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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY & LICENSING BOARD

- - - - -x
In The Matter Of: :
CAROLINA POWER & LIGHT COMPANY, :
(Shearon Harris Nuclear Power :
Plant) :
- - - - -x

Washington, D.C.
Thursday, October 14, 1999

Deposition of DAVID A. LOCHBAUM, called
for examination, pursuant to notice, at 10:10 a.m.,
at the offices of Shaw Pittman, 2300 N Street, NW,
Third Floor, Washington, D.C., before Mario A.
Rodriguez, a notary public in and for the District
of Columbia, when were present on behalf of the
respective parties:

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18 On Behalf of the Board of Orange County

19 Commissioners:

20 DIANE CURRAN, ESQ.

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5 ALSO PRESENT:

6 JAMES A. DAVIS, Materials Engineer
7 KENNETH C. HECK, Operations Engineer
8 U.S. Nuclear Regulatory Commission
9

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P R O C E E D I N G S

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Whereupon,

DAVID LOCHBAUM,

a witness, was called for examination by counsel
and, having been first duly sworn, was examined and
testified as follows:

MR. O'NEILL: First instructions to the
court reporter: To transcribe everything during the
deposition except during breaks or mutual
off-the-record discussions when nothing should be
transcribed.

Interrupt when necessary to clear up any
doubts about a question or an answer that you have
since what you transcribe is what's important.

Please transcribe the attendances and the
exists and entrances of any individual during the
deposition.

And we've already introduced ourselves
prior to going on the record and we note that you
have all of the individuals for the record at the
moment.

I'll ask you to mark all exhibits prior to

1 commencing an examination and we'll agree on a
2 number.

3 And you might take a moment to explain to
4 the witness the manner of transcription to make sure
5 that he understands how this is being conducted.
6 And you can go ahead and do that if you wish.

7 (Pause.)

8 EXAMINATION

9 BY MR. O'NEILL:

10 Q Mr. Lochbaum, you have been deposed
11 before, have you not?

12 A Yes, I have.

13 Q Indeed you have been deposed by me before.

14 A Yes, I have.

15 Q Have you been deposed since the time that
16 we were together for a deposition?

17 A No.

18 Q If at any time you want to take a break,
19 please speak up and we'll do that.

20 If you don't understand something, please
21 speak up and I'll clarify my question. If you do
22 not ask for a clarification, then I will assume that

1 you understand the question and we'll go on with
2 your answer that will reflect your response to the
3 question.

4 I'm sure you realize that your answers
5 must be truthful, and there are serious consequences
6 if they are not.

7 You understand that?

8 A Yes, I do.

9 Q Mr. Lochbaum, before we started, you
10 indicated that, responding to the notice of
11 deposition in this case, that you had brought with
12 you some documents. Would you be kind enough to
13 explain what documents you've brought with you.

14 A I have the documents that were in the
15 declaration that was filed or dated March of 1999
16 that are not documents that are publicly available,
17 the ones I accessed on the Internet, like the NRC
18 information notices and what not.

19 What I do have are the ones that weren't
20 commonly available, and those are the January 2nd,
21 1981, NRC inspection report that's referenced in the
22 declaration, the August 5th or 25th, the date's kind

1 of hard read there, 1981 NRC inspection report
2 that's also referenced in the declaration; the
3 August 13th, 1981, inspection report that's
4 referenced in the declaration; the September 14th,
5 1981, inspection report that's referenced in the
6 declaration. And that's it.

7 These are not necessarily the complete
8 inspection reports; portions of them are just
9 dealing with long-term storage or quality control,
10 and not in every case are they the full inspection
11 report. They are just the portions I relied upon.

12 Q You might give a copy of the stack to the
13 staff as well.

14 A I have three copies. I don't know who
15 gets the three, but I have three complete sets.

16 Q I'll take a copy and one for the staff.

17 And if we make one an exhibit, we can give
18 it to the court reporter.

19 Mr. Lochbaum, the notice of deposition
20 instructed that you produce at the time of the
21 deposition documents upon which you have relied or
22 intend to rely with respect to contention 3 and

1 which have not been previously produced to Carolina
2 Power & Light Company by the board of commissions of
3 Orange County.

4 A That's correct.

5 Q The documents that you have just described
6 on the record are all of the documents that are
7 responsive to that request; is that correct?

8 A The declaration referred to some
9 information notices, NRC inspection manual chapters
10 and so on. Those are available on the Internet and
11 I did not have a hard copy. So those are relied
12 upon as cited in the declaration, but I don't have
13 hard copies to produce today.

14 Q Okay. Other than information that was
15 cited in the declaration; is there any other
16 information, any other documents, as that term is
17 used broadly, which includes videotapes, electronic
18 data or anything else, that you have relied upon or
19 intend to rely upon with respect to contention 3 in
20 this proceeding?

21 A Yes.

22 Q And what other information is there?

1 A During discovery, we are getting some
2 documentation from CP&L. Talking to counsel, Diane
3 Curran, the understanding was we are not going to
4 provide copies of stuff that we get from CP&L. So
5 we intend to rely on that information or those
6 documents, but we didn't produce them today under
7 that understanding.

8 Q Okay. Now, other than information which
9 Carolina Power & Light Company has produced to the
10 board of commissioners of Orange County, and I will
11 use the acronym BCOC to save my voice, and the
12 information which has been referenced in your
13 declaration, some of which is produced here today,
14 is there any other information upon which you have
15 relied or intend to rely with respect to contention
16 3 in this proceeding?

17 A No.

18 Q Mr. Lochbaum, when did you first become
19 involved in any way in the spent fuel pool expansion
20 at the Carolina Power & Light Company, Harris plant?

21 A It was summer of 1998, June or July. I
22 was contacted by a staffer on the -- I believe it

1 was the Chatham County Commission, and asked to
2 attend the NRC meeting in Rockville between CP&L and
3 the NRC staff to discuss the re-racking project.

4 I attended that conference, I believe it
5 was in July. July 14th strikes a bell, but that --
6 I don't have an exact date in July. But it was July
7 of 1998 I attended that public meeting, provided
8 comments back to the Chatham County staffer.

9 Q And how did you provide those comments?

10 A I believe it was either a fax or an
11 e-mail.

12 Q Did you provide a copy of the fax or
13 e-mail in the documents that were produced by BCOC?

14 A No, because I did not rely on them.

15 Q My question is; did you -- well, were
16 those comments provided to Chatham County or to
17 Orange County?

18 A Chatham County.

19 Q And those comments were with respect to
20 this application that it was not yet filed by CP&L?

21 A It was well before the application, yes.

22 Q And do you have a copy of those comments

1 in your files?

2 A I don't know. I don't believe I do, but I
3 don't know for a fact.

4 Q But in any event you're not relying on
5 them in any way?

6 A No.

7 Q And they are not informing any facts that
8 you're going to rely on in addition to your
9 opinions?

10 A No, not at all.

11 Q Okay. Subsequent to attending the meeting
12 in July of 1998 and in providing comments to Chatham
13 County, what was your next involvement in the, at
14 that time, nascent license application?

15 A Sometime earlier this year,
16 January/February time frame, I was contacted about
17 reviewing the application that was filed by CP&L to
18 see if there was -- just to take a look at it and
19 provide any comments or questions or whatever.

20 I believe I was contacted by -- I was
21 either contacted by the Chatham County staffer or by
22 Jim Warren of NC Warren. At the moment I can't

1 recall which -- who contacted me.

2 But in any event, I did review the
3 application and was later contacted by Diane Curran
4 about providing some commentary or declaration as to
5 the concerns I raised or had.

6 Q And this you believe was in January of
7 '99?

8 A January or February. I don't recall.

9 Q Do you recall any other involvement with
10 the Harris spent fuel pool between July '98 and
11 January/February '99?

12 A Yeah. Following the meeting in July,
13 there were some issues -- as a member of the public
14 going to an NRC public meeting, you're not allowed
15 to say anything. It's observation only. So there
16 were some concerns I had, sort of some questions I
17 had in my mind that I couldn't ask. So I contacted
18 the licensing man -- person who attended the July
19 meeting for CP&L whose name escapes me right now.

20 I e-mailed him because that had been on
21 the sign-up list with -- saying I had some concerns.
22 I would like to give CP&L the chance to address them

1 first.

2 And that individual arranged for a telecon
3 -- well, that individual contacted me back, said
4 they'd like to see the questions before they
5 determined whether they would answer them or just
6 include them in their application.

7 They reviewed the questions and then
8 arranged a telecon with me sometime last year, maybe
9 September/October, I forget the exact time frame,
10 around there, in which they provided via telecon
11 answers to those questions or those issues.

12 And I followed up that telecon with a
13 letter to the plant manager at Harris I believe,
14 saying, appreciating that they had responded to me
15 in that way and documenting those, that meeting.

16 MR. O'NEILL: I'd ask the court reporter
17 to mark as Exhibit 1 three pages. One is a letter
18 from David A. Lochbaum to J.W. Donahue, dated August
19 31, 1998, a one-page letter. And, as part of
20 Exhibit 1, a second letter dated July 29, 1998, from
21 David Lochbaum to J.W. Donahue.

22 (Lochbaum Deposition)

1 Exhibit Number 1 was marked
2 for identification.)

3 BY MR. O'NEILL:

4 Q Mr. Lochbaum, have you had a chance to
5 review what has been marked as Exhibit 1?

6 A Yes, I have.

7 Q And are these two letters that you just
8 described in discussing correspondence with Carolina
9 Power & Light Company after the July meeting?

10 A Yes, they are. They filled in the gaps.
11 The individual I contacted, the licensing individual
12 was Kevin Shaw, and the site manager was Mr.
13 Donahue. The dates are earlier than I thought, but
14 they are the letters that I referenced or talked
15 about.

16 Q During the briefing in July, was there a
17 discussion by Carolina Power & Light of the
18 alternative plan for qualifying certain piping and
19 welds that no longer was a QA documentation
20 available?

21 A I recall that there was, yes.

22 Q At the time you addressed this letter to

1 Mr. Donahue, you did not raise any concerns about
2 the alternative plan; is that correct?

3 A That is correct.

4 Q And is it true that after you raised these
5 concerns, you participated in a phone conversation
6 with members of the Carolina Power & Light Company
7 staff?

8 A That's correct.

9 Q And during that conversation, was there a
10 technical discussion on the issues that you had
11 raised?

12 A Yes, there was.

13 Q During that discussion did you raise any
14 questions regarding the alternative plan?

15 A No, I did not.

16 Q During the July 1998 meeting, wasn't there
17 a fairly full discussion of the alternative plan as
18 one of the issues that would be addressed in the
19 license application?

20 A Yes, there was.

21 Q Did you have any concerns with respect to
22 the alternative plan during that discussion by

1 Carolina Power & Light in July of 1998?

2 A Not at that time, no.

3 Q What happened between that presentation in
4 July of 1998 and the time contentions were filed by
5 BCOC where you raised questions concerning the
6 alternate plan?

7 A I actually got to see what the alternative
8 plan was on paper instead of just bulleted items in
9 a presentation and look at it in a little more
10 detail.

11 Q So I take it between this exchange that is
12 represented by Exhibit 1 and when you were contacted
13 by, first, Chatham County or Jim Warren and then Ms.
14 Curran, that you had no involvement with the Harris
15 spent fuel pool expansion program?

16 A I believe that's true. I don't recall any
17 other contacts.

18 Q Okay. What happened then after
19 January/February 1999? What happened next?

20 A Between that and filing the contention?

21 Q Correct.

22 A After Diane Curran had me prepare a

1 declaration, it was reviewed by the other expert
2 witness, Gordon Thompson and Diane Curran, and there
3 were some comments either by telecon or by fax that
4 were incorporated into the final declaration that
5 was submitted -- I think it's dated the end of
6 March. Actually, I have it with me. It's March
7 31st, 1999.

8 Q Have you been retained as an expert by the
9 board of commissions of Orange County?

10 A I am an expert witness. Retained to me
11 implies monetary compensation, and there is no
12 monetary compensation, so I am an expert witness but
13 there is no financial involvement at all.

14 Q So you're independent?

15 A Very independent, yes.

16 Q Okay. And you're -- and as you just
17 indicated, you're not being financially compensated
18 by the board of commissioners of Orange County in
19 any way?

20 A Occasionally we've gone down for a meeting
21 and they've picked up a lunch where there were a
22 bunch of people sitting, but no travel expenses, but

1 other than an occasional lunch, which I believe is
2 two to date, there's been nothing other than that.

3 Q And what about NC Warren or Chatham
4 County, are they compensating you in any way?

5 A UCS is paying my salary and expenses.

6 Q By the way, is Orange County a member of
7 the Union of Concerned Scientists?

8 A I don't know.

9 Q Do they contribute financially to your
10 organization?

11 A Not to my knowledge, but they may. I
12 don't keep track of stuff like that. And that also
13 applies to NC Warren and others. I just -- I don't
14 know. They may or they may not, I don't know.

15 Q And I take did you haven't retained Ms.
16 Curran as your counsel?

17 A Not on this issue. UCS has in the past
18 retained Diane Curran.

19 Q Okay. But today she is not your counsel,
20 you're independent?

21 A That's correct.

22 Q Okay. And obviously Ms. Uttal is not your

1 counsel either?

2 A That's correct.

3 Q So you're here counsel-less?

4 A I'm my own counsel. I prefer to say that
5 rather than counsel-less.

6 Q That's fine.

7 MS. CURRAN: I think we are getting into
8 some legal territory here, and it's my view that Mr.
9 Lochbaum is acting as an expert for Orange County
10 and that I'm entitled to counsel him in this
11 deposition.

12 You know, if this comes up as an issue, I
13 guess we'll have to talk about it.

14 MR. O'NEILL: It would occur to me that if
15 you represented a party, that party would know that
16 you're representing them.

17 THE WITNESS: Not this party. That would
18 be a bad assumption.

19 MR. O'NEILL: I would ask the court
20 reporter to mark as Exhibit 2 a two-page document
21 entitled David A. Lochbaum, which appears to be his
22 curriculum vitae.

1 (Lochbaum Deposition
2 Exhibit Number 2 was marked
3 for identification.)

4 BY MR. O'NEILL:

5 Q The document should be just the two-page
6 resume and not certificate of service which is
7 unnecessary. Okay.

8 Mr. Lochbaum, is this your resume?

9 A Yes, it is.

10 Q Did you prepare it?

11 A Yes, I did.

12 Q Was it filed in response to an
13 interrogatory in this proceeding?

14 A I don't know.

15 Q Did you provide it to counsel for BCOC to
16 allow her to file it?

17 A I provided it to Diane Curran because she
18 asked me for it. I don't know what she did with it.

19 Q Okay. But you did prepare this?

20 A Yes, I did.

21 MR. O'NEILL: I'm going to at this time
22 mark as Exhibit 3 a transcript of the deposition of

1 David Lochbaum in another proceeding taken in
2 Indiana.

3 (Lochbaum Deposition
4 Exhibit Number 3 was marked
5 for identification.)

6 BY MR. O'NEILL:

7 Q And the date on it is February 3rd, 1999.
8 Mr. Lochbaum, would you look at the last
9 -- page 316 of the deposition.

10 A Yes.

11 Q Is that your signature?

12 A Yes, it is.

13 Q And the date of the signature is February
14 18, '99?

15 A That's correct:

16 Q And you reviewed the transcript before you
17 signed it?

18 A I'm not sure I reviewed this one or not
19 because the one I reviewed was not stamped
20 confidential. There was an issue of
21 confidentiality, and there was a second deposition,
22 because I did not sign the confidentiality

1 agreement.

2 Q Well, let me give you the original that I
3 have which is the same one which appears to have the
4 original signature which was bound and also has the
5 seal and affidavit of the court reporter.

6 A There is a -- there was a separate page
7 about the confidentiality because this was struck
8 out before I signed it.

9 Q Okay.

10 A So with that caveat or explanation, yes.

11 Q And at the time of this deposition, you
12 answered questions truthfully to the best of your
13 knowledge and belief?

14 A Yes, I did.

15 Q And there is nothing that you would take
16 back today that you answered back in February?

17 A I think, given a second shot, I might
18 answer questions a little better, but not because it
19 was incorrect or false.

20 Q One of the reasons I introduced this, it
21 will save us from reploting old ground --

22 A I suspected that.

1 Q -- to have that already in the record.
2 Since February of 1999, have you been
3 promoted at UCS?

4 A No.

5 Q So you're not an officer or a member of
6 the board at UCS?

7 A No, I'm not.

8 I'm not sure that would be a promotion,
9 but I'm not.

10 Q Okay. Looking at your resume on page 1, I
11 note that during the period November '87 to 9/96,
12 one of the items that you indicated you were
13 responsible for was "vertical slice assessment of
14 the spent fuel pit cooling system, and for
15 confirmation of licensing commitment implementation
16 at the Salem generating station."

17 Do you see that?

18 A Yes, I do.

19 Q What is the spent fuel pit cooling system?

20 A At Salem, that's the system that cools the
21 spent fuel pool. They call it a spent fuel pit.

22 Q So it's the same as a spent fuel pool at

1 most pressurized water reactors?

2 A It's similar. There are slight
3 variations, but it's the same functions, yes.

4 Q And what kind of assessment did you do of
5 the spent fuel pit cooling system at Salem?

6 A It was a vertical slice. We looked at
7 procedures, design, basis requirements, changes to
8 the design basis requirements over time as far as
9 modifications and new requirements imposed;
10 Maintenance practices, modifications. They
11 re-racked the pools, we looked at data evolution,
12 operation of the system, emergency procedures and
13 response.

14 Basically everything that touched the
15 spent fuel pool was looked at in the vertical slice.

16 Q Did the Salem spent fuel pit have a
17 cooling and cleaning system similar to the one at
18 the Shearon Harris plant?

19 A It had filter demineralizers, so it was
20 similar, yes.

21 Q And the cooling system was intended to
22 remove the heat from the spent fuel pool or pit as

1 they called it there?

2 A That's correct.

3 Q And what was the ultimate sink for the
4 heat that was removed from the spent fuel pit at
5 Salem?

6 A The ultimate was the Delaware Bay.

7 Q And what kind of a heat transfer system
8 was involved in that particular system?

9 A They had a spent fuel pit cooling loop
10 that transferred the heat to a service water system
11 that transferred its heat to the Delaware Bay
12 ultimately.

13 Q And is there any difference between that
14 system and the system at Shearon Harris?

15 A There are differences, yes.

16 Q What are the differences?

17 A There's quite a few differences. There is
18 a -- the spent fuel pit cooling system at Salem is
19 not safety-related. It's not a class 1 evac system.
20 It's seismic, just as the one at Harris, but there
21 are differences such as that, and those lead to
22 changes in how the instrumentation is and how the

1 procedures are structured and set up.

2 Those aren't all of the differences, but
3 those are probably the primary, key differences.

4 Q Have you studied the spent fuel pool
5 cooling and cleaning system at Shearon Harris?

6 A I have not do a vertical slice. I haven't
7 looked at it in that same detail, no.

8 Q What have you done with respect to your
9 review of the spent fuel pool cooling and cleaning
10 system at Harris? And we'll just call it the
11 cooling system to avoid that each time.

12 A I looked at the application that was filed
13 by CP&L that described the work they had done in
14 support of the application request. I also went to
15 the public document and reviewed the FSAR chapter on
16 the cooling system, but I didn't find anything there
17 that I relied on to get back to the earlier question
18 about documents produced or cited.

19 So that's pretty much what I did to look
20 at the cooling system at Harris.

21 Q Now, in the production of documents by
22 Carolina Power & Light to BCOC, there's quite a few

1 documents that related to the design of the cooling
2 system at Harris that were produced; is that not
3 true?

4 A There were quite a few produced and also
5 quite a few cited in references.

6 Q And, in fact, you spent a day reviewing
7 those documents in Raleigh, did you not?

8 A Going through those documents. I wouldn't
9 -- we were screening the documents to find out which
10 ones we wanted to request. That's a little
11 different than, you know, reading and comprehending
12 what was there.

13 Q Did you review the drawings of the spent
14 fuel cooling system?

15 A We've requested several drawings. I can't
16 say that I've studied them at this point.

17 Q Now, you say you've requested, but in fact
18 all of those documents have been provided to BCOC,
19 have they not, that you requested?

20 A I don't know.

21 Q You don't know?

22 A I don't know.

1 Q So since the documents have been provided
2 to counsel for BCOC, you have not reviewed them?

3 A I have received some documents from Diane
4 Curran. I have not reviewed all those documents
5 yet.

6 Q Okay.

7 A And some of those documents produced did
8 include some drawings, but I have not reviewed them
9 yet at this time.

10 Q Do you recall that you made a presentation
11 to the board of commissioners of Orange County in
12 Chapel Hill on April 7th, 1999?

13 A I remember making a presentation. I
14 wouldn't swear that it was April 7th. But I do
15 remember making a presentation.

16 MR. O'NEILL: I'd ask the court reporter
17 to mark as Exhibit 4 a set of slides entitled Risky
18 Business: Spent Fuel Storage at Harris Nuclear
19 Plant, dated April 7, 1999.

20 (Lochbaum Deposition
21 Exhibit Number 4 was marked
22 for identification.)

1 BY MR. O'NEILL:

2 Q Does this refresh your recollection of the
3 date of your presentation?

4 A Yes, it does. April 7th must have been
5 the date.

6 Q Are you aware that copies of the
7 videotapes of that presentation were produced to
8 Carolina Power & Light?

9 A No, I'm not aware.

10 Q Are you aware that it was videotaped?

11 A I knew there were cameras there. I don't
12 know if it was for live or for videotapes. So I
13 don't know. I'm not in possession of a copy and I
14 have never seen one, so I don't know.

15 Q You can take my word that it was
16 videotaped.

17 A I trust you then.

18 Q During that presentation, do you recall
19 making the following statement, and I quote: "The
20 Harris cooling system is better than the average
21 plant in the country"?

22 A I believe I did make that statement, yes.

1 Q And on what do you base that statement?

2 A On the fact that it's a state class 1E
3 system, and most plants in the country are not class
4 1E systems. And also safety-related, most plants --
5 most cooling systems in the country are not
6 safety-related.

7 Q Is there anything else on which you base
8 that statement that the Harris cooling system is
9 better than the average plant in the country?

10 A Those two are the primary reasons. I
11 can't recall any other.

12 Q What is the benefit and why would you say
13 it is better to have a class 1 safety grade system
14 as part of the cooling system? What is the
15 advantage?

16 A I'm sorry. Could you --

17 Q What is the advantage of having the class
18 1 safety grade cooling system as opposed to not
19 having a safety grade cooling system?

20 A By being class 1, it means that the
21 cooling system is backed up by the on-site emergency
22 power source, in this case diesel generates. It's

1 part of the original analysis and it's not a
2 contingency measure that may work. It's already
3 analyzed to be part of the plant's design.

4 Q What about the pedigree of the piping of
5 the system, is there a difference between a system
6 that is a class 1 system such as at Harris and
7 systems at other plants?

8 A In this case, it's a distinction somewhat
9 lessened by the fact that at all the plants, they
10 are all seismic design. I hate to say all. At most
11 plants, if not all, they are seismically designed,
12 which tends to narrow that gap between
13 safety-related and non-safety-related.

14 But even with that narrowing of the gap,
15 there is a difference in the pedigree for a
16 safety-related system, and the safety-related system
17 is a higher quality or designed to higher standards
18 than a non-safety-related system.

19 Q And what advantages does it provide to
20 Harris to have it designed to higher standards?
21 What is the benefit to the Harris plant?

22 A The problem I'm having is, when you say

1 "to the Harris plant," if you say, what's the
2 advantages of it, -it's safer and things like that.

3 Q Right.

4 A But the benefit to the Harris plant would
5 be actually disincentives. It costs more than it
6 would otherwise. So depending on how you look at
7 safety, it's who benefits from that.

8 Q Well, presumably Carolina Power & Light
9 will benefit from a safer plant.

10 A I think that's why we are here today, so
11 I'm not sure --

12 Q Well, and certainly everyone would benefit
13 from a safer plant; is that correct?

14 A Again, there seems to be some contention
15 over that, so that's why we're here today. So I'm
16 not sure that's a given.

17 Q What else have you done to familiarize
18 yourself with the design and quality of the spent
19 fuel cooling system at Harris?

