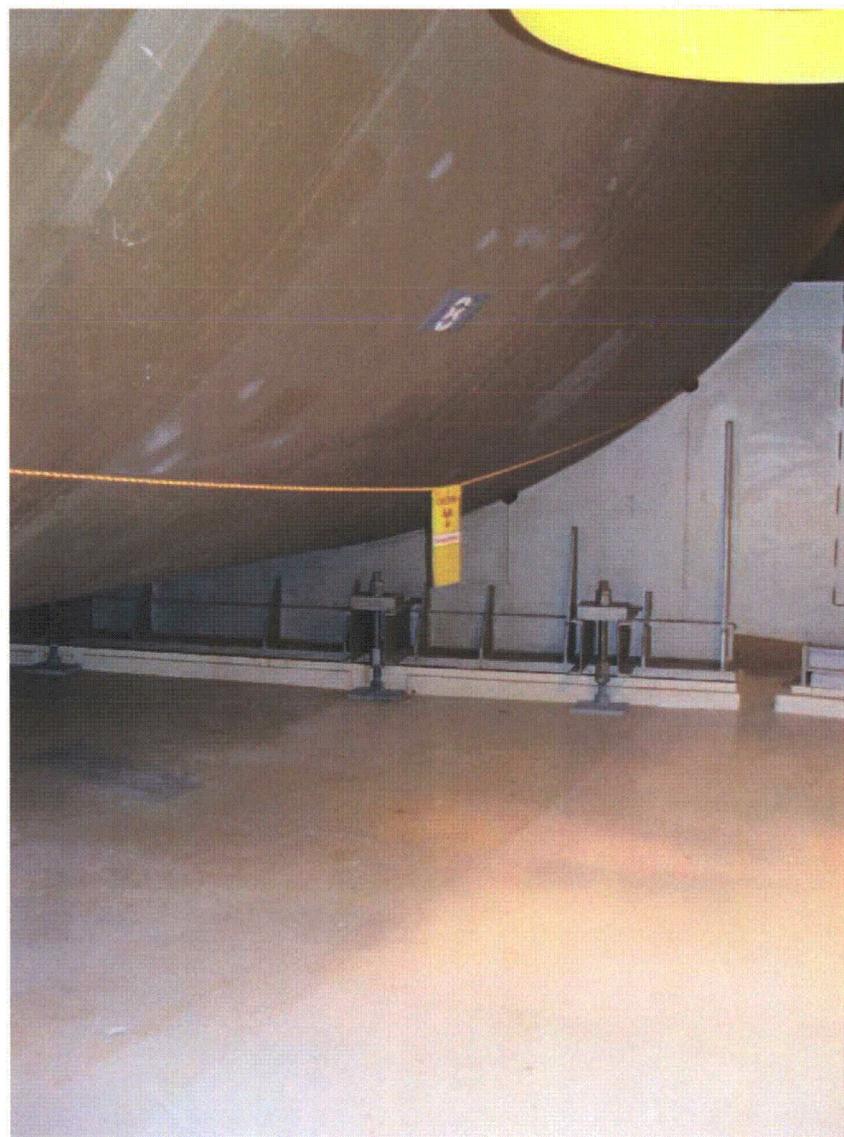


Back

Containment Inservice Inspection

Torus Room Floor

Bay 8



Back

Containment Inservice Inspection

Torus Room Floor

Bay 9

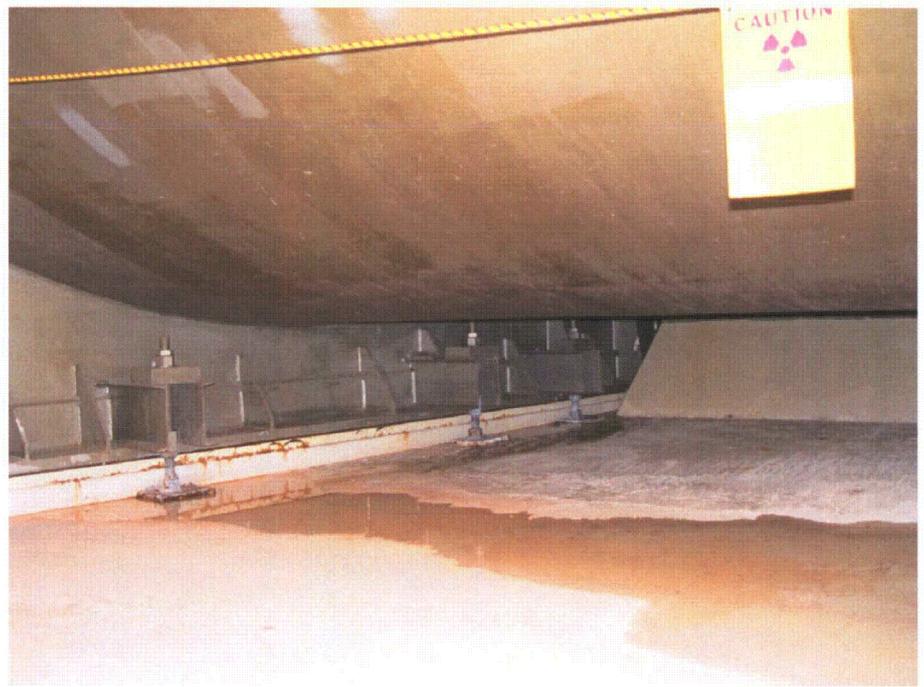


[Back](#)