20 A In addition to the previous answer?

21 Q Correct.

22 A Nothing in addition to the previous

1 answer.

2 Q Okay. Have you been involved in the
3 review of the spent fuel cooling system at any plant
4 other than Salem?

5 A Yes, I have.

6 Q And what plant was that?

7 A Well, most notably was the Susquehanna
8 Steam Electric station in Pennsylvania.

9 Q And that's a boiling water reactor?

10 A Yes, it is.

11 Q And the spent fuel pool in that plant is
12 inside the containment?

13 A Yes, it is.

14 Q And the spent fuel pool at the Harris
15 plant is in a spent fuel pool handling building?

16 A That's correct.

17 Q And what involvement did you have with
18 respect to the cooling system at Susquehanna?

19 A As part of a power upgrade project, I was
20 on a team that was evaluating systems for assurance
21 that they could meet all the requirements after
22 power uprate.

1 I was assigned to look at the spent fuel
2 cooling system at Susquehanna in light of that
3 project or under that project.

4 Q And what aspects of the cooling system did
5 you look at?

6 A It was similar to a vertical slice in that
7 we looked at design requirements, we took the
8 numbers that had been projected for after power
9 uprate in terms of heat loads, flows and so on.

10 We also looked at operating experience to
11 see if margins would be compromised by the
12 additional power uprate requirements, and tried to
13 make sure that all design, licensing and operator
14 requirements would be fulfilled after power uprate.

15 Q Was the spent fuel pool cooling system at
16 Susquehanna a safety-related system?

17 A It had portions that were, but it was not
18 safety-related as is, the Harris spent fuel cooling
19 system.

20 Q In addition to Salem and Susquehanna, have
21 you been involved in the spent fuel pool cooling
22 system at any other plant in any way?

1 A I have worked at plants where I was, for
2 example, the Browns Ferry plant where I was a shift
3 technical advisor and a reactor engineer, and the
4 involvement with the fuel pool cooling system at
5 those plants is more from an operational standpoint.
6 The ability or inability of the fuel pool cooling
7 system to do things put limits on what reactor
8 engineers could do in terms of fuel movements and
9 fuel unloading and so on.

10 Likewise at the Hatch plant where I was a
11 reactor engineer, I had operational reviews or
12 interfaces with fuel pool cooling, but not from a
13 design standpoint as at Susquehanna and Salem.

14 Q Have you worked at any plant during
15 construction of the plant?

16 A Yes, I have.

17 Q And what plant was that?

18 A The Hatch plant was in the tail ends of
19 construction. In fact, the radwaste system, of
20 which I was a system engineer, was the last system
21 on unit 2 to be pre-op'd and accepted for operation.
22 That was my assignment.

1 And then I went to work at the Grand Gulf
2 Plant during its initial construction.

3 Q And did you have responsibilities as a
4 construction engineer or on the operations side?

5 A It was on the operations side.

6 Q As a start-up engineer?

7 A As a start-up engineer, yes.

8 Q Have you had any experience as a
9 construction engineer?

10 A No, I have not.

11 Q Have you had any responsibility for
12 welding at a nuclear power plant?

13 A No, I have not.

14 Q Have you had any responsibility for
15 construction quality assurance or quality control at
16 a nuclear power plant?

17 A I have in a standpoint -- I worked for a
18 brief while for General Electric, and one of the
19 assignments was at the Grand Gulf Nuclear Power
20 Station. The plant owner or plant licensee asked me
21 to go through the nonconformance reports that were
22 written against GE products and services during the

1 tail end of construction to ensure that they were
2 resolved, dispositioned, make sure that there
3 weren't any that were missed.

4 A lot of those involved -- they used a
5 head -- bolt, take out the main steamline plugs and
6 missed, they hit the vessel instead of the plug. So
7 a lot of these were to ensure that, you know,
8 equipment was either repaired, reworked or accepted
9 as is or there was some kind of disposition.

10 So I had to review hundreds of those
11 things and track them down.

12 Q Have you been responsible for writing or
13 modifying QA procedures?

14 A Well, also at the Grand Gulf plant for GE,
15 one of the things I had was -- the independent
16 safety engineering group was being formed in
17 response to NUREG 0656 -- I think it's 0646 or 0656.
18 I can't recall offhand. But you are required to
19 have an independent safety and engineering group.
20 One of its responsibilities is to periodically
21 verify the adequacy of the on-site QA/QC group.

22 So I wrote the procedures for the

1 independent safety and engineering group to perform
2 that audit function.

3 Q By the way, have you reviewed the QA
4 procedures that are being used to commission the
5 spent fuel pool cooling system for unit 2 for pools
6 C and D?

7 A If they were in the application, I did.
8 There were also some documents like that that we've
9 requested that I have not yet reviewed.

10 Q Do you know what NDE stands for?

11 A Yes, I do.

12 Q What is it?

13 A Non-destructive examination.

14 Q Have you been responsible for NDE at any
15 nuclear plant in any way?

16 A Not in a traditional sense. I've done a
17 lot of examination that didn't result in
18 destruction, but not NDE as you use it.

19 Q Have you ever qualified as an NDE
20 examiner?

21 A No, I have not.

22 Q Have you been responsible for NDE

1 examiners at any nuclear plant?

2 A No, I have not.

3 Q Have you ever welded materials together?

4 A No, I have not.

5 Q And I believe you indicated earlier you
6 have not had any responsibility as a welding
7 engineer.

8 A That's correct.

9 Q Have you ever been responsible for the QA
10 or QC inspectors at a nuclear plant?

11 A No, I have not.

12 Q Have you serviced on any ASME code
13 committees?

14 A No, I have not.

15 Q Are you an expert in material science?

16 A No.

17 Q Are you an expert in corrosion of
18 materials at a nuclear power plant?

19 A No, I'm not.

20 Q Are you an expert in stress analysis?

21 A No, I'm not.

22 Q Are you an expert in failure analysis?

1 A I've been trained in root cause analysis,
2 so with that slice of it, that's a smaller subset
3 than failure analysis in a broad sense.

4 Q Tell me what your experience has been in
5 failure analysis.

6 A As an STA, shift technical advisor at
7 Browns Ferry, part of your job is to figure out what
8 happens: Do the post trip analysis, do the
9 preliminary determination when a piece of equipment
10 fails as to what caused it and what happened.

11 So in addition, for certain things we were
12 required to write the licensee event reports that
13 were later submitted to the NRC. That involved --
14 sometimes if it was an area within my system
15 responsibility, I would do the failure analysis,
16 find out what happened.

17 For the areas that were not within my
18 responsibility, as the STA I was responsible for
19 working with whoever was responsible to identify
20 what the failure was and get that information in to
21 the licensee event report or the post trip report or
22 whatever the proper document was.

1 Q Are you an expert in the causes of
2 degradation of stainless steels?

3 A No, I'm not.

4 Q Are you an expert in probability and
5 statistics as it applies to engineering design?

6 A No.

7 Q What is the diameter of the piping at the
8 union 2 spent fuel pool cooling system?

9 A I don't know. I doubt it would be all the
10 same diameter.

11 Q What are the diameters if they are not all
12 the same?

13 A I don't know.

14 Q Any idea?

15 A No.

16 Q What is the thickness of the piping at the
17 Harris spent fuel pool cooling system for unit 2?

18 A I don't know.

19 Q What is the materials of the piping for
20 the spent fuel pool cooling system for unit 2?

21 A Some of it, if not all of it, is stainless
22 steel.

1 Q What kind of stainless steel?

2 A I'd have to look at the report. I don't
3 recall.

4 Q Are there more than one kind of stainless
5 steel?

6 A Yes, there are.

7 Q Do they have different properties?

8 A Yes, they do.

9 Q Do they have different resistance to
10 degradation based on the type of stainless steels?

11 A Yes, they do.

12 Q What kind of weld process was used for the
13 field welds for the unit 2 spent fuel cooling
14 system?

15 A I don't know.

16 Q How many weld presses were made for each
17 field weld on the spent fuel cooling system?

18 A I don't know.

19 Q Are you aware of how many welds are in the
20 spent fuel cooling system for unit 2?

21 A No.

22 Q Total welds?

1 A No, I'm not.

2 Q Do you know what percentage of them were
3 vendor welds and what percentage of them were field
4 welds?

5 A I know the range. I don't know the
6 numbers.

7 Q What was the range?

8 A Between zero and a hundred.

9 Q What is the design pressure of the spent
10 fuel cooling system for unit 2 for pools C and D for
11 Harris, design pressure?

12 A My recollection is 150 pounds per square
13 inch gauge, but I'd have to go back and look at the
14 documents to be sure. That's just my recollection.

15 Q What is the actual maximum pressure that
16 that piping or welds would see in the operation of
17 the system?

18 A It would be the shutoff head of the pumps,
19 but I don't know what that is.

20 Q Do you know -- well, what is the level at
21 which the suction and discharge is connected to the
22 spent fuel pool from the top of the pool to the

1 point of suction discharge in feet?

2 A I don't know.

3 Q How deep were the spent fuel pools at
4 Harris?

5 A I don't know.

6 Q Approximately?

7 A Approximately 45 feet.

8 Q Relative to the total depth of the pools
9 that you think is 45 feet, about where do you
10 understand the suction and discharge to be in the
11 pool? At the bottom?

12 A The pump suction?

13 Q The suction of the spent fuel cooling line
14 suction and discharge?

15 A The suction and discharge are above the
16 bottom. I'm not clear what question you're trying
17 to ask here.

18 Q I'll try to be more clear. I'm sorry.

19 The spent fuel pool configuration is like
20 any swimming pool, it has a bottom, sides and a top.
21 And it's open at the top; is that correct?

22 A That's correct.

1 Q So it's open to atmosphere?

2 A That's correct.

3 Q Okay. And then the sides of the pool have
4 some openings; is that correct?

5 A That's correct.

6 Q And among the openings in the side of the
7 pool is a suction to the spent fuel pool cooling
8 system where the water is taken from the pool, goes
9 through the pump to the heat exchanger and then is
10 returned to the pool; is that correct?

11 A That's correct.

12 Q Now, my question is, given -- assume for
13 the moment that you're correct and that the depth of
14 the pool is 45 feet.

15 A Approximately 45.

16 Q And that there is someplace along from
17 zero feet at the top to 45 feet deep at the bottom
18 -- where do you understand the suction discharge
19 lines to lie on the sides of the pool?

20 A My understanding is the suction line is
21 basically at zero feet. I don't know where the
22 discharge line is.

1 Q Okay. And the purpose is not having it
2 close to the top so you can't drain the pool; is
3 that not correct?

4 A That is not correct.

5 Q That is not correct?

6 A I believe your question was not having it
7 at the top?

8 Q The reason that you have it at the top is
9 so that you won't drain the pool, for example, if
10 you had it at the bottom.

11 A That's correct, but I don't think that's
12 the question you asked me.

13 MS. CURRAN: I think the word "not"
14 slipped in there.

15 BY MR. O'NEILL:

16 Q Well, let me reformulate the question.

17 Why, Mr. Lochbaum, would you have the
18 suction and discharge lines at the top of the pool
19 as opposed to the bottom or the middle of the pool?

20 A So you don't inadvertently drain the pool.

21 Q And that is indeed the design at Shearon
22 Harris; is it not?

1 A I told you I don't know where the
2 discharge is. I understand that they meet that
3 requirement, but I don't know exactly where that
4 design is.

5 Q Okay. Now, if it is true that the suction
6 discharge are more or less at the top of the pool,
7 what could the maximum pressure seen by the piping
8 be, since it's opened to atmosphere?

9 A It would -- if the pump is running, then
10 it would be the discharge pressure at the pump,
11 particularly if there was a valve downstream that
12 was closed, and that section of the pump would see
13 whether the shutoff -- if the pump is not running,
14 then it's just going to be the elevation head.

15 Q Okay. But you don't know what the maximum
16 operating pressure would be as set forth in much of
17 the documentation you had a chance to look at?

18 A I seem to recall a number of 45 PSIG, but
19 I wouldn't swear to that because it may be
20 overdrawing my memory banks here.

21 Q Okay.

22 (Discussion off the record.)

1 MR. O'NEILL: I'd ask the court reporter
2 to mark as Number 5 a two-page document entitled
3 David Lochbaum, Nuclear Safety Engineer.

4 (Lochbaum Deposition
5 Exhibit Number 5 was marked
6 for identification.)

7 BY MR. O'NEILL:

8 Q Did you write this, Mr. Lochbaum?

9 A No, I did not.

10 Q Who wrote it?

11 A Anita in our Cambridge office.

12 Q Did you review it?

13 A I provided input to it, but I don't --

14 Q Is the information in this one-page
15 write-up entitled David Lochbaum, Nuclear Safety
16 Engineer, correct and accurate to the best of your
17 knowledge and belief?

18 A Well, there's two points. In the third
19 paragraph, the last sentence, "Finally, three years
20 after they first sounded the alarm," that sentence,
21 it was actually closer to four years.

22 And the last sentence or last paragraph

1 which is a one-sentence paragraph, you know, it's --
2 I'm not going to argue that that's true or not,
3 whether we have that reputation, but we have that
4 editorial right, I guess, to claim that.

5 Q Where is this document from?

6 A You handed it to me.

7 Q I understand, but where did it come from?

8 A It looks like it came from the Union of
9 Concerned Scientists web site.

10 Q And, indeed, if we were looking at the web
11 site, the little x's would be where your picture is.
12 But we weren't able to print that out.

13 A Right. A good thing. It wasn't one of my
14 better photographs.

15 Q In the fourth paragraph, and I'll read
16 this paragraph for the record, "Concerned about
17 nuclear safety and fed up with NRC complacency, Dave
18 joined USC in 1996. , 'When I raise safety concerns
19 on the UCS letterhead, the NRC pays attention,' he
20 says -- a welcome change from the patronizing and
21 dismissive response he received previously. And pay
22 attention they do, as the 1997 closure of the Maine"

1 -- I assume that's M-A-I-N-E.

2 A Supposed to be, yes.

3 Q -- "Yankee Plant attests. See Nucleus
4 Article, fall 1997."

5 Do you take credit for the closure of the
6 Maine Yankee Plant?

7 A I do not, no. UCS does. I do not.

8 Q I see. Is there any evidence that you
9 have of complacency by the NRC in connection with
10 the license application that we're discussing today
11 for the spent fuel pool at Shearon Harris? Are you
12 concerned about NRC complacency here today?

13 A Not today. I'm concerned with answering
14 the questions in the deposition.

15 Q I understand, but back to the question.
16 Do you have any evidence or concerns with respect to
17 this proceeding --

18 A Yeah.

19 Q -- at this plant with NRC complacency?

20 A Yes, I do.

21 Q And what is it?

22 A One of the contentions we raised had to do

1 with heat loads and some issues that was not
2 admitted or accepted or whatever the right legal
3 terms is by the SLB.

4 The NRC staff counsel had advised the SLB
5 at the hearing that there was no merits to the
6 contention we raised. And then shortly thereafter,
7 after it was ruled out of bounds or, again, whatever
8 the right legal term is, the NRC staff issued an RAI
9 to CP&L on the very same subject.

10 So it's a little troubling to me or it
11 concerns me that the staff would tell the SLB that
12 this contention had no merit and then turn around
13 and ask the CP&L the same questions about an issue
14 that they had just weeks before said had no merit.

15 So either they are wasting CP&L's time or
16 they are being a little bit less than forthright
17 with the SLB.

18 Q So you think asking questions is
19 complacent?

20 A No. I think telling less than the truth
21 or not being forthright with the SLB, downplaying
22 the seriousness of an issue that they themselves

1 believe to be an issue is in that complacent arena.

2 Q Does the NRC only ask questions when they
3 believe there's a serious issue; is that what you're
4 saying?

5 A I wouldn't say it under oath or not under
6 oath, no.

7 Q Okay. Do you believe that the NRC staff
8 was untruthful in this proceeding in telling the
9 Atomic Safety and Licensing Board there was no
10 reason to admit the contention on heat load?

11 A I think I answered your question saying it
12 concerned me that they took one action in the SLB
13 hearing and the later action contradicted what they
14 said in the SLB hearing. It's up to somebody else
15 to determine whether that was a false statement or
16 not.

17 Q It's a pretty serious accusation to
18 suggest that the NRC staff has made a false
19 statement to the Atomic Safety and Licensing Board,
20 isn't it, Mr. Lochbaum?

21 A Considering the other arenas that they've
22 made similar false statements, I don't think that

1 that's that serious.

2 Q Other than that issue that you've just
3 raised, do you believe that the NRC has otherwise
4 been complacent in connection with the license
5 amendment request relating to the Shearon Harris
6 spent fuel pool?

7 A No. But also I need to qualify that that
8 I wasn't really concerned with the NRC's performance
9 on this issue.

10 Q You weren't?

11 A The safety issues that we raised
12 independently I was concerned with. You know, I --
13 at this point I don't really care what the NRC staff
14 does.

15 Q Why do you not care what the NRC staff
16 does?

17 A It goes back to the feeling that I don't
18 believe the NRC staff is a strong or rigorous
19 regulator.

20 Q So that goes to what Exhibit 5 discusses,
21 that you can't trust the complacent NRC staff, but
22 fortunately we have David Lochbaum, USC nuclear

1 safety engineer, protecting public interest. Is
2 that sort of the pitch that you make here?

3 A No. The pitch I make there is the reason
4 I joined UCS was I was fed up with the complacency
5 of the NRC, and UCS was a way to get safety issues
6 addressed in a more productive manner.

7 Q After the deposition in February we had
8 occasion to ride back to Washington together, and in
9 fact next to each other on the plane; is that not
10 correct?

11 A That is correct.

12 Q And we had a discussion during that trip
13 about your background and experience in nuclear
14 power.

15 Is it not true that you told me that one
16 of your problems is that your constituents of UCS
17 constantly urge you to take a more aggressive
18 position against nuclear power than you really would
19 like to take? Do you remember that statement?

20 A I do remember that statement, yes.

21 Q So when you rail on about NRC complacency,
22 is that part of what your constituents expect you to

1 say or is that what you really believe?

2 A That's what I really believe. You can
3 look at statements before I joined UCS. I didn't
4 become more critical of the NRC since I joined UCS.
5 Perhaps more visible, but not more critical.

6 Q Okay. Are you aware that BCOC has
7 proffered you as an expert on contention 3 only?

8 A That's my understanding, yes.

9 Q Are you aware that on September 3rd, 1999,
10 in Orange County's supplemental response to
11 applicant's first set of interrogatories you were
12 proffered as an expert on both contentions 2 and 3?

13 A No, I'm not aware of that.

14 Q Did you have any discussion with BCOC or
15 counsel to BCOC about which contentions that you
16 would be an expert on?

17 A No, not that I recall.

18 Q Do you know why you were removed as an
19 expert on contention 2 and now only are an expert on
20 contention 3?

21 A We had some discussion in the last week
22 about the way it is now. In fact, I didn't know it

1 was that way before. But the way it is now allows
2 us to get by with the minimal resources we have.
3 Gordon has time to look at contention 2. Whatever
4 time I have I can look at contention 3. We don't
5 have much time to do cross-review or overlap. But I
6 didn't know that that was the reason because I
7 didn't know it was that way before.

8 Q Do you agree with Dr. Thompson's position
9 on contention 2?

10 MS. CURRAN: I'd like to -- I'm going to
11 object here because it's my understanding the
12 questioning that we agreed upon and that is in your
13 notice of deposition relates to contention 3.

14 Mr. Lochbaum has come here prepared to
15 talk about contention 3 and not contention 2.

16 MR. O'NEILL: Your objection is noted.

17 BY MR. O'NEILL:

18 Q You may answer the question.

19 A There is more to what Gordon Thompson has
20 said that I agree with than I disagree with. There
21 are probably parts that I would not agree with, or
22 either I don't agree with or I don't have enough

1 understanding to agree. I'm on the fence basically.

2 Q I didn't make copies of this because I was
3 concerned about the copyright admonition in the
4 front, but is it true that you have written a book
5 called Nuclear Waste Disposal Crisis, David A.
6 Lochbaum, that was published in 1996?

7 A That's correct.

8 Q And this book was referenced in your --
9 the information provided in answers to
10 interrogatories, as one of your publications, was it
11 not?

12 A Yes, it was.

13 Q Is the information in this book accurate
14 and correct to the best of your knowledge and
15 belief?

16 A It was when I wrote it. Since then, I've
17 had a few people read it and said I missed something
18 here. And I've had a few corrections noted, but I
19 haven't -- not enough that we've issued an update or
20 anything like that.

21 Q Are there any corrections that you would
22 like to at this time state for the record that might

1 relate to spent fuel pools, criticality, cooling
2 systems?

3 A No, the corrections have been made. I had
4 a couple where there was a mark 1 instead of a mark
5 2 in terms of containment design and so on that were
6 relatively minor and don't affect this case in any
7 way.

8 Q And the information in this book is indeed
9 your position on these issues?

10 A They are my own positions. It was written
11 before I joined UCS.

12 Q Do you consider yourself an expert on
13 spent fuel coolers and spent fuel storage?

14 A I'm knowledgeable -- yeah, I would say I
15 am an expert on spent fuel systems and storage.

16 Q Have you and Dr. Thompson discussed your
17 views on spent fuel storage as set forth in this
18 book?

19 A No. He obtained a copy of it early this
20 year. And I don't know -- to tell you the truth, I
21 don't even know if he's read it yet, so we haven't
22 discussed it.

1 Q And you haven't discussed where his views
2 as he's articulated them, may disagree with views
3 that you have in this book?

4 A No, I really haven't.

5 Q So that wasn't why you decided that the
6 two of you couldn't be compatible experts on the
7 same contention 2?

8 A No. It wasn't a professional disagreement
9 or even a personal disagreement for that matter.
10 Nothing like that.

11 Q In Orange County's supplemental response
12 to applicant's first set of interrogatories dated
13 September 3, 1999, there are three proceedings in
14 which it is indicated you have provided testimony.
15 The first is Kick versus MedEd. Second, Yankee Row.
16 And then number 4, instead of 3, is Seabrook Nuclear
17 Power Plant.

18 Is that just a typo or was there a third
19 one that somehow got deleted?

20 A There was a third one that never went to
21 trial or never went to the SLB or anything like
22 that. I provided a declaration that was never used.

1 Q And what was that?

2 A That was either Yankee Row or -- not,
3 Yankee. I think --

4 Q When was that?

5 A It was about the time -- it was between 2
6 and 4. It was between the Yankee Row first one and
7 Seabrook.

8 Q Well, Yankee Row has a date 9873601LA,
9 which suggests that it's '98; is that correct?

10 A That's what it suggests, yes.

11 Q What about Seabrook, when was that?

12 A Seabrook was also '98. It was toward the
13 tail end of last year; whereas, the Yankee Row one
14 was very early on. I think I filed a declaration in
15 either January or February of '98 for the Yankee Row
16 case.

17 Q And what is the declaration that was in
18 between the two, you think that was Yankee Row or
19 Vermont Yankee or you're not sure?

20 A It was for one of the plants in the
21 northeast for Citizens' Awareness Network, I
22 believe.

1 Q The one you have listed here?

2 A Was also Citizens' Awareness Network.

3 Q So that's two for Citizens' Awareness
4 Network; is that correct?

5 A That's what I recall, yes. I'd have to go
6 back to get the exact cite. But from recollection,
7 that's what it is.

8 Q But you did provide a declaration?

9 A Yes, I did. What I don't know is that it
10 was ever -- in fact, I don't think it was filed or
11 even submitted. I think they decided not to pursue
12 it.

13 Q Would you be kind enough, if it was filed,
14 of giving us the docket number and the name of that
15 proceeding. If it wasn't filed, then it wouldn't be
16 responsive.

17 A I think the reason it was not included is
18 it was not filed.

19 Q But you're not sure?

20 A I had a discussion with Diane. She asked
21 me that question if it was filed, and we said it
22 wasn't, so it was taken out. You asked me what it

1 was and stuff like that, and I just don't remember
2 the exact --

3 Q Okay. So to clarify the record, because I
4 was confused, your position is there was nothing
5 filed in the third proceeding?