Containment Inservice Inspection

Torus Room Floor

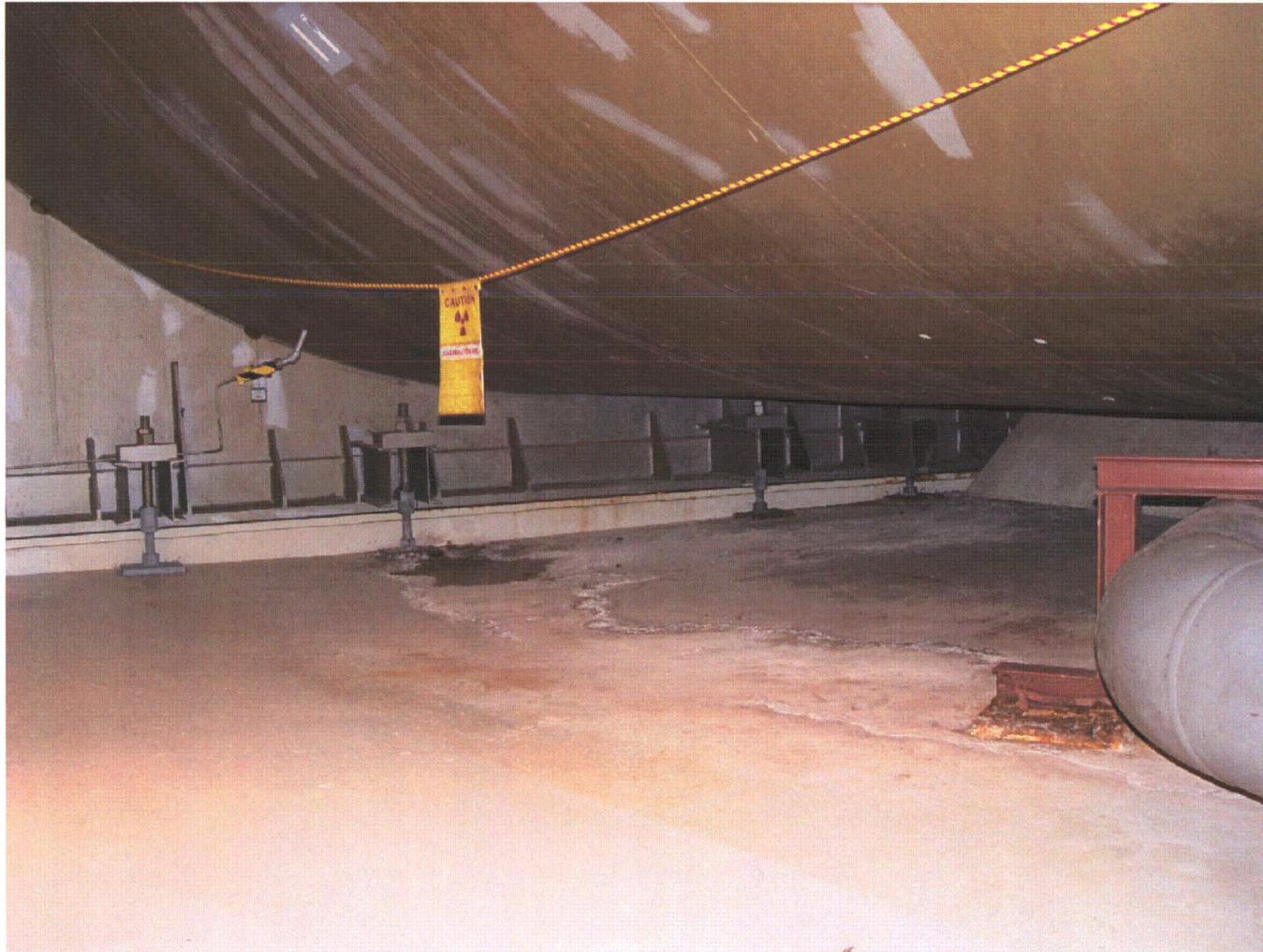
Bay 10



Containment Inservice Inspection

Torus Room Floor

Bay 11



Containment Inservice Inspection

Torus Room Floor

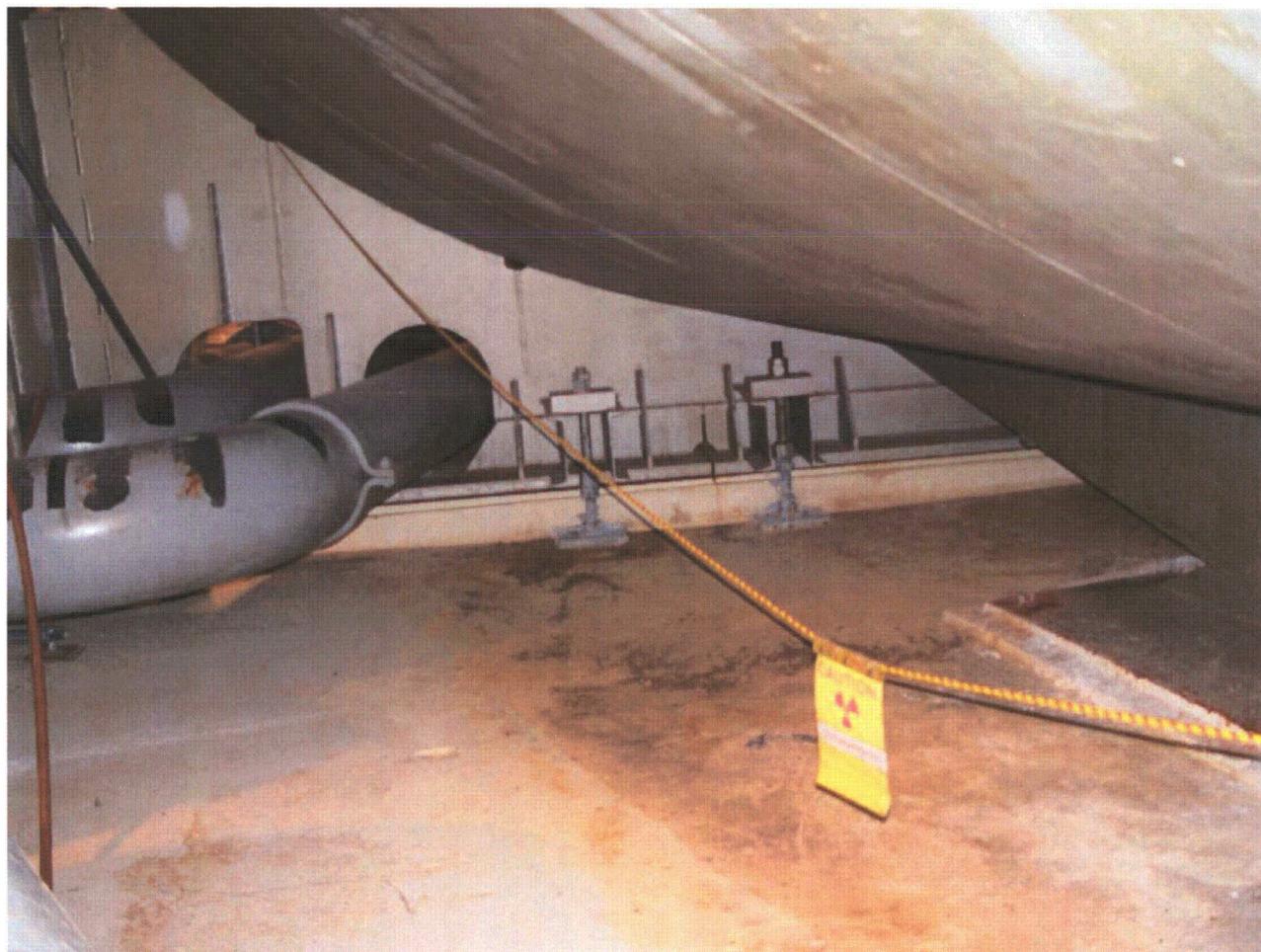
Bay 12



Containment Inservice Inspection

Torus Room Floor

Bay 13