6 A That's correct.

7 Q Okay. Tell me about the Seabrook
8 proceeding? That was the end of '98.

9 A The Seabrook owner had filed a license
10 amendment request seeking to extend or seeking a
11 one-time exception to a surveillance interval for
12 steam generator 2 inspections.

13 Because of a mid-cycle outage, an
14 unplanned mid-cycle outage, to do some work on
15 controlling ventilation, they were in a situation
16 where they would have had to shut down before the
17 refueling outage to do the steam generator
18 inspection, and they were seeking a one-time
19 exemption.

20 That's what they were asking for. The
21 application they submitted would have been for all
22 times, changing the surveillance frequency from 18

1 months to 24 months.

2 The Seacoast Antipollution League who
3 retained me or I volunteered again, it was the same
4 kind of arrangement, was intervening in that case
5 not to allow an all-the-time extension of the
6 surveillance interval or increase in the
7 surveillance interval.

8 Q What happened?

9 A My understanding is the SLB was formed.
10 It was admitted. Some of the contentions were
11 admitted. I forget the exact number. The parties
12 agreed to a settlement to basically the licensee
13 withdrew the license amendment request that rendered
14 the proceeding moot, and a settlement was issued
15 saying that everybody agreed to that.

16 Q And you filed a declaration in support of
17 the contentions?

18 A I submitted some information to the
19 counsel for Seacoast Antipollution League that they
20 incorporated. I don't believe my declaration was
21 filed as an attachment. I think the council
22 incorporated the technical material into SAPL's own

1 document or submittal, but I think that, as I
2 recall, that document stated that I was going to be
3 the expert witness to address certain issues.

4 Q And what was your position with respect to
5 this exemption request? Was it a 50.55a exemption?

6 A No. My understanding was it was a license
7 amendment request under 50.91, 50.92.

8 Q It was a technical specification change
9 then?

10 A Yes, that's correct. Because during the
11 settlement phase and the negotiation phase, that was
12 one of the options. If it would have been made a
13 one-time-only exception, a license condition type of
14 thing, that would -- because that's what SAPL could
15 have agreed to and that's what the licensee actually
16 wanted. But it ended up not being needed anyway.

17 Q Mr. Lochbaum, in the Orange County second
18 supplemental response to applicant's first set of
19 discovery requests in the first supplemental
20 response to NRC staff's first set of discovery
21 requests dated October 13, 1999, Orange County
22 states, "David Lochbaum will provide a declaration

1 or sworn affidavit in the subpart K proceeding with
2 respect to contention TC3. This is in response to
3 the interrogatory request for the names and
4 background of individuals or persons whom Orange
5 County expects to provide sworn affidavits and
6 declarations in the written filing."

7 What facts will you provide a sworn
8 declaration or affidavit on?

9 A Which facts?

10 Q What facts can you attest to?

11 A I haven't completed my review of the
12 discovery material, so I don't know what those facts
13 will be at this time.

14 Q But your facts will be limited to
15 information provided in the discovery material and
16 the information we previously discussed that was
17 attached to your earlier declaration or that was
18 provided in discovery by BCOC to CP&L; is that
19 correct?

20 A That is correct.

21 Q That's the universe of facts that you have

22 --

1 A Yes.

2 Q -- relating to this proceeding?

3 A That's correct.

4 Q And I understand that you will not be on
5 the tour of the plant on Wednesday of next week; is
6 that correct?

7 A I will be there Tuesday, the 19th. I
8 don't know if that's a tour of the plant or not.

9 Q There is not a tour of the plant on
10 Tuesday, the 19th.

11 A Then I will not be on the tour, that's
12 correct.

13 Q What will you be doing on Tuesday, the
14 19th?

15 A I believe there's some depositions being
16 taken at the plant site, and I'll be supporting BCOC
17 counsel in those depositions.

18 Q Okay. In response in general
19 interrogatory number 3, BCOC states, again,
20 referring to the same October 13, 1999, pleading,
21 "David Lochbaum will provide a declaration or sworn
22 affidavit in the subpart K proceeding with respect

1 to contention TC3."

2 Interrogatory number 3 requests
3 identification of individuals who are experts and
4 expected to provide sworn affidavits and
5 declarations for the written filing.

6 On what areas as an expert will you
7 provide written sworn testimony?

8 A Well, the snide answer would be the
9 answers -- the areas covered under technical
10 contention number 3, which were the quality
11 assurance and the readiness of the spent fuel pool
12 cooling system to be used.

13 Q I understand that. But we've established
14 some areas that are related that you are not an
15 expert. So now I want you to tell me what areas
16 relating to contention 3 that you consider yourself
17 an expert and, therefore, qualified to give an
18 expert opinion.

19 A Go back to the areas we just went through
20 with the yeses and nos. The areas of quality
21 assurance, where this plant has completed -- has all
22 the documentation necessary and the work necessary

1 to put this systems in service would be the areas I
2 would be looking at in providing an affidavit or a
3 declaration or some document.

4 Q But you will not be taking a position on
5 corrosion, I understand, since you're not an expert
6 in corrosion?

7 A I will not be saying whether a component
8 is corroded or not because I don't have the ability
9 to do that.

10 I can look at nothing and determine it
11 wasn't addressed and that the level showing that
12 this is -- all the bases have been covered, I can
13 determine whether that has been done or not.

14 So I think there is a distinction -- those
15 are my boundaries as far as what I --

16 Q And you certainly will not be giving an
17 opinion on welding, for example?

18 A I will not be saying, looking at some of
19 the information we just looked at in discovery and
20 saying, you know, CP&L says this weld is good and
21 I'll say, no, this weld is bad. I won't venture
22 anything like that.

1 But if they have not a process in place
2 that demonstrates that all the welds are adequate, I
3 could point out flaws or gaps in that process.

4 MR. O'NEILL: Off the record.

5 (Discussion off the record.)

6 THE WITNESS: Before we resume, could I
7 clarify two things that we talked about earlier
8 today?

9 MR. O'NEILL: Sure.

10 THE WITNESS: One of them had to do with
11 the retention and the expert witness part.

12 BY MR. O'NEILL:

13 Q Yes.

14 A I considered myself retained in the same
15 capacity as Gordon Thompson, the difference being --
16 there's two differences. One is I'm not getting
17 compensated, whereas Mr. Thompson is, at least for
18 his travel, perhaps for his time, I don't know. But
19 UCS is a public interest group. We do things like
20 this. That's how we get money from donors and
21 stuff.

22 So I don't want to get UCS in a position

1 of selling out my services. You know, that's not
2 how we are in business. So that's the reason we've
3 made these choices in the Seabrook case and in the
4 BCOC case.

5 The other distinction between myself and
6 Gordon Thompson is he has signed a
7 non-confidentiality agreement, and I cannot sign one
8 of those in this case, and I didn't sign one in the
9 Indiana/Michigan case. The reason being, as a
10 public interest group and a safety advocate, if I
11 find something in discovery that is a safety
12 concern, I have to have the freedom to try to get it
13 resolved in the public arena.

14 So I cannot sign a non-confidentiality
15 agreement, even though that means I can't look at
16 certain documents. That's the price I pay.

17 The second area I'd like to clarify was
18 the discussion we had on the plane coming back and
19 the pressure, the problem of people pressuring me to
20 take positions or not. We do get UCS members who
21 are not pleased with some of the positions I take,
22 but that doesn't reflect in the board or my

1 management pushing me to be -- take positions that
2 I'm not comfortable with.

3 In fact, it's generally the other way
4 around. They try to tone down some of the rhetoric.
5 They're not always successful. They didn't see the
6 title, the Risky Business title, so they are not
7 fully filtering all the stuff, but they try to rein
8 it in rather than push it out. I just wanted to
9 clarify those two points.

10 Q Have you inadvertently or advertently
11 reviewed or looked at any document that was produced
12 in this case that was marked proprietary?

13 A Not to my recollection. The reason I
14 hesitated, I reviewed a licensing submittal that was
15 stamped Confidential, but I don't think that was
16 this case. I think that was the Millstone case.
17 But it was in the public document room, so I think
18 it had been stamped inappropriately.

19 And to the best of my recollection, that
20 was the Millstone case and not the Harris case, but
21 I may have those backwards.

22 Q And as I understand it, in connection with

1 the documents that were produced by Carolina Power &
2 Light in this case that are stamped proprietary, you
3 will not look at them?

4 A I will not look at them, that's correct.

5 Q Okay.

6 A And I also will not be involved in any
7 discussions between other parties who have looked at
8 them.

9 Q Okay.

10 MR. O'NEILL: I'd ask the court reporter
11 to mark as Exhibit 6 a document dated May 27, 1999,
12 entitled Orange County's Response to Applicant's
13 Proposed Rewording of Contention 3, Regarding
14 Quality Assurance.

15 (Lochbaum Deposition
16 Exhibit Number 6 was marked
17 for identification.)

18 BY MR. O'NEILL:

19 Q Mr. Lochbaum, I assume you have seen this
20 document before or you have seen the contention
21 written before.

22 A I've seen the contention written before,

1 yes.

2 Q Did you draft this contention?

3 A No, I did not draft this contention.

4 Q Did you assist in the drafting of the
5 contention?

6 A I assisted in the drafting of the
7 contention.

8 Q Do you believe in this contention?

9 A I do believe in this contention, yes.

10 Q Let's look at it.

11 A Okay.

12 Q Take a moment to read the first paragraph,
13 then we'll take it line by line.

14 A (Witness complies.) Okay.

15 Q Now, contention 3 begins by stating,
16 "CP&L's proposal to provide cooling of pools C and D
17 by relying upon the use of previously completed
18 portions of the unit, 2 fuel pool cooling and cleanup
19 system and the unit 2 component cooling water
20 system" --

21 A Excuse me. Did you want me to read the
22 first paragraph on the first page or the first

1 paragraph of the contention?

2 Q The first paragraph of the contention.

3 A I read the wrong paragraph then. Give me
4 a minute. Sorry.

5 (Pause.)

6 (The record was read as requested.)

7 BY MR. O'NEILL:

8 Q -- "Unit 2 fuel pool cooling and cleanup
9 system and the unit 2 component cooling water system
10 fails to satisfy the quality assurance criteria of
11 10 CFR Part 50, Appendix B, specifically criterion
12 XIII (failure to show that the piping and equipment
13 have been stored and preserved in a manner that
14 prevents damage or deterioration.)"

15 Let's focus on that. Isn't it true that
16 the 50.55a alternative plan addresses the fact that,
17 during the period of time from 1983 to 1999, CP&L
18 freely admits that there was no quality plan for
19 storage and preservation of that piping, welds and
20 other components?

21 A That's correct.

22 Q Okay. So that's what we're addressing is

1 the fact that we have components and piping and
2 equipment that was not stored pursuant to a quality
3 program.

4 A That is correct.

5 Q Okay.

6 A Among others. That is not the only --

7 Q I understand. One at a time.

8 "Criterion XVI (failure to institute
9 measures to correct any damage or deterioration.)"

10 Now, is it your criticism that the
11 alternative plan fails to institute measures?

12 A In the sense of failure of not being fully
13 adequate, yes.

14 Q Okay. And what is not adequate in
15 connection with CP&L's commissioning plan, quality
16 assurance plan and other plans and procedures
17 adopted to commission the unit 2 spent fuel pool
18 cooling system?

19 A I think in the paragraph that starts
20 "Moreover" in bold.

21 Q Yes.

22 A "Fails to satisfy the requirements of 10

1 CFR, Section 50.55a for an exception to the quality
2 assurance criteria because it does not describe any
3 program for maintaining the idle piping in good
4 condition over the intervening years."

5 Continue on: "Nor does it describe a
6 program for identifying and remediating potential
7 corrosion and fouling."

8 That is our concern with the failures to
9 the three criterion above.

10 Q Okay. I want to go to criterion XVII,
11 "failure to maintain necessary quality records to
12 show that all quality assurance requirements are
13 satisfied."

14 CP&L begins with the admission and the
15 predicate that certain quality records were
16 inadvertently destroyed and do not exist; is that
17 correct?

18 A That is correct.

19 Q Therefore, the 50.55a plan, alternative
20 plan, is all about an alternative demonstration of
21 the quality of the spent fuel pool cooling system;
22 is that not correct? That's the purpose of it?

1 A That is its purpose.

2 Q Okay. Now, is it your position that the
3 50.55a plan is in itself inadequate because the plan
4 does not describe a program for identifying and
5 remediating potential corrosion or fouling?

6 A The application is deficient. I'm not
7 sure I've parsed it out discretely enough to say
8 that it's because the 550.55a alternative plan
9 doesn't contain it or the whole submittal does not
10 describe it.

11 Q This contention, and we have to be very
12 concerned about the words because this is what I
13 have to litigate. The words say "the alternate
14 plan," that's the "it," "does not describe a program
15 for identifying and remediating potential corrosion
16 and fouling."

17 Is that not what the contention says?

18 A That's what the contention says.

19 Q Is that what you mean?

20 A Yes.

21 Q Okay. Now, do you understand what 50.55a
22 is all about?

1 A In this application I do. It's used in a
2 number of places, and I can't swear that I
3 understand where 50.55a is used everywhere else, but
4 in this application I'd say yes.

5 Q Have you ever prepared a 50.55a
6 application in your work for a utility to obtain an
7 exemption to a code requirement?

8 A I've not prepared one. I've been the
9 reviewer for plans when I worked in licensing
10 groups.

11 Q Okay. What is the requirement, the code
12 requirement that the 50.55a plan addresses? The
13 code requirement.

14 A You're talking about the ASME code
15 requirement?

16 Q Correct.

17 A I don't recall offhand what the wording of
18 that code requirement is.

19 Q If you don't recall the wording, do you
20 understand what requirement the 50.55a plan
21 addresses?

22 A The purpose of the code is to ensure, or

1 the function of the code is to ensure that there is
2 a certain quality standard that are met prior to the
3 use of any safety-related system.

4 Q Okay. Now, what specifically, very
5 specifically, does CP&L say it cannot meet and,
6 therefore, requires an alternative plan?

7 A It cannot meet the quality assurance
8 documentation of the welds and the construction of
9 the spent fuel cooling system on unit 2. It lost --
10 some of the records were destroyed -- were
11 inadvertently destroyed and so on. It lacks that
12 pedigree.

13 Q So it lacks some records for certain
14 welds. Anything else?

15 A Well, the commissioning plan, not the
16 alternative plan, there were also some things that
17 were not yet installed and they had to go out and
18 verify that the installation was complete.

19 Q But that's not part of the 50.55a plan, is
20 it?

21 A That's correct.

22 Q Because the 50.55a plan only goes to what

1 is an exception to the code requirements.

2 A That's correct.

3 Q The code requirements are you will have
4 documentation with respect to each of the Section
5 III piping welds; is that not what we're talking
6 about?

7 A That's correct.

8 Q And CP&L says, with respect to certain
9 welds, we don't have the documentation?

10 A That is correct.

11 Q The 50.55a plan is designed to provide an
12 alternative to satisfy the intent of the code
13 requirements with respect to the documentation of
14 the welds; is that not correct?

15 A Would you read that again?

16 (The record was read as requested.)

17 THE WITNESS: In this case it does, yes.

18 I think it's been used in other applications

19 elsewhere.

20 BY MR. O'NEILL:

21 Q Of course. Now, is there anything else
22 that the 50.55a plan is designed to address, to your

1 knowledge and understanding of this process which
2 you are the expert on?

3 A I don't believe so, no.

4 Q Okay. For example, the 50.55a plan does
5 not address the heat exchangers, does it?

6 A That's correct.

7 Q Why doesn't it address the heat
8 exchangers?

9 A It's not required to address the heat
10 exchangers.

11 Q Because the heat exchangers meet all the
12 code requirements; is that not correct?

13 A I'm not going to swear to that, no.

14 Q Okay. But you have no reason to believe
15 that the heat exchangers don't meet the code
16 requirements?

17 A I've never looked at that question, so I'm
18 not going to say yes, or no.

19 Q It's not part of this contention, is it?

20 A It is not part of this contention. That I
21 can answer.

22 Q Do you happen to know how the heat

1 exchangers were stored?

2 A I do not happen to know how the heat
3 exchangers were stored.

4 Q But the heat exchangers can be inspected
5 carefully to ensure that, A, they meet the code
6 requirements and, secondly, that they haven't
7 deteriorated, can they not?

8 A Yes, the heat exchangers can be inspected
9 to ensure that, A, they met all the code and, B,
10 that they haven't deteriorated, yes.

11 Q Similarly, the pumps can be inspected, can
12 they not?

13 A The pumps can be similarly inspected, yes.

14 Q The piping that is accessible and not
15 embedded in concrete can also be inspected, can it
16 not?

17 A The piping -- even the embedded piping can
18 be inspected, yes.

19 Q Okay. But the piping that is accessible
20 can be inspected both with respect to the ID and the
21 OD, can it not?

22 A Would you --

1 Q The piping that is accessible that is not
2 embedded in concrete can be inspected from both the
3 ID and from the OD, can it not? Internal diameter,
4 outside diameter.

5 A Yes, it could.

6 Q Okay. With respect to the welds and the
7 accessible piping, even if the weld data reports are
8 missing, they can be recreated, can they not?

9 A I'm not sure that all the weld records can
10 be recreated. There are certain -- no, you cannot
11 recreate all the original weld data. No, you can't.

12 Q Is it your position that you cannot
13 recreate a weld data record for welds that can be
14 inspected and their pedigree can be verified both by
15 inspection external and internal?

16 A Part of the original welds records, data
17 records, includes the welder's name and
18 qualifications, and it's hard to do that by
19 inspection 18 years later, so data like that is not
20 going to be able to --

21 Q Isn't it true that there is a welder
22 symbol that is inscribed next to each of the welds?

1 A There is. I don't know offhand if the
2 cross-reference between those symbols and the
3 welder's name is part of the records that were
4 retained or part of the records that were discarded.

5 Q And you didn't review those records that
6 were provided at CP&L's offices with respect to all
7 of the welds and all of the piping and all of the QA
8 records that have been amassed relating to that
9 piping?

10 A I believe I answered earlier, we requested
11 some documents. I haven't had a chance to review
12 those documents. So I stand by that previous
13 answer.

14 Q This contention, however, does not address
15 the welds with respect to the accessible piping,
16 does it?

17 A No, it does not.

18 Q And, indeed, the 50.55a application
19 doesn't address the welds with respect to the
20 accessible piping, does it?

21 A That is correct.

22 Q The only thing that this contention

1 addresses, is it not true, is the embedded piping
2 and embedded welds?

3 A The way it's worded, that's correct.

4 Q Well, that's what we're talking about is
5 the way it's worded, right? I mean, that's the
6 issue.

7 A That's correct.

8 Q In fact, this was recrafted to make sure
9 that the issue was clarified after the prehearing
10 conference, and this pleading is, indeed, Orange
11 County's recrafting of the contention?

12 A I understand that.

13 Q In the April 7th, 1999, presentation that
14 you made to the commissioners and the public -- if
15 you will look at Exhibit 4. And you didn't number
16 your pages here, but if you look at --

17 A Yes, I did.

18 Q I'm sorry. Slide 7. Yes, you did. Thank
19 you. Slide 7. The last bullet says, "But the
20 alternative plan covers the system in 1983, not how
21 the intervening 15 years (of rust and neglect?) have
22 affected it."

1 That's your bullet.

2 A That's correct. That's my bullet.

3 Q And when you discussed this bullet --

4 A Time out. Because of our arms control
5 program, we don't use bullets. That's my item.
6 It's a small point, but they prefer me not to do
7 that.

8 Q I certainly would not want to be
9 politically incorrect.

10 A I appreciate that very much.

11 Q Notwithstanding the fate of the Nuclear
12 Test Ban Treaty yesterday.

13 At the time you discussed this on April
14 7th, 1999, didn't you say, with respect to the
15 alternative plan, "It shows, "it" referring to the
16 spent fuel pool cooling system, "would work fairly
17 well if we were in 1983"?

18 A I don't recall that. If you lifted it off
19 the tape, then I won't dispute it, but it sounds
20 like something I said.

21 Q You went on to say, "But it does not show
22 whether there are any problems since 1983."

1 A I believe that. I don't --

2 Q And that's your position?

3 A That's my position, yes.

4 Q So is it fair to say that if we focus on
5 this contention, that we do not have to prove,
6 because you are not disputing that we have
7 effectively recreated the pedigree of the system as
8 of 1983; that is, we CP&L, has recreated adequately
9 in the alternative plan the pedigree of 1983, but
10 you fault the alternative plan for not dealing with
11 what happened between 1983 and today?

12 A No, I don't think that's a fair
13 characterization.

14 For the embedded welds, we have an issue
15 that the original quality assurance requirements are
16 not met. The alternative plan is the alternative to
17 meeting the code, and we contend that that's not an
18 adequate -- an equal replacement.

19 And in addition to that, the alternative
20 plan, even if it were an equal replacement, just
21 hypothetically even if it were, it doesn't address
22 deterioration since 1983 when the system -- or early

1 '80s when the system was originally constructed.

2 Q Okay. Now, I want you to square what you
3 just said with what you said in April 7th, 1999,
4 because what I understood you to say in reviewing
5 your presentation and reading your item --

6 A Thank you very much.

7 Q -- that your concern is not that the
8 alternative plan is not adequate. Your concern is
9 not that the alternative plan is inadequate in doing
10 what it purports to do, which is to say, look, we
11 don't have the documentation, but we can show that
12 this was a quality built system.

13 Rather, your complaint is we have not
14 shown what happened after 1993. Are you backing
15 away from that now?

16 A No.

17 Q Explain what you meant.

18 A If you go back as we earlier covered, the
19 July 1998 meeting I attended and the questions that
20 came out of that, that wasn't my full universe of
21 concerns obviously, because there were issues that
22 came up after that.

1 Q Did you prepare this declaration?

2 A Yes, I did.

3 Q Turn to paragraph 14 on page 7.

4 A Okay.

5 Q There you state, "The alternative plan, at
6 best, provides assurance that the condition of the
7 unit 2 spent fuel pool cooling system when the
8 facility was cancelled in December 1983 satisfied
9 the quality standards specified in 10 CFR 50.55a."

10 Is it your position that the alternative
11 plan satisfies the quality standards, at least as of
12 1983?

13 A Well, you're throwing out my "at best"
14 part.

15 Q All right. Well, I understand that, but
16 I'm going to probe that.

17 But you have a chance now to say either it
18 does or doesn't and, if not, why?

19 A At the time I wrote this and today, and
20 all the periods between those two, I did not think
21 -- I do not think that the alternative plan provided
22 adequate assurance that the welds were adequate and

1 met all the requirements of 10 CFR 50.

2 Q Okay. Now, I want you to very carefully
3 specify what is wanting in the alternative plan with
4 respect to establishing equivalent quality of the
5 welds in 1983.

6 I don't want to talk about between '83 and
7 '99. I want to just focus on that one limited
8 aspect.

9 I want you specify every concern and every
10 issue where you believe, in your capacity as an
11 expert, that the 50.55a alternative plan does not
12 establish the quality of those welds as of December
13 '83.

14 A Within that scope?

15 MS. CURRAN: I just need to interrupt here
16 for a minute because I'm getting confused, because
17 when you started this line of questioning, and I
18 think it would just help to clarify -- when you
19 started this line of questioning you were asking
20 about the first criterion that's listed here and you
21 said, that's what I want to talk about.

22 And I think that's where some of the

1 confusion is coming up here, that that criterion has
2 to deal with storage and preservation of piping and
3 equipment, and now it seems like the welds are
4 getting into the questioning.

5 I just want to clarify that because I
6 think it's getting confused.

7 BY MR. O'NEILL:

8 Q Are you confused, Mr. Lochbaum?

9 A Not on that point.

10 Q Thank you.

11 You can answer the question now. Would
12 you please answer the question.

13 A I thought you were getting ready to say
14 something.

15 Q No.

16 A Within that scope, the alternative plan
17 doesn't require all of the embedded welds to be
18 certified. There is a sampling done.

19 In the original case, under 10 CFR, Part
20 50, every weld was examined, not a sampling, not
21 even a majority. All of the welds were verified.

22 Had the system been turned over for

1 construction or turned over for operation from
2 construction and then the records subsequently
3 destroyed, there would have been greater assurance
4 in my mind that all of the loose ends, all the
5 little bitty things that can go wrong during
6 construction had been fully resolved because that
7 has to be checked and rechecked before a system is
8 turned over.