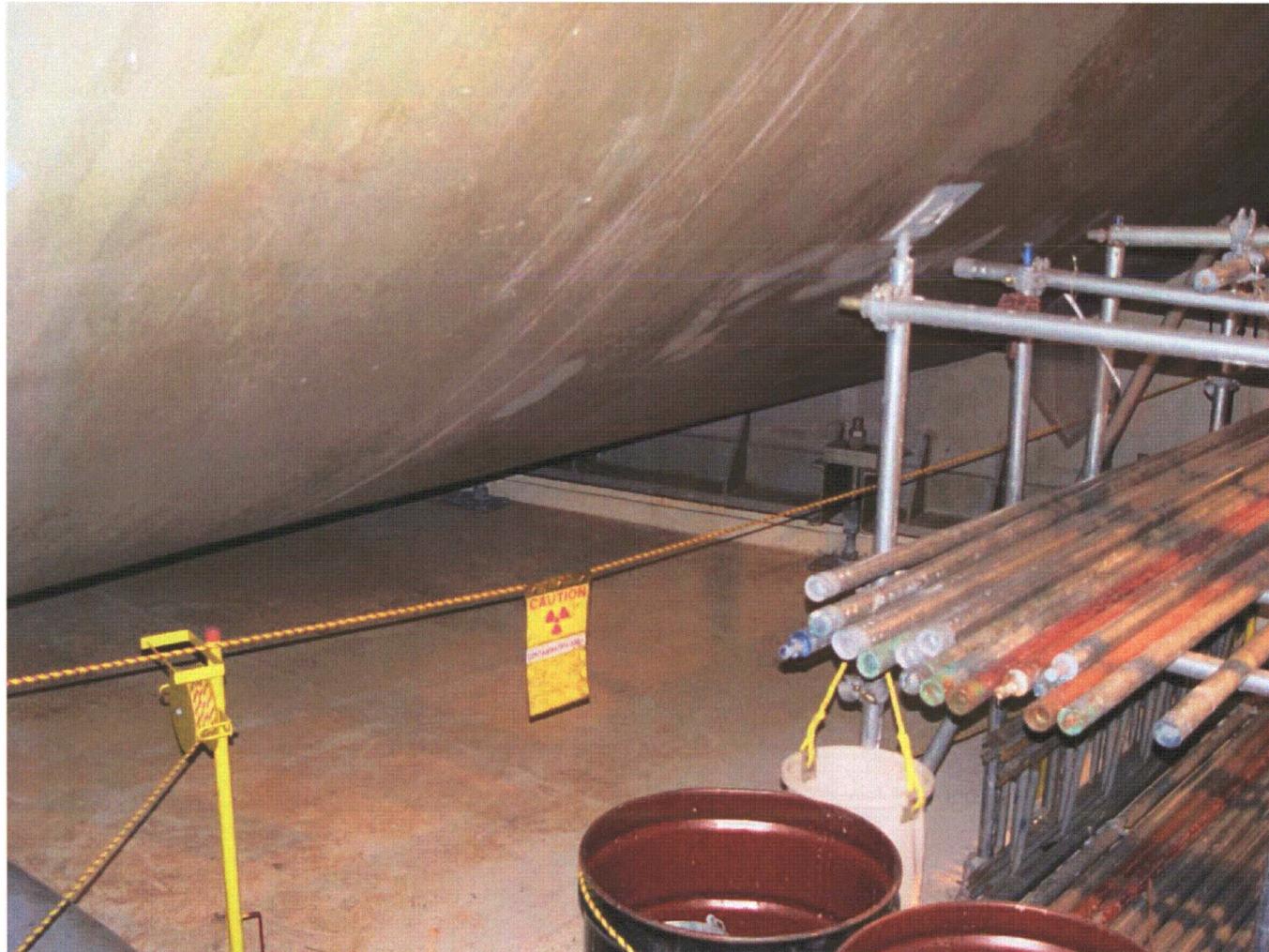


[Back](#)

Containment Inservice Inspection

Torus Room Floor

Bay 14



[Back](#)

Containment Inservice Inspection

Torus Room Floor

Bay 15



[Back](#)

Containment Inservice Inspection

Torus Room Floor

Bay 16



[Back](#)

Containment Inservice Inspection

Torus Room Floor

- **Concrete Cracking**

- Pilgrim built to ACI 318-63 concrete code.
- ACI 318 and NUREG/CR-6927 recognize concrete will crack under shrinkage, temperature and tension loading.
- Design of concrete structures assumes cracking, and reinforcing steel is added to ensure structural integrity.
- ACI 318 requires reinforcing steel to minimize cracking.