9 That wasn't the case at Harris, that the
10 system was -- construction on this system was
11 stopped before we got to that point and reached that
12 plateau or that milestone.

13 Because of that, or where it was when it
14 was stopped and then resumed, in my mind, the
15 alternative plan doesn't provide an equivalent level
16 of protection as would have been done under Part 50
17 or, if all these, you know, examinations and so on,
18 even on an audited basis had been done after the
19 system had been turned over and accepted, where
20 there would have been a greater level of assurance
21 that all the loose ends had been taken care of.

22 Q I want you specify here today specifically

1 what was not done at the time the welds were encased
2 in concrete. Prior to that, the system was
3 hydrottested, so all the welds were hydrottested.

4 What wasn't done at that point that you
5 have a concern about which can't be through the
6 alternative plan demonstrated?

7 A That's part of the discovery. I haven't
8 reviewed all the discovery documents. Some of the
9 discovery requests we made will allow me to answer
10 that question. Absent that review, I can't -- I
11 literally cannot answer that question at this
12 moment.

13 Q So the answer to the question is you do
14 not know?

15 A No, your question was you wanted me to
16 specify each and every one.

17 Q Yes.

18 A And I cannot answer that question because
19 I haven't done that work yet.

20 Q All right. I want to you specify one.
21 Tell me one thing that was not done at the point
22 that this system was hydrottested and was completed,

1 the concrete pour cards were filled out, it was
2 encased in concrete, that your concern was not done.
3 One thing.

4 A Had the system been turned -- the system
5 was not turned over.

6 Q The entire system was not turned over.

7 A Right.

8 Q That section of piping was clearly turned
9 over before it was encased in concrete. My point
10 is, what wasn't done pursuant to procedures?

11 A That's the document request. We haven't
12 reviewed those discovery documents to answer that
13 question.

14 It goes back to the earlier answer, the
15 full system wasn't turned over. That would have
16 done the checks to ensure that those -- the things
17 that should have been completed before we poured
18 concrete were done.

19 I agree with you in that, if you did the
20 final system review and acceptance, which is done,
21 it would have been late in the game to discover that
22 you missed something in an embedded system. But

1 that final check was not done, so I'm not going to
2 stipulate or concede that everything was done
3 correctly until I review those documents.

4 Q Did you ask for the hydrotest reports?
5 Did you ask for them when you were in Raleigh?

6 A I don't recall every single document
7 request.

8 Q Did you ask for the weld data reports that
9 existed?

10 A No, I did not.

11 Q Did you ask for all of the procedures
12 relating to welding, quality inspection and all
13 other QA procedures that go to the construction of
14 the spent fuel pool cooling system, particularly the
15 piping?

16 A I don't think we asked for all of
17 anything, so I think that's a safe answer, no.

18 Q Okay. Did you ask for any of it?

19 A We asked for some of those documents, yes.

20 Q I mean -- well, you have all the documents
21 that you asked for because they've been shipped to
22 your counsel. So BCOC has them. And you haven't

1 reviewed them?

2 A Well, as I answered your earlier question,
3 I wasn't sure we received all the discovery
4 documents. I can't attest to that.

5 Q Okay. Let's go back to what has been
6 marked as Exhibit 6.

7 Setting aside for the moment your concerns
8 regarding what happened between '83 and '99, can you
9 state today any other fact or opinion that goes to
10 the issues you have with the 50.55a plan?

11 A The 50.55a plan in our mind -- in my mind,
12 not our mind, I only brought one today -- does not
13 address deterioration of the embedded piping and
14 welds since installation.

15 Q Right. I said other than that. I said,
16 in other words --

17 A Okay.

18 Q -- pre-'83. I'm asking, is there any
19 other fact --

20 A No.

21 Q -- or opinion that you have?

22 A No.

1 Q Okay. Now, would it have been
2 appropriate, given your understanding of what is
3 required by the regulations in 50.55a, to have
4 elaborated in the alternative plan on what measures
5 would be taken to inspect and deal with
6 deterioration?

7 Was that an appropriate use of the 50.55a
8 alternative plan?

9 A I think 50.55a was intended -- I didn't
10 research the statements of consideration, but my
11 understanding of 50.55a is that, it's one of the
12 things we're trying to pursue in discovery and
13 interrogatories, it has not been applied to a plant
14 that has been sitting in mothballs for 18 years and
15 brought out.

16 So the concern would be whether 50.55a is
17 a proper way to do what is being done or sought in
18 this case.

19 Q Isn't the only thing that 50.55a is doing
20 is addressing missing records?

21 A CP&L in our view, in my view, is
22 attempting to use it for broader than that. It's

1 also trying to use it to accept a system that's been
2 sitting there for many years.

3 Q What is the basis of your statement that
4 CP&L is attempting to use 50.55a to do more than
5 what the plan says it intends to do?

6 A Because there is no discussion anywhere
7 else of looking for or searching for signs of
8 deterioration or problems in layup in intervening
9 years.

10 Q Are you aware of the inspections that were
11 carried out on the accessible piping and welds?

12 A I know that some were done.

13 Q Are you aware of the results?

14 A I saw some of the results, yes.

15 Q And did the results give you confidence
16 that the piping seemed to be maintained in pretty
17 good condition?

18 A Of the results I've looked at to date,
19 yes, but I also need to qualify that because that's
20 some of the documents we requested, and I still have
21 a review ongoing. But as of today, I haven't found
22 anything in that -- in addressing your question that

1 raised a concern.

2 Q Can you think of any reason that would
3 have a technical basis, a scientific basis as we
4 understand science, why the piping at the low end of
5 the system that happens to be the accessible piping
6 would be any different in its response to the
7 environment in which it was as to the piping that
8 happens to be encased in concrete?

9 A Yes. A number of plants have reported
10 problems with corrosion from the outside, where
11 boric acid or other materials leaked in and affected
12 pipe quality from the outside because of thinning of
13 walls or actually through wall cracks.

14 Q So that the piping that is accessible and,
15 therefore, susceptible to some sort of external
16 factor might be more likely to degrade than
17 something that's encased in concrete and is not
18 subject to any external factors; is that what you're
19 saying?

20 A No, that's not what I'm saying. That's
21 what you're saying.

22 I'm saying that, looking at one section of

1 pipe isn't -- that piece of pipe isn't necessarily
2 bounding for all the other pieces of pipe.

3 That's kind of why you do -- inspect all
4 the piping before you accept the system from
5 construction to operation. That's kind of like why
6 you inspect all the welds instead of just the one
7 limiting weld.

8 There are local factors, environmental
9 factors that can affect piping.

10 Q Let's look at the internal diameter of the
11 piping taken as a whole. And since you're a -- all
12 of the internal diameter of the many hundreds of
13 feet of piping.

14 A Did the volume.

15 Q Okay. Assume -- this is a hypothetical
16 question and you're an expert and I get to ask you
17 hypothetical questions.

18 A We went through that once before, I
19 remember.

20 Q Assume that the piping has seen the same
21 environmental condition. It's all connected. The
22 same water, same quality of water. Whatever it was,

1 all of the piping has seen the same quality of water
2 that's been flooded for some number of years, over
3 ten years, okay, with the same water. No different
4 in the top or in the bottom, in the middle. All the
5 same water.

6 Explain to me how it could be that the
7 piping, the top or at the middle, encased in
8 concrete, could be affected differently than the
9 piping that was accessible and outside the concrete.

10 Tell me any reason why that could happen.

11 A Let's take two welds, one that's in the
12 lower bottom portion that's accessible that you
13 referred to, and one that's inside the -- embedded
14 inside the concrete.

15 Q Um-hum.

16 A If the weld inside the embedded concrete
17 had a flaw in it, some kind of mistake, and it
18 wasn't the equivalent weld as the one that was
19 accessible, then the same quality water could
20 produce a deterioration of that weld as opposed to
21 the weld that was accessible and inspectable.

22 Q So if you inspect all the welds or inspect

1 any weld, you can tell whether or not that happened,
2 I take it?

3 A If you look for that, you should be able
4 to see that, yes. I also need to say that that's an
5 example. That's not --

6 Q Give me any more examples.

7 A Again, that's assuming that the only
8 deterioration or the only -- I'm not even going to
9 use that. The only attack could be from inside. If
10 you had some corrosion from the outside, then having
11 all the water inside the pipe be the same quality
12 would not say anything to the quality of that pipe
13 from external attack.

14 Q Are you aware of any stainless steel
15 piping that has been subject to attack from the
16 outside in this application?

17 A I'm not aware of it. I also haven't done
18 that part of the research yet.

19 Q Okay. If we look at paragraph 3 of
20 contention 3, you focus on the 15 welds for which
21 quality records are missing and are embedded in
22 concrete, and state "Inspection of the welds to

1 demonstrate weld quality cannot be adequately
2 accomplished with a remote camera."

3 What's the basis of that statement?

4 A The basis for that statement was when I
5 looked at what was done for the accessible welds and
6 compared that to what was done for these welds, it
7 didn't seem to be the same standard. It seemed to
8 be to a lower standard.

9 So it was that review or that conclusion
10 that formed the basis for this paragraph.

11 Q It certainly is different --

12 A It is different.

13 Q -- I agree to that. Why isn't it
14 adequate?

15 A In our view, in my view -- I've got to
16 stop doing that.

17 In my view, it is not the same quality
18 level as doing all the inspections that were done
19 for the accessible welds.

20 Q Even if we concede that it's not the same,
21 the question is, is it adequate to ensure that the
22 piping will perform in the -- for the function for

1 which it was designed?

2 A Well, I think the contention as written
3 says it's not.

4 Q And my question to you is why. I mean,
5 you can't just say it's different, therefore, it's
6 not adequate. You have to make that leap. Where's
7 the flaw? What's the problem?

8 A If a camera inspection was fully adequate
9 substitution, and because it's somewhat simpler to
10 do that than all the inspections that were done for
11 the accessible welds, then why wouldn't that be done
12 for all the welds in the plant instead of just the
13 ones that couldn't be done in this case.

14 Q Do you know what kind of inspection is
15 required by the ASME code, Section III, welding
16 procedures for this piping?

17 A I could not cite them to you.

18 Q Is any internal inspection actually
19 required?

20 A I believe those internal inspections were
21 the ones that were done when the thing was thrown
22 away.

1 Q My question is, is an internal inspection
2 required in the first instance?

3 A I don't know. I'd have to look at the
4 code. I don't know the answer to that question.

5 Q Assume for a moment hypothetically that
6 all that the code requires is a visual inspection on
7 the OD and a di-penetrative test of the OD.

8 Isn't this actually going beyond what is
9 required? That's a hypothetical question which you
10 can answer as an expert.

11 A I understand. I don't recall having seen
12 the test records for the testing on the ODs for
13 those things. So I'm not sure -- since you take
14 away that portion during this visual inspection,
15 it's considered to be more since I don't -- where's
16 the record documentation of the thing that you're
17 hypothetically assuming?

18 Q Okay.

19 A Unless you're assuming that's been
20 recovered somehow.

21 Q Is there any other reason, objection,
22 concern that you have with respect to this visual

1 inspection with a remote camera other than it's
2 different and, therefore, not the same?

3 A The concern that we raised, that we have,
4 I have, is that the visual inspection scope was
5 pretty much limited to the quality of the welds, not
6 the quality of the piping in anything other --
7 pretty much the piping. So it was pretty much
8 limited to the welds.

9 Q What was the basis of that statement that
10 you just made?

11 A It was one of the documents within the
12 application. I forget exactly which attachment or
13 enclosure it was to the document, but when I
14 reviewed what was looked at, it seemed to be focused
15 almost exclusively on the welds.

16 Q Did you read the inspection procedure for
17 the visual inspection?

18 A We have requested that. And I think it's
19 one of the documents we requested. I think I saw
20 actually two copies because I didn't keep real good
21 track when I was down at CP&L.

22 Q Did you review it?

1 A As I said earlier, we've requested it. I
2 haven't yet reviewed all the documents we've
3 received.

4 Q Assume for the moment that when the camera
5 goes through the piping, they don't shut it off as
6 it goes past the piping lengths to get to the weld,
7 and that indeed they look at it and then they look
8 at the welds and then look at the next section of
9 the pipe.

10 Would that satisfy that concern that you
11 just hypothesized?

12 A When a QC inspector goes out to look at a
13 piece of equipment in the field, he walks by a lot
14 of the parts of the plant before he gets to the
15 component he's looking at.

16 Taking credit for him wandering past all
17 the other portions of the plant that he gets to to
18 the component he's looking at is not an adequate
19 substitute.

20 So I have to answer the question no,
21 that's not an adequate --

22 Q If you have this entire inspection of all

1 the length of the piping recorded by videotape, and
2 a slew of experts can all sit down and look at it
3 and indeed do instant reply and rewind, doesn't that
4 revolve your concern that somebody has wandered by
5 to get to the point in which they were inspecting?

6 A I have not seen any documentation where a
7 slew or even a quarry or a gaggle of experts has sat
8 down and documented it and signed off to that.

9 Q Okay. Did you review the videotapes?

10 A I saw them in the box. We did not request
11 a copy of them. But there were some photographs
12 taken, and I did look at the photographs.

13 Q Right. But you didn't request a copy of
14 the photographs?

15 A Did not request a copy of the photographs
16 or of the videos.

17 Q And since you're not an expert in this
18 area, you probably wouldn't have known what you were
19 looking at; is that a fair statement?

20 A I would have known what I was looking at.
21 I wouldn't have testified that it was good, bad or
22 indifferent.

1 Q Okay. The fourth paragraph says,
2 "Finally, the alternative plan is deficient because
3 not all of the welds will be inspected by the remote
4 camera."

5 I take it that, hypothetically, this
6 concern would go away if all of them were inspected?

7 A Hypothetically, that's correct.

8 Q Okay.

9 A Well, it would roll back into the previous
10 concern.

11 Q I understand.

12 A Okay. I just didn't want to give up
13 anything there.

14 MR. O'NEILL: Off the record.

15 (Discussion off the record.)

16 BY MR. O'NEILL:

17 Q Referring to Exhibit 7, paragraph 7, you
18 begin listing documents upon which you have examined
19 and relied.

20 A That's correct.

21 Q Tell me what you have relied upon in Dr.
22 Thompson's study, "Risks and alternative options

1 associated with spent fuel storage at the Shearon
2 Harris Nuclear Power Plant" in connection with your
3 opinions relating to contention 3.

4 A There is nothing in Dr. Thompson's report
5 that I relied upon for contention number 3.

6 MR. O'NEILL: I've asked the court
7 reporter to mark as Exhibit 8 a document entitled IE
8 Information Notice Number 85-30: Microbiologically
9 Induced -- two words -- Corrosion of Containment
10 Service Water System, dated April 19, 1985, a
11 three-page document.

12 (Lochbaum Deposition
13 Exhibit Number 8 was marked
14 for identification.)

15 MR. O'NEILL: We will refer to
16 microbiologically induced corrosion as MIC, M-I-C,
17 for the benefit of the court reporter.

18 BY MR. O'NEILL:

19 Q Mr. Lochbaum, did you rely on Exhibit 8 in
20 forming your opinions set forth in your declaration?

21 A Yes, I did. On page 5 of the declaration,
22 paragraph 9(e), I described how I used or how I

1 relied upon this information notice.

2 Q And that document, by the way, just for
3 the record, is Exhibit 7; is that not correct? Your
4 declaration.

5 A My declaration is Exhibit 7, that's
6 correct.

7 Q Was the piping at H.B. Robinson unit 2 the
8 same material as the piping at Shearon Harris?

9 A I don't know that. They were both made of
10 stainless steel. I don't know if they are the same
11 type.

12 Q Was the water in the piping at H.B.
13 Robinson the same as the water in Shearon Harris?

14 A I would not believe so, but I don't know.

15 Q What is the system of the piping at H.B.
16 Robinson?

17 A H.B. Robinson, the system is the steam --
18 it was the service water system.

19 Q And what kind of water is in the service
20 water system?

21 A Generally untreated -- well, not
22 untreated, not demineralized water. Let's put it

1 that way.

2 Q Do you know what kind of water is in the
3 service water system at Robinson?

4 A No, I do not.

5 Q Do you know the source of the water?

6 A No, I do not.

7 Q What happened at H.B. Robinson upon which
8 you rely in forming your opinions with respect to
9 Shearon Harris?

10 A Quoting from page 5 of my declaration,
11 Exhibit 7, "According to this NRC document,
12 stainless steel piping at the Robinson plant
13 experienced significant corrosion pitting during an
14 outage lasting one year."

15 Q And what was the evidence of that pitting?

16 A The documentation was this information
17 notice.

18 Q What was the evidence of the corrosion
19 pitting at the plant?

20 A According to the information notice,
21 "Visual inspection of the entire system revealed
22 minor leakage at a total of 54 weld joints, 32

1 inside and 22 outside containment. Further
2 radiographic examination revealed evidence of
3 localized corrosion pitting on the inside surface at
4 many other austenitic piping weld joints of the
5 system."

6 Q What was the mechanism that caused the
7 pitting?

8 A According to this information notice, it
9 was MIC.

10 Q During what period of time did the MIC
11 occur?

12 A According to this information notice --
13 according to this information notice, it was during
14 the year 1984.

15 Q In a period less than a year?

16 A A period of less than a year.

17 Q Relatively rapid?

18 A I'm going to stick with a period less than
19 a year.

20 Q Does the NRC explain what conditions can
21 relate -- can result in MIC in stainless steel in a
22 nuclear plant?

1 A Yes.

2 Q Do those conditions include stainless
3 steel that is exposed to demineralized treated
4 water?

5 A This information notice does not exclude
6 that.

7 Q Does it include it?

8 A It's hard to say because it says a variety
9 of environments.

10 Q "Including soils, sediment, natural fresh
11 water (for example, wells, rivers, lakes), brackish
12 and sea water, as well as oil and other natural
13 petroleum products."

14 Is demineralized treated water fairly
15 included in that list?

16 A I would not include it, no.

17 Q I see. I know you're not an expert in
18 corrosion, but do you believe that the environment
19 in which a material is exposed to might have some
20 influence on its susceptibility to corrosion?

21 A That's what the NRC has said. And I
22 believe that, yes.

1 Q You believe that, too?

2 A Yes, I do.

3 Q Okay.

4 MR. O'NEILL: I ask the court reporter to
5 mark as Exhibit 9 an IE information notice number
6 85-56 entitled Inadequate Environment Control for
7 Components and Systems in Extended Storage or Layup,
8 dated July 15, 1985.

9 (Lochbaum Deposition
10 Exhibit Number 9 was marked
11 for identification.)

12 BY MR. O'NEILL:

13 Q Mr. Lochbaum, have you had a chance to
14 look at what has been marked as Exhibit 9?

15 A Yes, I have.

16 Q Is this one of the documents referenced in
17 your declaration, which is Exhibit 7, that you state
18 you relied on in forming your opinions regarding
19 Shearon Harris spent fuel pool cooling system
20 piping?

21 A Yes.

22 Q Tell me how you've relied on this

1 document.

2 A On page 5 of my declaration, which is
3 Exhibit 7, it would be paragraph 9(f), I described
4 what I gleaned or what I relied upon in the
5 information notice.

6 Q What was the material in the heat
7 exchanger that was affected in this information
8 notice?

9 A The problem was the copper alloy tubes and
10 the carbon steel tube sheets and water boxes.

11 Q What environment did the copper and carbon
12 steel see that resulted in the degradation?

13 A It states that standing water on the tube
14 side had been stored for a number of years,
15 apparently approximately eight years. It doesn't
16 say whether that was demineralized water or not.

17 Q Did they know what kind of water it was?

18 A No. The information notice says "the
19 source of the water is unknown." They hypothesized
20 it was inadequately drained after hydrotesting.

21 Q What was the cause of the degradation to
22 the heat exchanger?

1 A It says corrosion. It's not real clear as
2 to whether it was MIC or something else.

3 Q If you look at page 2 of the first
4 paragraph, since you don't have the independent
5 knowledge, can we establish that at least this
6 report says that "Corrosion has been attributed to
7 microbiological growth in the stagnant water that
8 was in the system during the extended outage"?

9 A Well, I believe that was for H.B.
10 Robinson.

11 Q I'm sorry. You're right. You're right.
12 So we're not sure what caused the corrosion in the
13 heat exchanger at -- what was it, Palo Verde?

14 A Nine Mile Point, unit 2.

15 Q Nine Mile Point.

16 I know you're not an expert in corrosion,
17 but do you think that different materials might
18 respond differently to microbiological attack?

19 A I strongly suspect it, yes.

20 Q And we already established that different
21 environments might also influence any type of
22 corrosion.

1 A On page 5 of my declaration, which is
2 Exhibit 7, paragraph 9(g), I described how I relied
3 upon this information notice.

4 Q Now, isn't it true that the problem at
5 Dresden was the result of rupture of piping that was
6 frozen?

7 A That is the cause, yes.

8 Q Do you expect that the spent fuel pool
9 handling building is going to be subject to
10 temperatures at Shearon Harris that will result in
11 piping freezing?

12 A No, but I would expect a reasonable,
13 prudent licensee to look at this event and look at
14 its systems on the long-term storage to see if there
15 was any potential problem.

16 In addition --

17 Q What did your counsel just point to and
18 show you in this exhibit? Not your counsel, excuse
19 me -- the counsel for BCOC.

20 A My counsel pointed to the paragraph on the
21 second page of this document, and the page numbering
22 is a little skewed because you have page 2 and 3 on

1 the same document.

2 Q Um-hum.

3 A Towards the top, the paragraph that starts
4 out "The water quality in the SFP was poor."

5 Q What was the water quality? What kind of
6 water are we talking about in the spent fuel pool?
7 SFP is spent fuel pool, isn't it?

8 A Yes, it is.

9 Q And what kind of water was in there?

10 A At this plant at Dresden I believe it's
11 just -- it's not borated water. It's just regular
12 water. Originally, it was demineralized, but they
13 had taken up the cleanup system at some time
14 previously.

15 Q And what did that result in?

16 A Water quality that didn't meet the
17 chemistry specifications.

18 Q Indeed, this -- on the same paragraph you
19 referred us to on page 2 of 3, second paragraph,
20 notes that the water quality by 1987 had degraded to
21 the point that an influx of microorganisms had
22 developed. Do you see that?

1 A Yes, I do.

2 Q This plant was shut down, wasn't it?

3 A Yes, it was. Still is.

4 Q It was shut down in 1983?

5 A It was shut down earlier than that, but it
6 remained shut down in 1983.

7 Q The original cleanup and cooling system
8 was shut down in 1983 I guess is what I was
9 referring to.

10 A That's correct.

11 Q What does this have to do with Shearon
12 Harris?

13 A Again, it goes back to opportunities to be
14 aware of the need to properly maintain equipment in
15 layup in proper condition.

16 Q Is there anything here that informs your
17 opinions with respect to the welds and piping that
18 are encased in concrete at the Shearon Harris
19 Nuclear Power Plant that I should be looking at?

20 A The reason I included this in the
21 declaration, and I can explain that purpose and
22 whether that answers your question or not I'm sure

1 we'll find out, is that I was aware of problems
2 caused by systems in long layup, this being one of
3 them. Since I was aware of them, the licensee who
4 got this thing should also be aware of those
5 problems.

6 So being aware of these problems, when I
7 looked at the application and didn't see any address
8 of deterioration over time, a concern was raised.
9 So that's the reason this information notice was
10 relied upon in my declaration.

11 Q Do you have an opinion on the quality of
12 the construction at Shearon Harris in general?

13 A No, I do not.

14 Q Do you have an opinion on the operation at
15 Shearon Harris over the last 12 years?

16 A Not over the entire period. In recent
17 history we have provided information to Chatham
18 County, specifically the chair, I believe her name
19 is Alice Gordon, about operation at the Shearon
20 Harris plant.

21 Q And what is your understanding of the
22 operation at Shearon Harris?

1 A Over that time period, which was not --

2 Q Whatever time period you have any
3 information on.

4 A It was within the last couple of years.

5 Q Um-hum.

6 A What we told Chair Gordon was that the
7 plant was a better than average performer.

8 Q And that would be consistent with the
9 statistics which one reviews in evaluating the
10 performance of a nuclear plant; is that not true?

11 A What statistics are you referring to?

12 Q Capacity factor, numbers of enforcement
13 violations, IMPO ratings.

14 A I cannot review IMPO ratings, so I don't
15 know whether those are or are not consistent.

16 But my conclusion was based on looking at
17 information, publicly available information, so it
18 would have to be consistent.

19 Q Now, you have periodically published a
20 little report on what UCS views as the good, the bad
21 and the ugly, have you not?

22 A No, we have not.

1 Q You have never published a report called
2 The Good, The Bad and The Ugly?

3 A You said periodically, which implies more
4 than once. It was a one-time report.

5 Q Is Shearon Harris one of the good plants
6 as you characterize them?

7 A I don't recall Shearon Harris being one of
8 the ten plants we looked at.

9 Q Okay.

10 A So it was neither good, bad or ugly.

11 Q Are you aware of any problems with the
12 unit 1 spent fuel cooling and cleanup system?

13 A I did not look, but I'm not aware of any
14 problems.

15 There is an appendix to the book that list
16 problems at plants, and I don't recall if Shearon
17 Harris is on that list or not. That was done some
18 time ago.

19 Q Are you aware of the sequencing of
20 construction of the spent fuel coolant piping and
21 the fuel handling building during the construction
22 of the Shearon Harris plant?

1 A In general. I don't know the specifics of
2 the sequencing, no.

3 Q Do you know whether or not, for example,
4 all of the piping for all four spent fuel pools was
5 generally constructed at the same time and all of
6 the concrete for all of the spent fuel pools was
7 generally poured at the same time?

8 A That's my understanding, yes.

9 Q So it would be fair, would it not, to
10 assume that the quality of the piping at unit 1
11 should not be very much different from the quality
12 of the piping at the unit 2 spent fuel cooling
13 system?

14 A It would be in the same ballpark, that's
15 correct.

16 Q Do you have an opinion on the quality of
17 the QA organization and its effectiveness during the
18 construction at the Shearon Harris plant?

19 A You know, in my declaration, there were
20 some inspection reports cited noting some problems
21 of quality assurance, but I wouldn't -- that
22 wouldn't lead me to believe that the quality

1 assurance program at Shearon Harris was deficient or
2 had a programmatic breakdown.

3 Q Are you aware of the overall quality of
4 the welding program at Shearon Harris which was
5 conducted by Shearon Harris as opposed to -- by CP&L
6 employees as opposed to by an outside vendor?

7 A No.

8 (Lochbaum Deposition
9 Exhibit Number 11 was
10 marked for identification.)

11 BY MR. O'NEILL:

12 Q I've asked the court reporter to mark as
13 Exhibit 11 the results of an NRC inspection, a cover
14 letter from Charles Murphy to J.A. Jones dated
15 January 2, 1981, which is two pages, appendix A,
16 which is a one-page notice of violation, and five
17 pages which are the results of inspection on
18 November 1, 1980.

19 Do you have that document, Mr. Lochbaum?

20 A Yes, I do.

21 Q What was your -- how did you rely on this
22 document in forming the opinions in your

1 declaration?

2 A On page 6 of my declaration, which is
3 Exhibit 7, paragraph 10 points out that the licensee
4 was cited for failure to store equipment in
5 accordance with instructions to prevent damage or
6 deterioration.

7 Q What was the severity level of that
8 violation?

9 A Severity level of that violation was level
10 V. Excuse me.

11 Q Do you want to look at that again?

12 A I do, just to make sure. It was a
13 severity level V violation.

14 Q Would you look at the appendix A, Notice
15 of Violation.

16 A Yes.

17 Q Is the violation you're referring to B?

18 A Yes.

19 Q What does that say with respect to
20 severity level?

21 A This is a severity level -- oh, sorry, VI.
22 I've got my Roman numerals -- I did look at it, I

1 just --

2 Q Roman numeral VI, V-I, right?

3 A Yes. Severity level VI.

4 Q We don't even have those anymore, do we?

5 A We don't even have V's anymore.

6 Q Right because they are so trivial?

7 A And IV's are very rare, too.

8 Q Right. Okay.

9 If you look at the write-up on this
10 particular violation on page 3 of the inspection
11 report, under 7(b), second paragraph, it says,
12 "However, since sufficient corrective action was
13 taken to resolve the one unsatisfactory condition
14 identified and CP&L is conducting closer
15 coordination between those responsible for
16 maintenance and those who requisition materials, a
17 written response will not be required for this item.
18 Except as noted, no violations or deviations were
19 identified in the areas inspected."

20 Does that suggest this was a very
21 significant item?

22 A No, it does not suggest that.

1 Q In fact, interestingly, the next item,
2 number 8, was on welding, was it not?

3 A Yes, it is.

4 Q And they didn't see any violations or
5 deviations in welding, did they?

6 A That's correct.

7 Q And this specifically had to do with
8 welding on ASME code 3 piping, I note. Was that not
9 true?

10 A That is correct.

11 Q So, Mr. Lochbaum, what was the purpose of
12 citing this trivial violation in your declaration?
13 Did you just go through and look for any violation
14 that you could possibly find during construction and
15 sort of say, ah, I've got some violations here; I'll
16 throw them in my declaration? What was the purpose?

17 A To show that there was a problem at this
18 site with the storage and layup of equipment.

19 Q Was this a problem?

20 A It is representative of a problem, yes.

21 Q This was a very small violation of which
22 you will see many, many, many of this variety and

1 much more during any inspection of any construction
2 site because no one is absolutely perfect in the
3 area of storage and in the areas of welding and in
4 the areas of quality control.

5 There are always going to be something you
6 can find wrong, but this is pretty small in the
7 relationship to the universe of violations; is that
8 not true?

9 A I wouldn't agree with that, because on
10 page 4 of this document you said they found no
11 violations of welding --

12 Q Correct.

13 A -- problems. And the question was, when
14 you do inspections, you'll find them all the time.

15 So I have to disagree.

16 Q Well, they found two violations during
17 this inspection, is that not true, this A and B?

18 A Well, you just asked me this welding in
19 ASME Section III, which was included in that long,
20 rambling question you asked me. So I had to answer
21 that question no.

22 Q Okay. So we have your first inspection

1 report that has this one little minor violation.

2 A I'm going to disagree because I don't
3 consider it little, but it has one finding.

4 Q Both of which are category 6, which are
5 not even reported any longer.

6 A Well, no plants are in construction
7 anymore. So that's true, too. I'm not sure that's
8 relevant to the matter at hand.

9 MR. O'NEILL: I ask the court reporter to
10 mark as Exhibit 12 a document dated August 5, 1981,
11 a two-page cover letter from R.C. Lewis at the NRC
12 to Mr. J.A. Jones, a notice of violation is appendix
13 A, and then an inspection report consisting of five
14 pages.

15 (Lochbaum Deposition
16 Exhibit Number 12 was
17 marked for identification.)

18 BY MR. O'NEILL:

19 Q Have you had a chance to look at what has
20 been marked as Exhibit 12?

21 A Yes, I have.

22 Q Did you rely on this document in forming

1 your opinions that are set forth in your declaration
2 that is Exhibit 7?

3 A Yes, I did.

4 Q How did you rely on this document?

5 A I relied on this document as described on
6 page 6 of my declaration, which is Exhibit 7,
7 specifically paragraph 11.

8 Q What was the violation here?

9 A The violation was failure to provide
10 records of inspection and monitoring of work
11 performance.

12 Q What activity was this relating to?

13 A According to the inspection report, this
14 activity was a unit 1 containment building weld.

15 Q What kind of weld?

16 A Cadweld.

17 Q Is a Cadweld different than a piping weld?

18 A Yes, it is.

19 Q What was the problem?

20 A The NRC inspector found that this weld did
21 not have the results of the installation inspection
22 recorded, and that the weld data report for one of

1 the weld joints was found not to identify the
2 correct welder who applied a tack weld.

3 Q That was it?

4 A That was the violation, yes.

5 Q What was that violation categorized as?

6 A Category VI, severity level VI.

7 Q And what does this have to do with the
8 contention 3?

9 A Contention 3 was that the -- the reason
10 this related to contention 3 was the alternative
11 plan is based on the assumption that the existing
12 quality of the welds and the piping met all of the
13 requirements.

14 This shows that there were problems at the
15 plant in meeting the quality assurance requirements
16 standard.

17 Q Do the same welders that do cadwelding
18 that do ASME code 3 piping welding?

19 A I don't know all the welders at the
20 Shearon Harris plant, so I'm not going to answer
21 that question. I don't have the information to
22 answer that question.

1 Q By the way, did this have anything to do
2 with the welders' qualifications one way or the
3 other as opposed to whether or not the right number
4 was down on a piece of people?

5 A No, it did not.

6 Q Because, in fact, further inquiry revealed
7 that both welders had the current qualifications for
8 the process that was applied. That's what the NRC
9 says on page 3 in the middle of the paragraph,
10 doesn't it?

11 A Yes, that's what it says.

12 Q And indeed, this inspection included,
13 according to this report, a number of work
14 activities and observations of in-process welding,
15 on, in this case, reactor coolant spool pieces, on
16 in-core instrumentation spool pieces, on storage of
17 ASME pipe spool pieces, the qualification and
18 training of the Carolina Power & Light QA welding
19 inspectors.

20 And with the exception of getting a number
21 wrong on the piece of paper with respect to the
22 welder's identification, the NRC inspectors noted no

1 violations or deviations with that one exception
2 were identified in the areas inspected?

3 A It's hard for reconcile with your earlier
4 comment that, when you do these inspections, you
5 find problems all over the place.

6 MS. CURRAN: John, I just want to point
7 out, it's after 1:00.

8 MR. O'NEILL: Okay. We can take a break
9 now. Off the record.

10 (Whereupon, at 1:09 p.m., the deposition
11 was recessed, to reconvene at 1:57 p.m., this same
12 day.)

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1 was when I referred to the Chatham County chair as
2 Alice Gordon. I misspoke. It was actually Margaret
3 Pollard at the time. I had the wrong name. It was
4 Chatham County and it was Margaret Pollard. I had
5 the wrong name.

6 BY MR. O'NEILL:

7 Q Okay. I appreciate that.

8 Would you please explain precisely on what
9 you relied from Dr. Gordon Thompson's work in
10 forming your opinions.

11 A In Dr. Thompson's report he talks about
12 the severity of various spent fuel pool accidents
13 and the consequences to people living around the
14 community -- around the plant, not around the
15 community, and talked that the consequences were
16 greater than CP&L had stipulated.

17 I relied on some of the information in his
18 report to support the conclusion that these issues
19 are serious and are not trivial matters, the fact
20 that the adequacy might not be there. They were of
21 safety significance. So I relied on his report in
22 part for that conclusion.

1 Q Now, how did you rely on this document in
2 connection with the opinions set forth in your
3 declaration?

4 A On page 6 of my declaration which is
5 Exhibit 7, specifically paragraph 12, I talked about
6 this inspection report and the notice of violation
7 dealing with inadequate measures to control
8 preservation of safety-related materials and
9 equipment.

10 Q What was the violation that you focused
11 on?

12 A It would have been violations shown on
13 appendix A labeled A and B.

14 Q What's the safety of level of these two
15 violations?

16 A Severity -- violation A is of severity
17 level V, and violation B is of severity level VI.

18 Q Do any of these violations relate to ASME
19 code Section III piping or welding of the spent fuel
20 pool cooling system?

21 A Severity -- excuse me. Violation A does
22 not; violation B may or may not because it refers to

1 training and qualification records of welders who
2 may or may not have been working on the spent fuel
3 pool cooling system.

4 Q Actually, this inspection report also
5 details the inspection of welding activities at the
6 Harris plant, doesn't it?

7 A Yes, it does.

8 Q Beginning on page 3.

9 A Yes, it does.

10 Q And it provides the results of detailed
11 observation of welding activities, visual
12 inspections of welds, welder qualifications, does it
13 not?

14 A Yes, it does.

15 Q And with respect to those sections, there
16 were no violations or deviations, except for 6(a)(1)
17 which is nonwelding activities; is that not correct?

18 A Paragraph 8, page 7 states that, "Within
19 the areas examined, no violations or deviations were
20 identified except as noted in paragraph 8c."

21 Q I think you've gotten ahead of me. I was
22 just focusing first on the welding which is

1 described in paragraph 6.

2 A I thought your question was in the
3 inspection report.

4 Q No, I just focused now on the welding
5 activities.

6 My earlier question was, with respect to
7 the observation of welding activities, the visual
8 inspection of welds and welder qualifications, as
9 you can see on the bottom of page 4, within those
10 areas there were no violations or deviations.

11 A What is your question again, please?

12 Q I'll break it up.

13 Is it not true that this inspection
14 included observations of welding activities, visual
15 inspections of welds and welder qualifications?

16 A Yes, that is true.

17 Q Within those areas enumerated in the last
18 question, is it not true that there were no
19 violations or deviations identified?

20 A What were the three areas in your previous
21 -- these questions are way too long and I'm having
22 trouble following what it is you're asking me.

1 So can we do this a little bit simpler for
2 me?

3 Q Absolutely.

4 A Thank you.

5 Q Is it true that the inspectors observed
6 welding activities?

7 A Yes, that is true.

8 Q Did they find any violations or deviations
9 in inspecting welder activities?

10 A They didn't -- they did not have any
11 violations or deviations in that area, that's
12 correct.

13 Q The same for visual inspection of welds,
14 they have reviewed it, no violations or deviations;
15 is that not correct?

16 A That is correct, with the qualification
17 that there was an unresolved item. But there were
18 no violations or deviations.

19 Q Same question with respect to welder
20 qualifications.

21 A There were no violations or deviations
22 identified.

1 MS. CURRAN: Mr. O'Neill, we would be
2 willing to stipulate that these documents say what
3 they say.

4 MR. O'NEILL: Thank you.

5 BY MR. O'NEILL:

6 Q How does this inspection report which you
7 cited in your declaration and which you brought here
8 today, at least an incomplete version of it, support
9 your position in any way whatsoever?

10 A It supports it in that we contend that the
11 spent fuel pool cooling system on unit 2 was not --
12 no evidence was provided showing that it was
13 properly laid up and maintained during the period
14 between construction being terminated or deferred
15 and the decision to put the system in service at
16 this time.

17 Q Isn't it true, Mr. Lochbaum, that the
18 company has stipulated that they did not in any way
19 in their quality program lay up and maintain the
20 spent fuel pool cooling system for unit 2 between
21 the period 1983 and 1999?

22 A I don't know if they stipulated that or

1 not.

2 Q That was the predicate for the 50.55a
3 request in the first place.

4 A I thought we discussed this morning that
5 that was because the welding records were thrown
6 away, not because they didn't do any layup.

7 Q That was also part of it is that they had
8 not -- if you read the application, the first thing
9 it says is that was abandoned in place. No lay up.
10 No quality control.

11 A I don't recall the no quality -- well, the
12 abandoned in place implies it, that's correct.

13 Q Okay. Let's go through the last document
14 that you cite in support of your declaration.

15 I've asked the court reporter to mark as
16 Exhibit 14 an inspection report dated September 14,
17 1981, a cover letter of two pages from R.C. Lewis to
18 J.A. Jones at CP&L, one page notice of violation,
19 and an inspection report consisting of ten pages.

20 (Lochbaum Deposition
21 Exhibit Number 14 was
22 marked for identification.)

1 BY MR. O'NEILL:

2 Q Do you have Exhibit 14 in front of you,
3 Mr. Lochbaum?

4 A Yes, I do.

5 Q How is it that you view this document,
6 Exhibit 14 supports the opinions set forth in your
7 declaration of Exhibit 7?

8 A On page 7 of my declaration, which is
9 Exhibit 7, paragraph 13, I explained that this
10 inspection report involves a failure to follow
11 procedure for inspection of the fuel pool liner
12 welding.

13 Q What was the severity level of this
14 violation?

15 A This was a severity level V violation.

16 Q What was the resolution of this issue?

17 A I don't know that we know the resolution
18 of this issue because the notice of violation
19 required a response and we don't have that response
20 in front of us.

21 Q Setting aside the paperwork violation, did
22 the inspector also inspect the welds during this

1 inspection?

2 A Yes, according to page 8 of Exhibit 14.

3 Q And including the welding activities, the
4 welder qualification?

5 A That is correct.

6 Q And other than the procedural issue that
7 you've identified, there was no other violations or
8 deviations identified by the NRC inspectors, were
9 there?

10 A Well, as page 8 points out, the visual
11 examinations that were done by the NRC inspector
12 were prior to the welds being final inspected by
13 quality control.

14 So it wasn't -- there were no violations
15 or deviations cited, but the work hadn't been done
16 on the liner. There was still some work left.

17 Q And there's no issue that you're raising
18 in this proceeding with respect to the liner welds
19 in spent fuel pools A, B, C or D, is there?

20 A That is correct.

21 Q Okay. Now, if you turn back to Exhibit 7,
22 you say, having reviewed the documents that we've

1 just gone over, "it's my professional opinion" --
2 yours, I'm reading from paragraph 8 -- "that CP&L's
3 proposed use of an alternative plan per 10 CFR
4 50.55a to demonstrate that the unit 2 fuel pool
5 cooling system was 'designed, fabricated, erected,
6 constructed and inspected to quality standards
7 commensurate with the importance of the safety
8 function to be performed' raises significant safety
9 concerns for persons living near the facility."

10 I want you to detail in as much detail as
11 you can what you mean by that.

12 What are the significant, emphasizing
13 significant, safety concerns for persons living near
14 the facility that you believe that the information
15 referred to in paragraph 7 raises?

16 A That statement was based on my judgment
17 that this system provides a safety function. The
18 alternative plan lessens the ability and reliability
19 of that system to perform that safety function.

20 If that safety function is not performed
21 or is performed at a degraded manner, then it
22 increases the potential for reactor material to be

1 released to the environment or to the atmosphere,
2 and thereby challenging or jeopardizing the health
3 of people living around the facility.

4 Q What would it take for radioactive
5 material to be released to the environment?

6 A It would take fuel damage.

7 Q How would you get fuel damage in a spent
8 fuel pool -- in spent fuel pool C or D which,
9 pursuant to this license amendment request, will
10 contain a maximum of 1 MBtu of used fuel that has
11 been cooled five years or more? How will that
12 happen?

13 A You can either have a criticality concern
14 or you can have an overheating problem.

15 Q Okay. With respect to contention 3, we
16 don't have a criticality concern.

17 A That's correct.

18 Q So let's look at contention 3.

19 How could you get an overheating problem?

20 A If your fuel pool cooling stops working
21 properly, then even 1 million Btus per hour could
22 cause overheating and damage.

1 Q All right. Isn't it true that there is a
2 redundant system to the spent fuel pool cooling
3 system, the unit 2 system which would cool pools C
4 and D?

5 A There is a redundant system, yes.

6 Q Okay. And in fact, for there to be any
7 radioactivity released, you would somehow have to
8 uncover the fuel, right?

9 A No, it's not.

10 Q How would you have radioactivity released
11 from the fuel if it is not uncovered and still sitting
12 in pool water?

13 A For contention 3 -- let me think about
14 this.

15 Q You're an expert only on contention 3 you
16 may recall?

17 A Yeah, but your questions are broader than
18 that sometimes. I just want to make sure I'm
19 answering them fully.

20 You're correct. Without, uncovering
21 you're not going to have fuel damage.

22 Q How would you get fuel damage in a spent

1 uncover the fuel, right?

2 A No, it's not.

3 Q How would you have radioactivity released
4 from the fuel if it is not uncovered and still
5 sitting in pool water?

6 A For contention 3 -- let me think about
7 this.

8 Q You're an expert only on contention 3 you
9 may recall?

10 A Yeah, but your questions are broader than
11 that sometimes. I just want to make sure I'm
12 answering them fully.

13 You're correct. Without uncovering you're
14 not going to have fuel damage.

15 Q Let's assume that one of the welds, all of
16 the welds even, that are embedded in concrete have
17 some flaw, have a crack, have a pinhole corrosion,
18 and notwithstanding all of the control quality in
19 which they were installed, welded, inspected, or
20 your concerns have been validated that there is some
21 microbiologically-induced corrosion and we've got
22 some pinholes in there, how does that result in

1 significant safety concerns for persons living near
2 the facility?

3 Tell me how that happens. Show me the
4 path from which you get from that concern to
5 radioactivity released into the environment.

6 A The path is, again, is that if the system
7 stops working properly, the spent fuel pool can
8 overheat, can boil. The boil-down can cause fuel to
9 be uncovered, can cause fuel damage, can cause
10 releases to the atmosphere, can cause harm to the
11 people living around the plant.

12 Q And how can your pinholes in a couple of
13 welds encased in concrete result in a loss of water
14 to the pool? How does that happen?

15 A They are not my pinholes, sir. I've said
16 that the quality of the welds and the piping is
17 suspect. You have postulated that there will be
18 only pinholes.

19 Q You postulate whatever defect you want in
20 the welds and tell me how that results in the spent
21 fuel becoming uncovered.

22 A The piping is supposed to be designed for

1 seismic qualifications. If the piping integrity is
2 degraded, or welds, piping or welds is degraded due
3 to any reason, the ability of that piping and welds
4 to withstand an event such as a seismic event is
5 challenged. If the plant has a seismic event and
6 the piping is broken, then the system may not work.

7 If the system does not work, the water in
8 the fuel pool can heat up and boil, can uncover, can
9 be fuel damage, can cause harm to the people living
10 around the plant.

11 Q Are you a seismic design engineer, Mr.
12 Lochbaum?

13 A No, I am not.

14 Q Are you an expert in seismic design?

15 A No, I am not.

16 Q Isn't it true, notwithstanding the fact
17 you're not an expert but because of your general
18 familiarity with nuclear power plants, that the
19 spent fuel pools themselves are designed to
20 withstand seismic events?

21 A That is true.

22 Q Isn't it true that the reinforced concrete

1 of which the spent fuels are constructed are
2 designed to withstand a seismic event?

3 A That is true.

4 Q Isn't it true that if that, in fact, is
5 correct that there's no way in the world that the
6 embedded piping in that concrete can be adversely
7 affected by a seismic event?

8 A As you astutely pointed out, I'm not a
9 seismic design engineer, so I'm not qualified to
10 answer that question.

11 Q Then why did you postulate an event which
12 can't possibly happen?

13 A I didn't say it couldn't happen. If you
14 recall, I said I can't address that question. So I
15 did not say it could not happen, sir.

16 Q I want you to try again, tell me in your
17 professional opinion in an area in which you have
18 some qualifications how the postulated defects, any
19 one you want to postulate, in that piping that's
20 embedded in concrete can result in uncovering the
21 spent fuel in that pool and raise a significant
22 safety concern to persons living near the facility.

1 A If the piping or the welds fail for any
2 reason, then the system may not function.

3 If the system does not function, the water
4 in the spent fuel cooling will heat up, can reach
5 boiling, cause uncovering of fuel in the pool, fuel
6 damage, release of radioactivity and cause harm to
7 people living around the plant.

8 Q How can the piping result in the system
9 not functioning such that the pool loses water and
10 the spent fuel is uncovered? You have to tell me
11 how you get there.

12 A I'm saying the piping can fail.

13 Q How?

14 A Any number of ways. It's -- you can have
15 through-wall cracking. You can have --

16 Q Where is the water going to go?

17 A Through the crack.

18 Q Where to?

19 A To the outside the pipe.

20 Q How is it going to get outside of the pipe
21 if it's encased in reinforced concrete?

22 A Concrete is relatively porous. Water can

1 get through.

2 Q Isn't -- the Dresden pool doesn't even
3 have a spent fuel liner because the concrete itself
4 holds the water?

5 A That is absolutely true, and it was
6 designed to withstand water.

7 The piping that we're talking about was
8 not designed the same way because the piping is
9 supposed to retain the waters.

10 Q How do you know?

11 A That general knowledge you referred to
12 earlier.

13 Q You know that this concrete is such that,
14 if there was a leak, that the water is going to leak
15 through two-and-a-half, three, four feet of
16 concrete; is that your testimony?

17 A No, I'm not testimony --

18 Q The how does the water get out of the
19 pool?

20 A Through the crack in the piping.

21 Q Through the concrete?

22 A No, no. Excuse me. The pipe -- the water

1 does not get out of the pool through the pipe in the
2 concrete because eventually the water will drain
3 down to where the suction and discharge of the
4 suction stops.