- **Leaching and Efflorescence**

- Very limited leaching and efflorescence noted.
- NUREG/CR-6927 notes this is unlikely to be an issue for high quality, low permeability concretes.

Containment Inservice Inspection

Water on Torus Room Floor

- **Concrete Water Chemistry**

- Minimum degradation threshold limits for concrete established:
 - Acidic solutions with pH < 5.5
 - Chloride solutions > 500 ppm
 - Sulfate solutions > 1500 ppm
- Pilgrim groundwater is non-aggressive to base-mat:

<u>Date</u>	<u>pH</u>	<u>Chlorides (ppm)</u>	<u>Sulfates (ppm)</u>
11/27/05	6.2	420	16
6/13/06	6.3	210	<5

- Torus Room Floor Water Samples:

<u>Date</u>	<u>pH</u>	<u>Chlorides (ppm)</u>	<u>Sulfates (ppm)</u>	<u>Calcium (ppm)</u>
3/89	8.76	120		292
4/99	9.5			
2/07	9.45			
3/07	9.29	560	9.1	6.8

Containment Inservice Inspection

Water on Torus Room Floor

- Assessment Findings
 - Groundwater migration is highly localized.
 - Path is through vertical joints and zones most likely weakened by tensions generated during setting and hydration following the construction.
 - Localized zones are discontinuities equivalent to a vertical cylindrical hole of a maximum diameter of 4 mm (1/6th in).
 - The localized calcium leaching does not affect the overall structural performance of the slab.

Containment Inservice Inspection

Water on Torus Room Floor

- Assessment Recommendations:
 - Calcium leaching may have degraded the grout in the annular space between the 3 in. diameter hole and the 2 in. diameter Williams rock anchors. An inspection of the grout and bolt is recommended.
- Assessment Conclusion:
 - The highly localized nature of the zones through which water penetrates, does not compromise the overall structural performance of the Torus base mat. It does not affect the bulk integrity of the concrete slab or the overall compressive and bending load bearing capacity of the reactor foundation.
 - Non-aggressiveness of ground water verified.
 - Condition of Anchor Bolts to be verified.

Containment Inservice Inspection

Torus Room Floor

- Verify Condition of Torus Hold Down Bolts (by sample)
 - Prior to Period of Extended Operation
- Determine Additional Actions Based on Torus Hold Down Bolts Inspection and Water Chemistry
 - Prior to Period of Extended Operation
- Monitor Chemistry Of Groundwater
 - Every Five Years
- Monitor Chemistry of Water on Floor
 - Prior to Period of Extended Operation
 - Once in First Ten Years
- Inspect Structure in Accordance with Structures Monitoring Program
 - Every Five Years

Reactor Vessel Neutron Fluence

OI 4.2

- Lack of benchmarking data to support plant specific fluence calculations for use in TLAAAs

Reactor Vessel Neutron Fluence

- **Current Licensing Basis**
 - 10 CFR 50 App. G requirement for current operation
 - Current P-T curves valid through Cycle 18 (2011 RFO)
 - Commitment to Submit Action Plan for Resolution by September 15, 2007
 - Commitment to submit RG 1.190 calculations by June 8, 2010

Reactor Vessel Neutron Fluence

- Current Actions
 - Evaluate TLAAAs to determine limiting Fluence
 - Limiting Beltline Adjusted Reference Temperature
 - Upper Shelf Energy
 - RPV Internals
 - RPV Welds
 - RPV nozzles near beltline
 - Core Shroud Fluence Limiting based on BWRVIP-35
 - Limiting Fluence values will not be challenged

Reactor Vessel Neutron Fluence

- Future Actions
 - Benchmark Computer Code using Pilgrim or other BWR3 Dosimetry Data
 - Previous commitment to submit action plan by September 15, 2007
 - License Condition to submit calculations consistent with RG 1.190 by June 8, 2010 which demonstrate limiting fluence values will not be reached during period of extended operation.

Questions