5 So the water doesn't get out of the pool
6 through the pipe. That's not what I was testifying
7 to or stating.

8 I'm stating that the cracking could cause
9 the pipe or the system to stop running.

10 Q How?

11 A If the crack is large enough that allows
12 water to flow through the system, you can get
13 run-out on the pumps and the pumps won't work
14 anymore.

15 Q How can the crack get large enough if it's
16 embedded in concrete?

17 A That's one of the reasons -- if what
18 you're saying is true, then why worry about the
19 quality assurance at all? Why not just -- the
20 piping is there, who cares?

21 Q Because there is a lot of redundancy. But
22 my question to you is not why the company spent a

1 lot of money on a system that could just as well
2 have worked without pipe, but why you, as an expert,
3 are testifying and telling the people of Orange
4 County and the surrounding counties that there is a
5 significant safety concern because of the welds and
6 because of this piping.

7 A Because I believe that to be true, sir.

8 Q And you haven't yet told me how the water
9 could ever get out of the pipe.

10 A I have told you.

11 Q How?

12 A Your judgment is that you don't believe
13 me. That's a little different than saying that the
14 water can get out through the pipe and through the
15 concrete. You chose not to believe that and I can't
16 do much about that.

17 Q Is it your testimony that the water can go
18 through two or three or four feet of concrete if
19 there was a leak in the pipe?

20 A My testimony is that the water can get
21 through the pipe. Whether it drains back on the
22 outside of the pipe because there is a gap and it

1 drains back inside the building or it goes through
2 the porosity of the concrete or a combination of
3 those two, I don't know. All I know is that if the
4 water leak rate through the pipe is sufficient, the
5 system will stop working. The water in the spent
6 fuel pool will heat up and so on.

7 Q Have you calculated how large a defect
8 would be required in order to in any way exceed the
9 capability of the pump to pump water into that pool?

10 A No, I have not.

11 Q Do you have any guess as to how big a hole
12 or a defect it would have to be?

13 A I'd prefer not to guess, sir.

14 Q Do you have an estimate?

15 A I have no estimate. That's a different
16 word for guess in this case.

17 Q Okay. So let me ask this: Do you have
18 any other scenarios other than the ones you've just
19 testified to as to how you could get to a point
20 where there is a significant safety concern for
21 persons living near the facility relating to the
22 piping and the welds in the spent fuel pool in C and

1 D?

2 A No, I think that's a serious enough
3 threat.

4 Q On page 4 of your declaration, (d), 9(d),
5 you state, "The alternate plant and the license
6 amendment application do not describe any program
7 for proper storage and preservation of materials and
8 components as required by appendix B to 10 CFR Part
9 50. Nor do they describe any effort to determine if
10 the installed piping and equipment experienced any
11 deterioration over the many years of non-use since
12 the piping and equipment were installed."

13 Is your testimony that nowhere has the
14 applicant described what they are going to do to
15 inspect and to determine whether or not there has
16 been any deterioration of the piping? Is that your
17 testimony?

18 A My testimony was the alternative plan and
19 the license amendment application do not describe
20 that. They might be in another document somewhere.
21 I didn't address documents outside of the documents
22 cited.

1 Q Did the license amendment request refer to
2 other documents which describe how the applicant
3 planned to inspect the piping to determine whether
4 there was deterioration, or do you remember?

5 A It's been a while. I don't recall. It
6 referred to a commissioning plan. I can't remember
7 if the commissioning plan --

8 Q Have you reviewed the commissioning plan?

9 A Yes, I have.

10 Q Okay. We'll get to that.

11 On page 7, paragraph 14, second sentence,
12 you say that "The NRC inspection reports cited in
13 paragraphs 11 and 13 suggest that these quality
14 standards may not have been met in December 1983."

15 We've gone over each of these inspection
16 reports. Is there anything else on which you relied
17 in stating that there is a suggestion that quality
18 standards may not have been met by the spent fuel
19 pool cooling system piping in 1983?

20 A No, and I need to make -- point out one
21 problem. My paragraph numbering was suspect here.
22 I've got two paragraphs 11s and two paragraphs 12s

1 it looks like.

2 Q Yes. I assume that that was the
3 paragraphs previous as opposed to the --

4 A It was the first sets of 11 and 12, yes.

5 Q Right. Setting that aside --

6 A No. To answer the question, I did not
7 rely on anything else.

8 Q So you relied on those four documents and
9 that's it?

10 A Those four documents and the license
11 application.

12 Q The license application? Where in the
13 license application do you infer that quality
14 standards may not have been met in the construction
15 of the spent fuel pool piping?

16 A In looking where the plant was when the
17 construction was terminated, the system had not been
18 turned over for operation, hadn't been end-stamped
19 and all that.

20 Had that been done, then the issue really
21 would have been one of paperwork, not of quality,
22 because you have to -- that would have been a higher

1 level of assurance, that all the items were closed
2 out and so on.

3 So the application which indicated where
4 the plant was at the time when construction was
5 stopped and these inspection reports combined led to
6 this conclusion.

7 Q Turn to page 8 where you opine and state
8 here "that the risk to the general public could be
9 increased by the proposed activity and that the risk
10 and potential are foreseeable, not highly
11 speculative, and potentially significant."

12 Other than what you've just discussed in
13 the last few minutes about your postulated break of
14 the piping and the weld and leaking through concrete
15 somehow or around the pipe inside the concrete to
16 the extent the pump couldn't pump water into the
17 pool any longer, do you have any other basis in
18 which you are of the opinion that the risks are
19 significant?

20 A Well, as I said earlier, some of that was
21 -- relied upon the information in Gordon Thompson's
22 report, but it was primarily dependent upon my only

1 issue concerns about the fuel pool cooling system
2 not being able to cool the pool.

3 So it's predominantly my own conclusions
4 as we went through. There is a secondary reliance
5 on Gordon Thompson's work.

6 Q Dr. Thompson does not in any way discuss
7 the spent fuel pool piping, does he?

8 A No, he doesn't. At least not in his
9 report.

10 (Lochbaum Deposition
11 Exhibit Number 15 was
12 marked for identification.)

13 MR. O'NEILL: I've asked the court
14 reporter to mark as Exhibit 15 a 13-page document
15 with a cover sheet which is entitled Shearon Harris
16 Nuclear Power Plant, Docket Number 50-400/License
17 Number NPF-63, Request for License Amendment, Spent
18 Fuel Storage, 10 CFR 50.55a Alternative Plan.

19 This was enclosure 8 to the license
20 amendment application.

21 BY MR. O'NEILL:

22 Q Do you have that document in front of you,

1 Mr. Lochbaum?

2 A Yes, I do.

3 Q Do you recognize it?

4 A Yes, I do.

5 Q Did you review it?

6 A Yes, I did.

7 Q Do you have any reason to take issue with
8 CP&L's statement that, with respect to the unit 2
9 fuel pool cooling system, they were constructed to
10 the same codes and standards using the same
11 procedures and personnel as unit 1, which was fully
12 completed and licensed, and appropriate records
13 documenting field activities were generated at the
14 time of construction as required by the construction
15 codes and plant procedures and maintained in storage
16 under the control of the construction quality
17 assurance program pending system completion and
18 turnover?

19 Do you have any reason to doubt that?

20 A In general I don't doubt it. The only
21 reason I hesitated is same personnel, you know, over
22 a period of time, you may use slightly different

1 welders, so they're probably not exactly the same
2 people, but --

3 Q That goes to an earlier question.

4 Do you have any understanding of the
5 sequencing of the welding activities for the piping
6 that was embedded in concrete in the four spent fuel
7 pools?

8 A You said they were done at the same time
9 as I recall.

10 Q I suggested that, but I don't testify
11 here. Do you have any reason to know one way or the
12 other?

13 A I have no reason to know one way or the
14 other.

15 Q Okay.

16 A But either way I don't think it changes my
17 answer because if they were done the same time, you
18 know, a person can't be in the same places, and if
19 they were staggered in any way, then a guy who did
20 work on unit 1 might not have been around for unit
21 2. But I'm not contending that they used the
22 similar people. You know, there is mostly overlap.

1 Q Mr. Lochbaum, you haven't raised any issue
2 with respect to the pedigree of filler material that
3 was used in the welds, have you?

4 A No, I have not.

5 Q Do you have any reason to doubt that
6 hydrotesting was performed on all of the ASME code 3
7 piping that comprises the spent fuel pool cooling
8 system?

9 A I have no reason to doubt that, no.

10 Q And do you understand that when the system
11 is completed, it's all hooked up again with the
12 pumps and the heat exchangers, that they will do a
13 hydrotest again?

14 A That is my understanding.

15 Wait. When you asked me that question,
16 did you refer to original construction or part of
17 the proposed plan?

18 Q Both.

19 A Okay. I only answered for the original
20 construction, but it is my understanding that they
21 will do it in the future, too. I just wanted to
22 clarify.

1 Q By the way, if you look at page 5 of 13.

2 A Yes, sir.

3 Q Bottom of the page, it will inform you of
4 the size of the piping, the diameter piping is both
5 12-inch and 16-inch. Do you see that?

6 A Yes, I do. I did not recall it earlier
7 but I see it.

8 Q And you don't have any reason to doubt
9 that, do you?

10 A No, I have no reason to doubt it.

11 Q And none of the 160 vendor welds are being
12 questioned by you here?

13 A Well, I'd have to clarify. See, I'm not
14 sure which ones were the vendor welds. Anything
15 that's invited, no matter who does it, is --

16 Q If you look at the paragraph above, you'll
17 note that, of the 40 field welds, 37 are fuel pool
18 cooling system piping welds, 15 of which are
19 embedded in concrete. So we're talking about field
20 welds.

21 A But I don't know who did -- were those
22 vendor or not?

1 Q Do you know the difference between a field
2 weld and a vendor weld?

3 A No.

4 Q Okay.

5 A I'm not a weld expert.

6 Q Okay. If you look on page 6 of 13 which
7 talks about hydrotesting, the middle of that
8 paragraph says, "Of these 15 embedded field welds"
9 -- does that refresh your recollection as to whether
10 the welds we're talking about are field welds or
11 not?

12 A No, because I didn't have a recollection
13 on this. I see what you're talking about, but --

14 Q But you hadn't read this before so you
15 don't know?

16 A No. I've read that, but I didn't -- I
17 didn't put that -- burn that into my memory.

18 Q Attached to the response to the first RAI
19 was a matrix which listed every one of the welds.
20 Did you study that matrix?

21 A No, I did not study.

22 Q So the matrix would have told you which

1 welds are field welds, which welds are vendor welds,
2 which welds have QA records, which welds don't. But
3 you didn't take a look at that?

4 A No, I said I took a look at that. I
5 didn't study it.

6 Q Do you remember that matrix?

7 A Yes.

8 Q Do you know the difference between Section
9 III piping and B31.1 piping?

10 A Yes, I do.

11 Q What's that?

12 A B31.1 is a different code, a different
13 portion of the code, so it has different standards
14 that you meet than ASME Section III.

15 Q And we're not talking about any of that
16 piping here, are we?

17 A Well, when you say "that," are you talking
18 about --

19 Q B31.1.

20 A No. At least not the embedded welds. I
21 believe the system does have some B31.1 welds, but
22 not in the portion that we're talking about.

1 Q Beginning on page 5 of 13 and going over
2 to page 11 of 13, is a discussion of the -- let me
3 start over. Strike that.

4 Beginning at page 8 of 13 over to page 11
5 of 13, CP&L lays out why the 50.55a plan establishes
6 an equivalent quality of the welds notwithstanding
7 the fact that the weld data reports are not
8 available for those 15 welds.

9 If you would take a moment to review each
10 of those issues and tell me which ones you find
11 fault with.

12 A I think on the bottom of page 8 there is a
13 discussion of no direct records of welder
14 identification have been located for 15 welds.

15 Q Yes.

16 A That is a lower or different standard than
17 had those records been available for review.

18 So that is a part of the overall concern.

19 Q Did you look at the end of that paragraph
20 which indicates "Of the 15 welds, QC construction
21 reports provide the identification of welders
22 associated with at least three"?

1 A That was actually before my sentence, but
2 I see that.

3 Q Okay.

4 A I did see that, yes.

5 Q So now we're down to 12 with respect to
6 welder identification.

7 And then did you see the next sentence,
8 which says, "But hydrostatic test records have been
9 located which attest to the existence of completed
10 WDR packages for these welds at the time of
11 construction."

12 Do you understand what that means?

13 A Yes, I do.

14 Q Good.

15 MR. O'NEILL: I've asked the court
16 reporter to mark as Exhibit 16 a one-page document
17 entitled Weld Data Report with various dates on it,
18 but the one under the welding engineer's
19 verification is 12/27/78.

20 (Lochbaum Deposition
21 Exhibit Number 16 was
22 marked for identification.)

1 BY MR. O'NEILL:

2 Q With respect to weld I.D. 2-SF-1-FW5, have
3 you seen this document before, Mr. Lochbaum?

4 A It might have been in the stack we looked
5 at at discovery, but I don't have specific
6 recollection of this document.

7 Q Do you know whether this weld is one of
8 the 15 welds?

9 A I do not.

10 Q Are you aware of information that was
11 provided by the applicant in response to the RAI
12 that indicated that a couple of the WDRs had been
13 obtained because they were attached to other QA/QC
14 documentation?

15 A I did see that RAI response, yes.

16 Q Okay. So in any event, does this -- do
17 you understand this to be a weld data report? You
18 said you were familiar with them.

19 A It is a weld data report.

20 Q All right. What does this tell you? If
21 you read this, what do you now know about the weld
22 that you didn't know before you looked at it? Walk

1 through it. Tell me what you understand from the
2 weld data report.

3 A I know the system that the weld is for.

4 Q And what system is this?

5 A SF, spent fuel.

6 Q Correct. Okay.

7 A I know the category, category 3.

8 Q Um-hum.

9 A I know which drawing this weld appears on.

10 Q Right.

11 A I know the weld record for this joint. I
12 know the weld I.D. for this weld. I know the design
13 line that this weld is within. I know what the base
14 metal for the piping is. I know what the joint type
15 would be if I knew what those codes were. I know
16 what the -- well, I can't, because I can't read it.

17 I don't know what that PC and HT -- heat
18 treatment and stuff like that, but I don't know
19 exactly what that is.

20 I know the weld procedure that was
21 followed and also the revision level. I almost know
22 the material thickness, but it's not full copy. I

1 know the fill metal type, if I knew what that code
2 was.

3 I know the welding engineer who verified
4 the data. I know who reviewed the weld data and I
5 know who released it.

6 Q Who reviewed the hold points.

7 A Reviewed the hold points, excuse me, yes.
8 And who released it for welding.

9 Q Okay. What else does it tell you?

10 A It tells me the welders who worked on this
11 for the tack, the root, the intermediate and the
12 final.

13 Q In this case it was all the same welder,
14 wasn't it?

15 A Well, let's assume -- I don't know -- it
16 seems like it was, but I don't know if they use one
17 code for --

18 Q Welder A-15.

19 A But I don't know what CP&L's terminology
20 is. I don't know if that's a group of welders or an
21 individual welder. It sounds good.

22 Q Okay. Now, what else can you tell about

1 the inspection of the weld?

2 A It tells me that a QA inspector signed
3 off, or initialed off in this case, that the spools
4 were joined. I don't know what the H and A stands
5 for.

6 Verified the fit-up, pre fit-up and
7 fit-up. Checked the purge gas for the weld, which
8 was also -- the fit-up and inspection check purge
9 gas was also verified by the ANI inspector.

10 Q What's the ANI?

11 A American Nuclear Insurers.

12 Q What's his role?

13 A His role is similar to a quality control
14 function.

15 Q Who does he work for?

16 A He works not for the utility, he works for
17 the company that provides basically the insurance
18 for the facility, ultimately.

19 Q It says -- is that an independent check?

20 A They are both independent checks. The QA
21 is also an independent check. But it's independent
22 of the company in addition.

1 Also tells me that the QA had checked the
2 preheat temperature, N/A on the root pass, NDE and
3 interpass temperature check, independent NDE --
4 intermediate NDE. It says that the QA visually
5 inspected the final weld. And I assume that's the
6 nondestructive examination procedure that was
7 followed to do that.

8 It tells me that the QA inspected for
9 joint identification.

10 Check QA inspected for -- or check for
11 final cleanliness, and that QA checked for final
12 nondestructive examination. Again, I assume that's
13 the procedure that was followed to do that.

14 Q And at the bottom of this you see a number
15 of signatures, don't you?

16 A Yes, I do.

17 Q The first one is the QA inspector; is that
18 right?

19 A That's correct.

20 Q The next one is QA final acceptance.

21 A That's correct.

22 Q And the last one is verified by the ANI.

1 A That's correct.

2 Q And this is one weld?

3 A That is correct.

4 Q Okay. Now, isn't it true we know that one
5 of these was filled out for every one of the welds
6 that were embedded in concrete that we've talked
7 about now? We know that, don't we?

8 A CP&L has stated that.

9 Q And --

10 A We do not have the record because they
11 were thrown away.

12 Q We do not have the WDRs or we wouldn't be
13 here?

14 A That's correct.

15 Q But we do have something else with respect
16 to paperwork that indicates that the WDR was done
17 properly, don't we?

18 A Well, procedurally you wouldn't do the
19 hydrotest until these packages were completed.

20 Q Have you reviewed hydrotest reports
21 before?

22 A Yes, I have.

1 Q And do you know what a hydrotest traveler
2 requires?

3 A For the ones I've reviewed, I do. That's
4 not a universal requirement, so I don't know what
5 CP&L's requirements are.

6 Q Have you reviewed the hydrostatic test
7 records for the welds in question --

8 A No, I have not.

9 Q -- that were provided in the documents
10 rooms and were produced in discovery?

11 A Again, we may have -- I may have requested
12 some, I know I didn't request all of those. I may
13 have requested some. I have not yet reviewed the
14 discovery documents.

15 Q Okay.

16 MR. O'NEILL: Let me ask the court
17 reporter to mark as Exhibit 17.

18 (Recess.)

19 MR. O'NEILL: I've asked the court
20 reporter to mark as Exhibit 17 a two-page document
21 entitled Carolina Power & Light Company, Corporate
22 Quality Assurance Department, Hydrostatic Test

1 Record, with a date under the mechanical discipline
2 engineer of March 3rd, '82.

3 (Lochbaum Deposition
4 Exhibit Number 17 was
5 marked for identification.)

6 BY MR. O'NEILL:

7 Q Mr. Lochbaum, do you have in front of you
8 Exhibit 17?

9 A Yes, I do.

10 Q Have you seen hydrostatic test records
11 before?

12 A Yes, I have.

13 Q Do you know what hydrostatic test records
14 can inform you of?

15 A Yes.

16 Q Why don't you do what you did with respect
17 to the weld data report and go through and tell me
18 what you now know about the hydrostatic test record
19 and the line of piping that it relates to.

20 A This tells me that this was for units 2
21 and 3. The system was the spent fuel system and it
22 was turnover page -- telling me the turnover

1 package.

2 The code class of the piping being
3 hydrostatic Kelly tested. The drawings that showed
4 the piping in question. And it explains the test
5 boundaries.

6 Q What does the test boundaries mean?

7 A The test boundaries describe the portions
8 of the piping that are being subjected to
9 hydrostatic test pressure and the boundaries between
10 that part of the system, if it's not the entire
11 system, and other piping that's connected but not
12 tested.

13 Q So, for example, where it says under test
14 boundaries, from and including 2-SF-144 FW-515, what
15 does that designation refer to?

16 A I don't know CP&L's designation. It
17 sounds like that's a valve, but I cannot attest to
18 it. That looks like what it is. I'd have to look
19 at the drawing to verify that.

20 Q And if you -- well -- and so one test
21 boundary was a valve, you believe, and it goes to
22 the spent fuel liner ring weld and all welds

1 between; is that correct?

2 A That's correct. That's the two
3 boundaries.

4 Q Okay. Now, what else does this tell you?

5 A It tells me the design pressure of the
6 piping, the test pressure, the hold pressure, the
7 maximum pressure and the time at the test pressure
8 and what was used to test whether it was air or
9 water, in this case water.

10 It tells me it was prepared by a
11 mechanical discipline engineer and reviewed or
12 verified by the QA/QC specialist, mechanical QA/QC
13 specialist.

14 It tells me the components within the test
15 boundary.

16 Q Do you know what those components might
17 be?

18 A No, I don't.

19 Q Okay.

20 A I don't know what those are.

21 It tells me, whatever they are, that the
22 manufacturing fabrication records were accepted.

1 There were no open DDRs or NCRs, probably design and
2 discrepancy reports, nonconformance reports, and
3 that that had been verified, that condition had been
4 verified by somebody.

5 Q It look likes TG. If you look on page 2,
6 it's Tommy Gilbert. You see his initials throughout
7 and his signature, test inspected by Tommy Gilbert.

8 A Okay.

9 Q Okay. What do we learn at the bottom of
10 the page?

11 A It tells me that they verified that the
12 openings were plugged, the system was filled and
13 vented of air.

14 It tells me that items that were not being
15 tested were disconnected and/or isolated or
16 disconnected and isolated.

17 It tells me that surfaces that were to be
18 inspected during the hydrotest were clear and
19 unobstructed.

20 It tells me that the temperature of the
21 water and also the minimum temperature during the
22 hydrostatic test that it could be.

1 And the MTE, the maintenance test and
2 equipment number for the thermometer that was used
3 or pyrometer that was used to record that
4 temperature or measure that temperature.

5 And it tells me the pressure gauges that
6 were used to check pressures during the hydrostatic
7 test.

8 Q Going on to the second page.

9 A It tells me some more components. These
10 are welds that are within the test boundaries.
11 Shows me the test records that were complete as
12 shown on the isometrics, that they were inspected
13 for visual leakage.

14 Q Now, let's stop there for a second.

15 What do you understand weld data records
16 complete, yes, to mean?

17 A That the weld data records were complete
18 for those welds listed on this page.

19 Q And what would the QA/QC inspector have
20 done before he would have initialed this pursuant to
21 procedures?

22 A He would have verified that the weld data

1 records were complete.

2 Q So if we go back to what was marked as
3 Exhibit 16, which is a weld data record, he would
4 have checked that the information that you read off
5 in some detail was complete; is that correct?

6 A No, I don't think that he would have -- he
7 would have verified that that record had the proper
8 signatures. I don't think he is going to go back
9 and verify all that data that I just read.

10 If the form is complete and signed off at
11 the bottom, I think that's what he would do for
12 signing off this column.

13 I don't think he would go back to the
14 individual to verify all the boxes on that sheet.

15 Q But certainly this signature indicates
16 that Mr. Gilbert looked at this weld data report?

17 A That's correct.

18 Q If it was one of the ones included in this
19 list?

20 A With that stipulation, yes.

21 Q All right. What does it mean when he
22 says, "Yes, shown on isometric"?

1 A I take that to mean that the weld is shown
2 on the isometric drawing.

3 Q And what do you understand visual leakage
4 inspection to have included? Do you know what the
5 visual leakage inspection would have required by
6 procedure at CP&L?

7 A At other places I've worked, and I assume
8 it's the same at CP&L, it would have meant during
9 the hydrostatic test you would have eyeballed the
10 weld and ensured that there were no signs of
11 leakage.

12 Q And that's while the system was at
13 pressure that that inspection was conducted?

14 A As long as it was above the test, the
15 minimum test pressure, yes.

16 Q And that would have not just been looking
17 at one point, but looking at the entire weld, 360
18 degrees, is that not correct, by procedure?

19 A I don't know that that's what CP&L's
20 procedure called for. My recollection is other
21 plants didn't make you do a 360-degree eyeball
22 check. So I wouldn't -- I can't say that.

1 Q But we can ask that question of somebody
2 at CP&L?

3 A You can do anything you want.

4 Q All right. So with respect to each of
5 these welds, we show that the weld data records were
6 complete, that they were shown on the isometric for
7 as-builts, and that there was an inspection of each
8 individual weld while the system was at the test
9 pressure. Is that a fair statement?

10 A That's a fair statement.

11 Q All right. Now, maximum pressure applied
12 is shown here as 43 psi?

13 A That's correct.

14 Q And if we go back to the front page, we
15 note that while you had some problems because you
16 weren't aware of what this was, the design pressure,
17 operating pressure was 25 psi for this system.
18 That's not much pressure in that because it's opened
19 atmosphere; is that correct?

20 That's how you would read design pressure
21 versus the maximum pressure applied which, of
22 course, would be above the design pressure; is that

1 true?

2 A Could we break that into --

3 Q Sure. Let's go back to page 1. You have
4 a design pressure that's 25 psi.

5 A That's correct.

6 Q And the minimum test pressure is listed as
7 32 psi.

8 A That is correct.

9 Q And if you go to the second page, we see
10 that actually the maximum pressure applied was 43
11 psi.

12 A That is correct.

13 Q And it was held for at least 11 minutes.

14 A No.

15 Q No?

16 A No.

17 Q Actual time of test pressure?

18 A Yeah, but test pressure doesn't
19 necessarily correspond to the 43 pounds. So the
20 test pressure was maintained for 11 minutes, but not
21 necessarily 43 pounds.

22 Q But it would certainly have to be between

1 32 and 43?

2 A For 11 minutes. That's what that says --

3 Q Okay.

4 A -- tells me.

5 Q Then what else do you understand from the
6 rest of page 2?

7 A Well, it says that after the test, they
8 basically rechecked the test gauge, the pressure
9 gauge that was used. And apparently it was signed
10 off as okay.

11 The welds were signed off on the isometric
12 drawing and then it's got the people who
13 participated or did the QA for the test, the QA
14 inspector, the ANI inspector, the mechanical QA/QC
15 specialist and what was N/A for the start-up group.

16 Q Okay. Now --

17 A One thing about this I don't understand is
18 at the top of page 1 there is a correction to
19 correct the document date of September 1983. And I
20 don't see, with exception to the weld procedure
21 maybe, what was changed, because the rest of the
22 document is signed off in June of '82.

1 But I don't think that alters what we just
2 went through.

3 Q Right. Do you know how many of the 15
4 welds have a hydrotest record that includes that
5 weld, 15 embedded welds?

6 A I'm sorry. What was the question?

7 Q Do you know how many of the 15 embedded
8 welds have available one of these hydrotest records
9 which includes a segment of the piping that includes
10 that embedded weld?

11 A I do not.

12 Q If you -- hypothetically, if all of the
13 embedded welds were identified in one of these
14 hydrotest records, where a QA inspector established
15 that he had reviewed the weld data report, would
16 that resolve your concerns about the quality of the
17 welds?

18 A It would resolve portions of them, and the
19 portion being the -- the first part, in that the
20 alternative plan where you don't visually inspect
21 all the welds, it would resolve that part.

22 The part of the concern, the contention

1 that dealt with what has happened since 1983 are
2 really not affected by it.

3 Q Okay. So let's have another hypothetical.

4 Suppose that CP&L was able to find a
5 remote crawler to get to all of the welds and was
6 able find a hydrostatic test report that included
7 all of the welds. Would that resolve all of your
8 concerns?

9 A Well --

10 Q Assuming, of course, that the visual
11 inspection showed that there was no material
12 degradation to the welds or to the piping.

13 A The contention that I have is that there
14 was no provision for checking for deterioration.
15 Now, hypothetically, if a remote crawler or some
16 other means was done to do that, then I'd have to
17 look at that to ensure that that addressed all the
18 potentials that -- questions that I raised.

19 If it did, then that would address the
20 second half of it, yes.

21 Q Okay.

22 MS. CURRAN: We need to take a break.

1 MR. O'NEILL: Sure. I thought we just
2 took one.

3 MS. CURRAN: I'll be right back.

4 (Recess.)

5 MR. O'NEILL: I've asked the court
6 reporter to mark as Exhibit 18 a document entitled
7 Carolina Power & Light Company, Shearon Harris
8 Nuclear Plant, Plant Operating Manual, Volume 4,
9 Part 8, Special Plant Procedure.

10 (Lochbaum Deposition
11 Exhibit Number 18 was
12 marked for identification.)

13 BY MR. O'NEILL:

14 Q And it's a temporary procedure for remote
15 visual examination of interior welds and surfaces of
16 an embedded unit 2 spent fuel pool cooling piping.
17 And it's Rev. 0 and it includes six pages.

18 Do you have before you Exhibit 18, Mr.
19 Lochbaum?

20 A Yes, I do.

21 Q Have you seen this document before?

22 A I recollect that this seems to be one of

1 the documents we requested in discovery, but I
2 wouldn't want to swear to that without checking it,
3 but it seems like it was.

4 Q The number at the bottom of the page is
5 called a Bates number and is an indication of one of
6 the documents that was put in the document room that
7 you requested and was produced to Ms. Curran.

8 A That's correct.

9 Q Did you review this document while you
10 were looking at it?

11 A Well enough to the point where I did
12 request it. Like I said, I think I requested this.
13 I don't want to --

14 Q I would like you to take a few minutes and
15 read it cover to cover.

16 This is the procedure for visual
17 inspection.

18 (Pause.)

19 THE WITNESS: Okay.

20 BY MR. O'NEILL:

21 Q Now, it is true that the intent of CP&L to
22 do a visual inspection on at least some of the welds

1 was noted in the first license amendment request and
2 then in response to the RAI and in public statements
3 that were made and briefings relating to the license
4 amendment request; is that not true?

5 A That is correct.

6 Q Okay. And this appears to be the
7 procedure by which the visual inspection was carried
8 out; is that not true?

9 A It is a procedure for doing visual
10 inspections. I don't know if that's the one they
11 intended to use or not.

12 Q Okay. If you note on page 3, Purpose,
13 this includes an inspection of the interior welds
14 and surfaces of the embedded piping.

15 Anything missing there? So far so good?

16 A No. So far so good.

17 Q Okay. There is a list of references at
18 2.0 which indicate relevant documents relating to
19 this procedure. Are you familiar with those
20 documents?

21 A Not all of them, no. CP&L letters and
22 stuff, I don't.

1 Q Did you review them when you were at the
2 CP&L documents room?

3 A I can't attest to each and every one of
4 these, so I don't know. I can't answer that
5 question.

6 Q Okay. Any problem with the prerequisite?
7 Something that's missing there?

8 A Before we get that far, the purpose is for
9 -- it says interior welds and surfaces?

10 Q Yes.

11 A We had this morning talked about the
12 potential for an external contaminant attacking the
13 pipe surface, so this only would have looked at the
14 interior of the pipe.

15 Q That's certainly true.

16 A But in any event. Prerequisites.

17 Q And it would be impossible to look at the
18 exterior of the pipe that's encased -- embedded in
19 concrete.

20 A I'm not sure it's impossible, no.

21 Q Well, unless you rip out the concrete.

22 A Well, you said impossible.

1 Q Right. Okay. Any problem with
2 prerequisites that you see in this procedure?

3 A No.

4 Q Do you understand the calibration that's
5 being done with respect to the camera?

6 A Yes, with one mil resolution. Yes.

7 Q Okay. Any problem with precautions?

8 A No.

9 Q Any problem with 4.2 and limitations?

10 A No.

11 Q Do you disagree with the equipment that
12 was being used?

13 A I'm not familiar with the equipment, so I
14 don't agree or disagree.

15 Q Okay.

16 A It looks appropriate, but I --

17 Q I want you to look hard at the acceptance
18 criteria and tell me if you have any disagreements
19 with the acceptance criteria.

20 A The acceptance criteria would -- as
21 supported by attachment 1, which is the remote
22 visual examination data sheet, would seem to focus

1 or narrow the scope down to the welds themselves.

2 Q But if you look at 6.01, it does also talk
3 about the welds/surface. So while many of these
4 would only be applicable to a weld, to be sure, it
5 is clear that this is also to look at the surface.

6 A I'm not sure -- I wouldn't make that leap,
7 because if it was me performing this procedure, when
8 I go down to B in the attachment as to what I'm
9 supposed to look at, the focus is on the welds.

10 Q Okay. By the way, what is the most
11 susceptible part of the piping to -- I know you're
12 not an expert in corrosion, but in corrosion, MIC or
13 otherwise, if you know?

14 A The most vulnerable is the portion that
15 has stress -- well, if it's stress corrosion, it
16 would be the portion of the pipe that sees stress
17 and also sees some corrosive agent.

18 If it's from the water, it would be the
19 piping that has water in it that has the highest
20 stress, or -- it's anything that combines the
21 corrosion agent and a flaw or a weak spot in the
22 weld or piping.

1 Q Do you know where most of the pits were in
2 the piping at the Robinson plant that you referred
3 to in your IE notice?

4 A My understanding is it was in the welds,
5 around the weld areas.

6 Q And do you know why that's true?

7 A No.

8 Q Okay. There may be -- I understand you're
9 not an expert in this area, but there may be some
10 reason to really focus on the welds, too, that's
11 logical because of materials and because of
12 susceptibility to corrosion and where that's more
13 likely than not to occur; is that not true?

14 A That is true.

15 Q Okay. Do you have a concern regarding the
16 -- any piping that was inspected by CP&L and any
17 weld pursuant to this procedure, if they properly
18 identified any -- any deficiencies as indicated by
19 the acceptance criteria that they saw?

20 A My concern was that the focus was on the
21 welds. And if there were defects or indications in
22 areas other than the welds, this procedure would not

1 necessarily -- it wasn't -- this procedure didn't
2 give me the confidence that they would have been
3 detected and identified.

4 Q On the other hand, if somebody who was
5 responsible for and that was an expert in corrosion,
6 for example, were to testify that he reviewed
7 carefully all of the videotape of both the segment
8 of the piping and the weld, that might resolve some
9 of those concerns I take it?

10 A Well, I notice that the procedure says, on
11 section 4.2, limitations, item number 4, "The vendor
12 personnel operating the closed circuit television
13 system need not be certified visual weld examiners.
14 The television system operators shall display
15 proficiency in performing their required functions."

16 As I interpreted that, and I may be wrong,
17 as I interpreted that step in this procedure, the
18 videotapes were made by technicians who were trained
19 in the use of the equipment and so on, not people
20 who were necessarily qualified or not backed by
21 people who were NDE or qualified to detect
22 corrosion, these experts you referred to.

1 Do you have Exhibit 19 in front of you,
2 Mr. Lochbaum?

3 A Yes, I do.

4 Q Did you review this document when you were
5 visiting the CP&L documents production room?

6 A I may have. Again, I don't specifically
7 recall this document. It may have been one of the
8 ones we requested.

9 Q Okay.

10 A The number, the Bates number seems in the
11 range that we looked at, so that would lead me to
12 believe that I did review it.

13 Q So you haven't reviewed it carefully?

14 A I have not reviewed it carefully.

15 Q Would you take a few minutes to review it
16 carefully, please.

17 (Pause.)

18 THE WITNESS: Okay.

19 BY MR. O'NEILL:

20 Q By the way, based on your review of this
21 document, do you now know what the wall thickness is
22 of the 12- or 16-inch diameter spent fuel pool

1 A No, I don't know how much.

2 Q Okay.

3 A And also I couldn't -- I assume that .375
4 is correct, but I also don't know what the right
5 thickness is.

6 Q You could look at the isometrics and
7 determine that?

8 A That would tell me what the thickness was.
9 You said for the safety function, so I'd have to
10 look at the seismic design qualification and
11 everything else to find out what the right thickness
12 is.

13 Q An area, I note, that you indicated was
14 outside your expertise to actually calculate?

15 A To calculate, I can look at the drawing
16 and see what it says.

17 Q Right.

18 A That's a little different.

19 Q Do you have any concerns about the results
20 of the inspection on these six welds and associated
21 piping?

22 A Yes. It reiterates -- this, as I

1 understand it, is the follow-up to this test. It's
2 the evaluation of the results from --

3 Q The draft, I might note.

4 A That's what it's intended to be
5 ultimately, as I understand it. It's to review the
6 test results of this visual inspection using the
7 camera to see if it's adequate or not.

8 Q Right.

9 A As -- my concerns with the test were that
10 it was focused on the welds. And this ESR,
11 engineering service request, pretty much only talks
12 about the quality or the adequacy of the welds, so
13 that confirms the concern from the test that I had.

14 In addition, the only other concern that
15 was raised was this one defect or indication that
16 was observed and discussed, the lack of fusion for
17 the one weld.

18 Q An incompletely-consumed insert on the
19 root pass is a more correct statement.

20 A Indications of incomplete fusion is the
21 last sentence.

22 Q Um-hum.

1 A I'd have to pull that string a little bit
2 further to see why these weld data records which
3 look for things like this --

4 Q Wait a minute. Would you go back to what
5 is Exhibit 16 and show me where there is any
6 indication of an inspection of an ID of a weld in
7 that weld data report.

8 A Well, in this case it was N/A, which is a
9 root pass NDE. Isn't that looking for things such
10 as this?

11 Q Well, it was N/A for what reason?

12 A I don't know why this weld was N/A.

13 Q Right. Could it be that there is no
14 requirement for that type of inspection for a code
15 Section III piping that's used for this application
16 at this pressure?

17 A It could be, yes.

18 Q So you haven't found anyplace on the weld
19 data reports that would have required an internal
20 inspection as opposed to an external inspection of
21 the welds?

22 A Could you repeat that question.

1 Q You haven't found anyplace on the weld
2 data report that requires an internal inspection;
3 that is, ID inspection, as opposed to an external
4 inspection?

5 A That's correct.

6 Q Okay. Now, did you see at the top of the
7 last page that the root pass is backed up by
8 multiple weld passes?

9 A I did see that, yes.

10 Q And I believe you testified you had no
11 idea how many?

12 A How many passes?

13 Q Correct.

14 A That's correct.

15 Q Okay. Presumably enough passes to get to
16 at least .375 inches, however?

17 A Presumably, yes.

18 Q Okay. And that that was inspected on the
19 weld data report; that is, the external inspection
20 to show that the welding was properly done?

21 A But we don't have the one for that one.

22 Q Correct, but I mean in general.

1 A In general, that's correct.

2 Q Okay. By the way, do you understand what
3 the requirement is as discussed in the last
4 paragraph on the last page with respect to the joint
5 efficiency?

6 A No, I do not.

7 Q Okay.

8 A I'd have to look at that part of the code.

9 Q Okay.

10 MS. CURRAN: I need to confer with the
11 witness for a minute.

12 (Recess.)

13 THE WITNESS: Did I leave you that answer,
14 last answer, or did I leave you hanging.

15 MR. O'NEILL: No, you answered.

16 THE WITNESS: Okay. I couldn't recall.

17 (Lochbaum Deposition
18 Exhibit Number 20 was
19 marked for identification.)

20 BY MR. O'NEILL:

21 Q I've asked the court reporter to mark as
22 Exhibit 20 what is enclosure 16 to CP&L's response

1 to the RAI on the 50.55a alternative plan. It's
2 entitled Supplemental Quality Assurance Requirements
3 for the Design Change Packages Associated with
4 Completion of the Unit 2 and 3 Spent Fuel Pool
5 Cooling System. It has 15 pages.

6 Have you reviewed Exhibit 20 before, Mr.
7 Lochbaum?

8 A I seem to recall having gotten a copy of
9 the RAI response, but I didn't -- I was saving all
10 of the reviews to do at once, all the discovery
11 packages. So the answer to your question is no, I
12 have not in detail.

13 Q I'd like you to take some time, as much
14 time as you want, an hour if you want, to review
15 this.

16 Your contention is that CP&L has not
17 provided a plan to inspect and determine there is no
18 degradation. Months ago, you've had what
19 effectively is that plan and you say you haven't
20 reviewed it yet.

21 So if you're the expert on this
22 contention, I would like you to review it, and take

1 an hour to review if you want to, because I want to
2 ask you some questions about it.

3 MR. O'NEILL: Why don't we take a break.

4 THE WITNESS: Okay.

5 (Recess.)

6 BY MR. O'NEILL:

7 Q Mr. Lochbaum, have you had a chance to
8 study carefully Exhibit 20?

9 A Yes, I have.

10 Q Does this adequately address your concerns
11 about the alleged failure to implement procedures to
12 deal with the period of time between 1983 and 1999?

13 A No.

14 Q Why not?

15 A It doesn't address the quality of the
16 piping, embedded piping.

17 Q Let's set that aside for a moment because
18 we've spent some time discussing that.

19 With the exception of the embedded piping,
20 the welds and embedded piping, does this equipment
21 commissioning plan and the quality assurance
22 procedures related to it address any concerns you

1 have with respect to the condition of the equipment
2 of the spent fuel pool cooling system that will be
3 commissioned and placed in service?

4 A Well, this plan by itself doesn't indicate
5 what examinations would be done for the accessible
6 piping.

7 The commissioning plan with the matrix of
8 which components are verified by walkdowns,
9 paperwork checks and so on provide, you know,
10 essentially the meat on the bone. This is the
11 skeleton of the program.

12 So it could, depending on what that meat
13 looks like.

14 Q And I take it that you haven't reviewed
15 all of the other procedures and all of the other
16 test results from the inspections and reviews of the
17 accessible piping and the welds that were provided
18 in the CP&L document production?

19 A I have not studied them. I did see quite
20 a bit and I saw the matrix, equipment matrix and
21 some of the resolution of the problems and some of
22 the acceptance of the installed, but I can't say

1 I've reviewed all of it, which is what your question
2 was.

3 Q But right now you also cannot point to a
4 particular disagreement that you have with what was
5 done?

6 A Not for the accessible piping, any
7 components, that's correct.

8 I do have one question about this, an
9 observation, not a question -- I'm not sure I'm
10 allowed to ask questions.

11 On page 3 of 15, this document refers,
12 under the Responsibilities section for both the AIA
13 and the modification engineer, it refers to the ESR.
14 The -- I don't see that the ESR is identified
15 anywhere within this document, but it's a relatively
16 minor point.

17 Q Okay. If you look at page 3 of 15 where
18 you were referring to a second ago, you see the role
19 of the authorized inspection agency or the
20 authorized nuclear inspector, do you not?

21 A Yes, I do.

22 (Lochbaum Deposition)

1 Exhibit Number 21 was
2 marked for identification.)

3 BY MR. O'NEILL:

4 Q I've asked the court reporter to mark as
5 Exhibit 21 a one-page document which was a letter
6 from Dr. Richard E. Feigel, vice president,
7 engineering of the Hartford Steam Boiler Inspection
8 and Insurance Company to Mr. Steve Edwards, manager
9 of the spent fuel pool activation project at
10 Carolina Power & Light Company, dated March 8, 1999.

11 Have you seen this document before?

12 A Yes, I have.

13 Q Do you know who Dr. Feigel is?

14 A He is the author of this letter.

15 Q And have you -- do you know what his
16 position is at the Hartford Steam Boiler?

17 A It says he's the vice president of
18 engineering.

19 Q Have you read his resume which was
20 provided to BCOC?

21 A I have seen it. I couldn't recall
22 specific points off of it. I did see it.

1 Q Do you recall what his responsibilities
2 are with respect to ASME code committees?

3 A No, I do not.

4 Q Okay. Does the fact that the independent
5 Hartford Steam Boiler who has agreed to be the
6 authorized nuclear inspector for the activation of
7 the spent fuel pool, does the fact of their
8 endorsement of the alternative plan provide you any
9 additional confidence as to the efficacy and
10 effectiveness of that plan?

11 A For the parts that we feel are within --
12 that I feel are within the scope of the plan, it is
13 good to have Hartford's endorsement of that plan.

14 My concern is that that plan is not
15 all-inclusive, as it should be, so this doesn't give
16 me any confidence regarding that scope problem.

17 Q Now, if we go back to what is Exhibit 20,
18 isn't it true that the ANI is an independent
19 reviewer every step of the way on the implementation
20 of this plan?

21 A I couldn't say every step all the way
22 through the plan.

1 Q If, in fact, it were true that, in
2 addition to, as set forth in some detail in Exhibit
3 20, the quality assurance requirements to which the
4 commissioning will be performed and the quality
5 assurance, independent quality assurance and
6 inspections and reviews, that indeed the ANI will
7 provide independent review of all aspects of the
8 commissioning of the spent fuel pool cooling system,
9 doesn't that provide additional assurance that it
10 will be done in a way that is quality and ensures
11 protection of public health and safety?

12 A Yes, that independent review does add
13 assurance.

14 Q What would you have required in this
15 commissioning plan to have satisfied any concern
16 that you might envision with respect to the
17 commissioning of the spent fuel pool cooling system?

18 A If this plan would have addressed complete
19 visual inspection of the interior piping surfaces of
20 the embedded piping portion and an assessment or
21 evaluation or inspection of the external piping for
22 the embedded portions, that would have addressed the

1 concerns with the scope.

2 Q Are you saying that you would have
3 required, to satisfy your concerns, Carolina Power &
4 Light to cut out reinforced concrete around the
5 spent fuel pool to take a look at the external welds
6 and the piping to satisfy your concern? Is that
7 your position?

8 A That would have satisfied the concerns.
9 I'm not saying that's the only way to satisfy those
10 concerns.

11 Q Okay. Well, let's eliminate that as
12 impractical for purposes of the hypothetical.

13 If we assume for the moment that that is
14 impractical and, in fact, could damage the piping
15 and would cause other problems, what, in addition to
16 what is in this commissioning plan and in addition
17 to what you've said with respect to a visual
18 inspection of all of the piping, would you require
19 to be in the commissioning plan to satisfy your
20 concerns?

21 A A complete visual inspection of the
22 interior piping surfaces, all of the welds of the

1 embedded portions, and some evaluation, analysis or
2 inspection of the exterior piping surfaces.

3 Q And, of course, the evaluation has been
4 done of all of the accessible exterior piping
5 surfaces.

6 A That's my understanding.

7 Q And what you're talking about is some
8 evaluation of the exterior that is embedded in
9 concrete?

10 A That is correct.

11 Q I want you to tell me what evaluation that
12 you would propose as one that would satisfy your
13 concerns, particularly since we've agreed, for this
14 opinion, that we are going to eliminate ripping out
15 all of the reinforced concrete, tearing up the spent
16 fuel pool to get to the piping?

17 A If it had been me in charge and I had to
18 answer that question and document that, some
19 walkdown of, was there any history of spills or
20 anything that would have gotten into the concrete or
21 around where these pipes came through walls that
22 could have been an external contaminant, an

1 inspection of where it went into the pipe, into the
2 walls and out of, things like that, that would have
3 given me some basis for saying that there was not,
4 or no apparent indications of an external
5 contaminant source.

6 Or could have walked through areas where
7 there was signs that water was collecting as if some
8 kind of water from some unknown source was
9 collecting in the building that could have
10 contaminated the external surfaces. I would have
11 tried to eliminate those potentials and documented
12 that in some kind of evaluation.

13 Q Are you familiar with the second prong of
14 the 50.55a(3) which allows for an exemption to ASME
15 code requirements that you can make certain
16 demonstrations?

17 There's two tests, alternate tests. One
18 is you can demonstrate adequate quality and safety.
19 That's the test we've been talking about; is it not?

20 A Right.

21 Q But there's a second test, isn't there?
22 In fact, the board referred to it in its order.

1 A That's correct.

2 Q What's the second test; do you recall?

3 A I don't recall offhand because that wasn't
4 the one that's the subject of the application.

5 Q Isn't it true that, as an alternative to
6 demonstrating an accurate level of quality of
7 safety, you can also demonstrate that it would
8 result in hardship or unusual difficulty without a
9 compensating increase in the level of quality of
10 safety? Do you recall that as being the second
11 test?

12 A I recall words to that effect, yes.

13 Q Okay. Isn't it true that where we are
14 right now, that the second test is also not only
15 applicable but a lot easier to meet? To meet your
16 test that you've just established, assuming for the
17 moment that you could inspect a hundred percent of
18 the internal surfaces, the only thing that you would
19 have CP&L do is somehow inspect the exterior of the
20 piping which would certainly, if anything would fall
21 into hardship or unusual difficulty, that might be a
22 definition of it, and it would be pretty hard to

1 justify that you'd have some increase in quality and
2 safety for doing that, wouldn't it?

3 A No, because, again, if it was me, I would
4 have to weigh whether -- opine for that exemption or
5 that provision is indeed a hardship versus dry cast
6 storage which does not require me to do that.

7 So to say that it's impractical to inspect
8 that, I have alternatives available that might allow
9 me not to require that hardship.

10 So I don't know that, if I was making that
11 determination, I would indeed be forced into the
12 hardship one.

13 You know, you've presupposed that we've
14 ruled out dry cast storage, and I'm not sure that I
15 have enough information to do that. Or other
16 options -- I don't mean to limit it to dry cast
17 storage, but that was the one that came to mind.

18 Q Setting aside some alternative outside of
19 the plan, but here we have a system that CP&L
20 believes is a perfectly good system; in fact,
21 they've done a lot of inspections and a lot of work
22 and they've replaced anything that had any question.

1 They have redone welds, they have inspected outside
2 and inside, and now they are ready to commission the
-- 3 system.

4 The only thing that David Lochbaum would
5 have them do more would be inspect a hundred percent
6 of the interior of the piping and somehow inspect
7 the outside.

8 If the only way to inspect the outside
9 would require the removal of reinforced concrete,
10 wouldn't you agree that, for purposes of this
11 application, what we're looking at, that that
12 additional step would result in hardship or unusual
13 difficulty, and would not provide an increasing -- a
14 compensating increase in quality of safety?

15 A No, because you've misstated what I've
16 said twice here already today in that I did not at
17 any time state that the only way to satisfy me is by
18 an inspection of the exterior portions of the
19 piping. I said an analysis, an evaluation or an
20 inspection.

21 You're presupposing that an evaluation
22 would be a greater hardship than ripping out the

1 piping and all the stuff like that, and I'm not sure
2 that that's necessarily true, so I could not leap to
3 that conclusion.

4 Q What kind of evaluation could be done
5 without ripping out the reinforced concrete to get
6 to the exterior piping?

7 A I went through that once just a few
8 minutes ago. Do we want to repeat it now or do you
9 want a different answer?

10 Q No, I want to understand. I may have
11 missed something there.

12 A I said if it was up to me, I said I would
13 do an inspection, look for things that could be --

14 Q Okay.

15 A That one.

16 Q I understand what you're saying. It is
17 inspection of the outside of the spent fuel pool to
18 see if there was any --

19 A Well, it's the fuel handling building.
20 You know, the piping traverses -- not traverses, it
21 runs through the building.

22 Q Correct.

1 A So you'd look for things that could be a
2 source of or evidence of water collecting.

3 Q Let's assume that the company has already
4 been smart enough to do that, unbeknown to you
5 perhaps, but suppose that they, in fact -- in fact,
6 if you'll read this, it says they did walk down the
7 entire system, okay. Every pipe, every weld. Every
8 part of the system. Let's assume that they were
9 smart enough to look for exactly what you suggested.
10 They have lots and lots of engineers and they have a
11 lot of experience, okay.

12 So assume they did that. What else would
13 you have them do?

14 A Instead of?

15 Q No, anything else in addition, instead of
16 cutting out all of the reinforced concrete.

17 A You're asking me to theorize. I'd have to
18 look at that evaluation and ensure that that
19 satisfied the concerns.

20 It's possible they might -- I haven't seen
21 any evidence that that has been done, which doesn't
22 mean that they are not smart enough. I don't mean

1 to imply that. That isn't a logical derivation of
2 that.

3 But I'll stick with the original answer.
4 Complete inspection of the interior surface and some
5 evaluation, inspection or analysis of the exterior.

6 Q Notwithstanding the fact that you're not
7 an expert, are you of the opinion that the piping at
8 the spent fuel pool at Shearon Harris may have been
9 subjected to MIC corrosion?

10 A There was a potential because there was a
11 long period of time where there may have been
12 stagnant water and high humidity, the conditions
13 that could induce or the environment that we used
14 earlier that could have produced them.

15 Q Now, setting aside what could have
16 happened, in light of the visual inspection of which
17 you saw was a draft report --

18 A Right.

19 Q -- which didn't report any observation of
20 corrosion, and in light of the fact that all the
21 accessible piping which was subject to the same
22 water not only has not reported any corrosion, which

1 has been inspected both from the inside and the
2 outside, and no one noticed any water leaking on
3 their heads when they walked under it for ten years,
4 does that suggest to you that it has not been
5 subjected to MIC corrosion?

6 A No.

7 Q No?

8 A No.

9 Q What would it take to satisfy you that
10 there has been no MIC corrosion?

11 A Well, for at least the third time, a
12 complete visual inspection of the interior piping
13 surfaces, including the welds, and an evaluation and
14 analysis or inspection of the exterior piping
15 surfaces of the embedded portion.

16 Q If you inspected 75 percent of all the
17 piping and all the welds, that doesn't get you there
18 that the probability is extraordinarily low that
19 there would be MIC corrosion somewhere up in a pipe
20 high up into the spent fuel pool that's embedded as
21 opposed to lower in the system or anywhere else in
22 the system that was inspected?

1 A Inspecting 75 percent would give you
2 greater assurance -- assuming the results came back
3 that there was no indication, would give you greater
4 assurance, and give me too, that there was no MIC.

5 Q By the way --

6 A But MIC is not the only -- it is one of
7 the things that could cause piping deterioration.

8 Q What other things could cause piping
9 deterioration?

10 A Rust. Well, stainless steel is less
11 likely to be rust, but I'm not an expert, but I --

12 Q I understand, and certainly that comment
13 suggested it, but what else could cause --

14 A I caught it. I get some credit for
15 catching it.

16 Q All right. What else could cause
17 degradation in stainless steel piping other than
18 MIC, given the fact that there is no temperature,
19 right? There is no stress --

20 A There is no temperature?

21 Q There is no temperature -- there's a high
22 temperature.

1 A High temperature.

2 Q What else could cause it?

3 A There have been things, contaminants,
4 chemical contaminants that caused problems even
5 including stainless steel, that could have been
6 interior or external to the piping.

7 Q Did you review the results of the samples
8 of the water in the lines?

9 A I've reviewed one sample that you
10 distributed at the hearing. We've requested in
11 discovery some more that have been done, which -- I
12 hadn't reviewed all the documents that we requested.

13 Q Okay. Assuming that the sample of the
14 water, not whether or not it has microbiologics in
15 it, but the chemical analysis shows demineralized
16 water with low concentrations of chlorine, fluorine
17 and everything else, as would be in the spent fuel
18 pool. What else could cause degradation of that
19 piping?

20 A Well, first of all, at the July 1998
21 meeting --

22 Q Um-hum.

1 A -- the CP&L representatives, and I forget
2 which one said it, but stated that the water in the
3 spent fuel pools C and D wasn't real good quality.

4 So the test that you distributed, the
5 water chemistry test that you distributed at the
6 hearing was from a much more recent vintage after
7 the water in pools C and D had been cleaned up some.

8 So I'm not sure that that test --

9 Q But it was -- there was no clean-up of
10 water in the piping. The water in the piping had
11 sat there for ten years. They then sampled it. The
12 sampling you got was what it was and what it's
13 always been presumably because there has been no
14 clean-up, nowhere for it to go.

15 So I'm now talking about -- remember,
16 there is a plug at the intake and discharge of the
17 spent fuel pools to this system. So that the water
18 that's gotten in there has just leaked by a plug,
19 but there has not been any circulation whatsoever.

20 So having said that, do you understand
21 that to be true? Is that your understanding?

22 A The configuration?

1 Q Yes.

2 A No.

3 Q You don't know that there's been plugs
4 there or not?

5 A I don't know that.

6 Q Okay. Assume for a moment that I'm
7 correct and there's been plugs there for at least
8 ten years, and that the only water that's ever
9 gotten into the piping has leaked by the plugs and
10 it stayed there until it was finally drained this
11 year. And that water was sampled. So we now have a
12 chemical analysis and analysis of any of any
13 microbiologics.

14 Is there any concern that we didn't get a
15 representative sample of the water?

16 A Not under these assumptions, no.

17 Q Okay.

18 A However, I don't -- I'm not endorsing
19 those assumptions.

20 Q Okay, I understand. But Dr. Moccari can
21 certainly tell us that.

22 (Lochbaum Deposition

1 Exhibit Number 22 was
2 marked for identification.)

3 BY MR. O'NEILL:

4 Q I've asked the court reporter to mark as
5 Exhibit 22 a technical report authored by Dr. Ahmad,
6 A-H-M-A-D, Moccari, M-O-C-C-A-R-I, dated May 12,
7 1999. Two pages.

8 And I believe, Mr. Lochbaum, you have that
9 in front of you and you've indicated you've seen it
10 before. In fact, I gave a copy of it to you at the
11 prehearing conference; is that correct?

12 A That is correct.

13 Q Did you review this report?

14 A Yes, I have.

15 Q Are you familiar with the laboratory tests
16 that were run by Dr. Moccari and the results?

17 A I see the tests that were written. I'm
18 not --

19 Q You're not an expert in this area?

20 A Right.

21 Q Do you have any reason to take issue with
22 Dr. Moccari's results that there were no nuisance

1 bacteria present in the water in the spent fuel pool
2 cooling system lines?

3 A At the time of the tests, I have no reason
4 to doubt his results.

5 Q Secondly, Dr. Moccari reports on the
6 chemical analysis of the water without giving
7 specifications, but he notes that it was
8 demineralized water with measured very low
9 concentrations of chloride, fluoride and sulfate.

10 Now, do you have any reason to take issue
11 with his representation of the results of the
12 sampling that was done chemically of this water?

13 A Well, some of the documents we requested
14 in discovery indicated chemical results that may
15 contradict this. So --

16 Q Could you tell me what you think you saw
17 that may have convicted this.

18 A Well, there were some chemistry results
19 that appeared to be of the spent fuel pool water
20 chemistry that showed -- there was a whole series of
21 them. One of them would show chloride was high and
22 then iron might be high or sulfates.

1 So I need to look at that information in
2 light of this report.

3 Q Assume for the moment that there are plugs
4 on the lines and that the only water that got into
5 the lines was that which leaked past the plugs, so
6 there was no recirculation.

7 Isn't it true that the water that was
8 sampled is the water that we are concerned about
9 here, not which may have been in some pool, whether
10 it's pool C, D or B?

11 A Even with that assumption, the water that
12 leaks by those plugs is coming from the place that
13 may have been the test I'm referring to.

14 Q Right.

15 A So it's not completely different water.

16 Q I understand.

17 A It would have carried the sulfates and the
18 chlorides with it in the water.

19 Q But what actually got in was what is
20 measured in those lines?

21 A At this time, that is correct.

22 Q And if you assume that I'm correct that

1 the -- there has been no circulation of the water
2 for at least ten years, what you got is what you
3 got?

4 A Well, except that I was sworn in and you
5 were not sworn in, so I'm not going to buy into that
6 assumption.

7 Q I understand, but if you assume that, then
8 there's no way that the chemistry of the water can
9 be other than what was sampled at the time.

10 The chemicals doesn't disappear, right?

11 A I'm not going to buy into that one either
12 because I don't believe that to be true. Chemicals
13 do indeed disappear.

14 Q Okay. By the way, do you know where the
15 sample points were?

16 A For this test or for the ones I referred
17 to?

18 Q Both. No, for this test and for the
19 sampling of the chemistry of the water in the lines.

20 A No, I do not.

21 Q Okay.

22 (Discussion off the record.)

1 BY MR. O'NEILL:

2 Q Did you review the resume of Dr. Moccari?

3 A No, I did not.

4 MR. O'NEILL: Let me have marked as
5 Exhibit 23 a two-page document entitled Resume of
6 Ahmad Alexander Moccari.

7 (Lochbaum Deposition
8 Exhibit Number 23 was
9 marked for identification.)

10 BY MR. O'NEILL:

11 Q Take a moment, if you haven't looked at
12 this, to review Dr. Moccari's credentials in the
13 area of corrosion and materials and metallurgy.

14 A Okay.

15 Q Are you familiar with the Fontana
16 Corrosion Center at Ohio State University?

17 A No, I'm not.

18 Q Are you familiar with Dr. Fontana?

19 A No, I'm not.

20 Q Are you familiar with Dr. Roger Staley?

21 A No, I'm not.

22 Q I guess we've confirmed that you're not an

1 expert in corrosion.

2 A I'm not sure that that is the appropriate
3 standard whether I know those individuals or not. I
4 think there's a different standard applied --

5 Q Let me ask this question. Do you happen
6 to know what the premier corrosion research
7 laboratory in the nuclear field is that has been
8 used for, among others, the Department of Energy,
9 Westinghouse and other major vendors in the nuclear
10 area when they want to have very high-quality
11 research done relating to corrosion of materials
12 that are nuclear power plant components?

13 A No, but I would hazard a guess it's Dr.
14 Moccari.

15 Q No. I asked the research laboratory.

16 A Oh, then I don't. I'm not even going to
17 guess now.

18 Q Okay.

19 A But that's still not the standard for
20 whether I'm a corrosion expert or not.

21 Q No. By your own admission you're not.

22 A I didn't realize it was that easy, just to

1 know who that person, you become a corrosion expert.

2 Q You don't have any reason to doubt or to
3 cast aspersions on Dr. Moccari's qualifications as a
4 corrosion expert?

5 A No, I don't.

6 Q Even though you can't confirm any of the
7 people --

8 A If he knows all those people, he is a
9 corrosion expert. We have established that.

10 Q -- studied under him.

11 (Lochbaum Deposition
12 Exhibit Number 24 was
13 marked for identification.)

14 BY MR. O'NEILL:

15 Q I've asked the court reporter to mark as
16 Exhibit 24 a letter dated January 22, 1999, from Mr.
17 David A. Lochbaum, Union of Concerned Scientists, to
18 the then sitting commissioners of the NRC, subject:
19 Current examples of risk-deformed regulation.

20 What instigated this letter, Mr. Lochbaum?

21 By the way, did you write this letter?

22 A Yes, I did. I signed it too.

1 Q What instigated this letter?

2 A My review of the license amendment
3 application submitted by CP&L dated December 23rd,
4 1998.

5 Approximately two weeks earlier, I think
6 either on January -- approximately two weeks
7 earlier, I don't know the date -- I had addressed
8 the commission during a commission meeting or a
9 briefing on risk-informed regulation and what some
10 of the concerns that UCS had about the industry and
11 NRC moved towards risk-informed regulation.

12 And subsequent to that meeting I reviewed
13 the license amendment application and found what I
14 considered this date to be another example of
15 problems with the move towards risk-informed
16 regulation.

17 Q I believe we established earlier that you
18 are not an expert in probability and statistics.

19 A That is correct. I don't even know who is
20 the premier person to be called before the NRC or
21 whatever.

22 Q Do you still believe, after you've had

1 some time to reflect on this, that the probability
2 of a fuel handling accident at Harris or any other
3 plant would double if you were to increase the
4 amount of spent fuel stored on site by a factor or
5 two?

6 A Yeah, because you -- the probability of
7 any individual fuel handling accident during a
8 movement stays the same. If you do twice as many
9 movements, then the probability of a fuel handling
10 accident doubles. That's straight math.

11 Q That is one of the major mistakes that
12 people who haven't studied probability and
13 statistics make.

14 If you had a revolver with six chambers
15 and you played Russian Roulette six times, by that
16 logic, the probability of death is one by your
17 logic, and that's not true, is it?

18 A That is not true.

19 Q Okay.

20 A You'd probably die sooner than that.

21 Q Or you may never die.

22 A I'm not going to take those odds.

1 Q Did you receive a reply from the Nuclear
2 Regulatory Commission with respect to this letter?

3 A I believe I did.

4 Q What did they say?

5 A They said they were going to give this
6 careful consideration, or words to that effect,
7 during the license -- their review of the license
8 amendment application.

9 MR. O'NEILL: I'd ask the court reporter
10 to mark as Exhibit 25 a letter dated March 11, 1999,
11 from Dr. K.P. Singh, S-I-N-G-H, to the chair at that
12 time of the Nuclear Regulatory Commission, Dr.
13 Shirley Jackson, the subject of which was the
14 January 22, 1999, letter from David A. Lochbaum to
15 the commission.

16 (Lochbaum Deposition
17 Exhibit Number 25 was
18 marked for identification.)

19 BY MR. O'NEILL:

20 Q Have you reviewed Exhibit 25 before?

21 A I don't recall having seen this before,
22 no.

1 Q Why don't you take a moment to read it.

2 (Pause.)

3 MS. CURRAN: Is the relevance to this to
4 contention 3 going to become apparent?

5 THE WITNESS: Okay.

6 BY MR. O'NEILL:

7 Q Do you disagree with Dr. Singh's analysis
8 of the faults in your letter in any way?

9 MS. CURRAN: Objection to the relevance to
10 this question.

11 BY MR. O'NEILL:

12 Q You may answer the question.

13 A Yes.

14 Q Tell me where you think Dr. Singh is
15 incorrect in his analysis of your letter of January
16 22?

17 A On the second paragraph of the first page,
18 the last sentence says, "The probability function
19 does not change unless the variables attendant to
20 are altered."

21 I agree with that statement, but in my
22 letter I pointed out that the number the fuel

1 moments was going to increase, which would double
2 it.

3 In the next paragraph, Dr. Singh addresses
4 that and dismisses it as negligible, not based on
5 the point I made, but based on his observations of
6 fuel handling experience within the industry.

7 Then he goes on into the middle of the
8 next page and talks about "the following facts based
9 on over 9,000 plant-years of worldwide wet storage
10 experience."

11 He states that, "There has never been a
12 case of loss of shielding to the stored fuel in any
13 fuel pool anywhere."

14 And that is not true. The Haddam Neck
15 reactor cavity seal failure of 1982 or '83 caused
16 quite a bit of loss of shielding to the stored fuel
17 at the Haddam Neck plant.

18 Q But it was not covered, of course.

19 A He said loss of shielding. If he had said
20 no uncovering, I might not have argued it. What he
21 said is factually not correct.

22 Q If you lost one inch due to evaporation,

1 that would be loss of shielding by your definition,
2 I guess.

3 A I wouldn't have -- that is negligible, as
4 he pointed out in the first page, so it would not
5 have done it. There have been many, many, as
6 evidenced in the appendix to this book, loss of
7 shieldings of more than one inch. That's not -- in
8 fact, there's a 1997 document that the AEOD branch,
9 the group that was formally known as AEOD, within
10 RNC has put out on loss of spent fuel water, which
11 is shielding.

12 And they said, based on plant experience
13 over an 11-year period just in the United States,
14 that this happens on average once a year.

15 That's a little bit more than never.

16 Q But it's never been -- fuel has never been
17 uncovered?

18 A He didn't say that. I'm addressing the
19 point he said and not the point he may have wanted
20 to say or you may have wished him to say or anything
21 else.

22 Q I'm just getting your views as on his --

1 A Right. His second item states that,
2 "There has never been a nuclear criticality accident
3 in any pool anywhere."

4 There was in the, I believe, Vermont
5 Yankee back in the 1974 or '75 time frame, they had
6 an inadvertent criticality in the reactor cavity
7 pool.

8 So to say there has never been a nuclear
9 criticality accident is somewhat bold. There may
10 not have been many. It didn't lead to fuel
11 uncovery, that type of stuff.

12 "There has never been a significant
13 release of radioactivity to the environment due to
14 the malfunction of a fuel pool." That one --

15 Q I think you say that in your book.

16 A I would say that in my book, yes. So he
17 got two out of three correct -- or wrong, in my
18 estimation. So that would be criticism of his
19 critique.

20 In the last paragraph, despite my
21 disclaimer, "legal intervention in CP&L's project is
22 already reported to have ensued." At the time I

1 wrote that letter, I had not been contacted by
2 anybody about providing expert witness testimony.

3 So the statement I made is correct at the
4 time and remains correct.

5 MR. O'NEILL: Just give me one second, Mr.
6 Lochbaum.

7 THE WITNESS: Take two.

8 BY MR. O'NEILL:

9 Q Mr. Lochbaum, did you understand all the
10 questions that I asked you and you answered?

11 A I didn't understand them all because I
12 asked for corrections on some of them. So with the
13 exceptions of the ones that I asked for corrections
14 on, yes.

15 Q Did you answer every question truthfully?

16 A Again, with the -- there were four
17 questions that I had to provide clarifications on
18 later, so the original answers to those were
19 truthful at the time. I had to explain later
20 because of various reasons.

21 Q Would you like to change any of your
22 answers?

1 A No.

2 Q Thank you very much. I don't have any
3 further questions.

4 MS. UTTAL: I don't have any questions.

5 MR. O'NEILL: I think we're complete.

6 (Reading and signature not waived.)

7 (Whereupon, at 4:31 p.m., the deposition
8 was concluded.)

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CERTIFICATE OF DEPONENT

I, DAVID A. LOCHBAUM, do hereby certify that I have read the foregoing transcript of my deposition testimony and, with the exception of additions and corrections, if any, hereto, find it to be a true and accurate transcription thereof.

DATE

Sworn and subscribed to before me, this the _____ day of _____, 19____.

NOTARY PUBLIC IN AND FOR

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1 DISTRICT OF COLUMBIA, to wit:

2 I, Mario A. Rodriguez, before whom the
3 foregoing deposition was taken, do hereby certify
4 that the within-named witness personally appeared
5 before me at the time and place herein set out, and
6 after having been duly sworn by me, according to
7 law, was examined by counsel.

8 I further certify that the examination was
9 recorded stenographically by me and this transcript
10 is a true record of the proceedings.

11 I further certify that I am not of counsel
12 to any party, nor an employee of counsel, nor
13 related to any party, nor in any way interested in
14 the outcome of this action.

15 As witness my hand and notarial seal this
16 14 day of October, 1999.

17

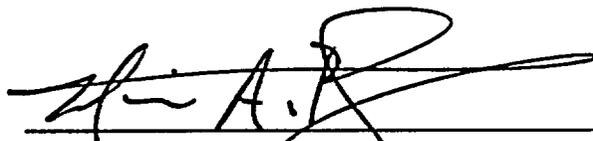
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MARIO A. RODRIGUEZ
Notary Public

MY COMMISSION EXPIRES: 5/31/2000

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CERTIFICATE OF DEPONENT

I, DAVID A. LOCHBAUM, do hereby certify that I have read the foregoing transcript of my deposition testimony and, with the exception of additions and corrections, if any, hereto, find it to be a true and accurate transcription thereof.

David A. Lochbaum

11-30-99

DATE

Sworn and subscribed to before me, this the _____ day of _____, 19____.

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E R R A T A S H E E T Page 1 of 2

Re: Carolina Power & Light Company, (Shearon Harris Nuclear Power Plant)

Case No.:

Date Taken: Thursday, October 14, 1999

Deposition of: DAVID A. LOCHBAUM

I hereby certify that I have read my deposition and that it is accurate, with the corrections listed below:

Page	Line	As Transcribed	Change To:
13	22	NC Warren	NC-WARN
20	3	NC Warren	NC-WARN
20	13	NC Warren	NC-WARN
27	19	EVAC	HYAC
22	2	state class IE	safety class IE
32	22	diesel generates	diesel generators
53	3	SLB	ASLB
53	4	SLB	ASLB
53	11	SLB	ASLB
53	17	SLB	ASLB
53	21	SLB	ASLB
54	12	SLB	ASLB
54	14	SLB	ASLB
61	21	SLB	ASLB
62	2	Yankee Row	Yankee Rowe
62	6	Yankee Row	Yankee Rowe
62	15	Yankee Row	Yankee Rowe
65	9	SLB	ASLB
126	14	IMPO	INPO
150	22	reactor material	radioactive material
165	18	end-stamped	N-stamped

11-30-99

Date

David A. Lochbaum

Signature of Deponent

NOTE: If there are no corrections, write "None" above. Use additional pages if necessary. Be sure you have dated the Errata Sheet.

NOTE: Page 152, line 22 through Page 154, line 14 is a duplicate (unnecessary) of Page 151, line 7 through Page 152, line 21.

ERRATA SHEET Page 2 of 2

Re: Carolina Power & Light Company, (Shearon Harris Nuclear Power Plant)

Case No.:

Date Taken: Thursday, October 14, 1999

Deposition of: DAVID A. LOCHBAUM

Page	Line	As Transcribed	Change To:
184	3	hydrostatic Kelly	hydrostatically
222	14	dry cast storage	dry cask storage
222	16	dry cast	dry cask



11-20-99