ORIGINAL

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY & LICENSING BOARD

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In The Matter Of: :

CAROLINA POWER & LIGHT COMPANY, :

(Shearon Harris Nuclear Power :

Plant) :

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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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APPEARANCES:

On behalf of Carolina Power & Light Company:

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On behalf of Nuclear Regulatory Commission:

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On Behalf of the Board of Orange County Commissioners:

DIANE CURRAN, ESQ.
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ALSO PRESENT:

JAMES A. DAVIS, Materials Engineer
KENNETH C. HECK, Operations Engineer
U.S. Nuclear Regulatory COmmission

C O N T E N T S

E X H I B I T S

P R O C E E D I N G S

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

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

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

(Pause.)

EXAMINATION

BY MR. O'NEILL:

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

A Yes, I have.

Q Indeed you have been deposed by me before.

A Yes, I have.

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

A No.

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

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

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

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

You understand that?

A Yes, I do.

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

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

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

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

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

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

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

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

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

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

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

A That's correct.

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

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

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

A Yes.

Q And what other information is there?

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

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

A No.

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

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

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

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

Q And how did you provide those comments?

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

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

A No, because I did not rely on them.

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

A Chatham County.

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

A It was well before the application, yes.

Q And do you have a copy of those comments

in your files?

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

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

A No.

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

A No, not at all.

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

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

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

recall which -- who contacted me.

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

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

A January or February. I don't recall.

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

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

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

first.

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

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

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

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

(Lochbaum Deposition

Exhibit Number 1 was marked for identification.)

BY MR. O'NEILL:

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

A Yes, I have.

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

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

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

A I recall that there was, yes.

Q At the time you addressed this letter to

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

A That is correct.

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

A That's correct.

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

A Yes, there was.

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

A No, I did not.

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

A Yes, there was.

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

Carolina Power & Light in July of 1998?

A Not at that time, no.

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

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

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

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

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

A Between that and filing the contention?

Q Correct.

A After Diane Curran had me prepare a

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

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

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

Q So you're independent?

A Very independent, yes.

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

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

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

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

A UCS is paying my salary and expenses.

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

A I don't know.

Q Do they contribute financially to your organization?

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

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

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

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

A That's correct.

Q Okay. And obviously Ms. Uttal is not your

counsel either?

A That's correct.

Q So you're here counsel-less?

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

Q That's fine.

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

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

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

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

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

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

BY MR. O'NEILL:

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

Mr. Lochbaum, is this your resume?

A Yes, it is.

Q Did you prepare it?

A Yes, I did.

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

A I don't know.

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

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

Q Okay. But you did prepare this?

A Yes, I did.

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

David Lochbaum in another proceeding taken in Indiana.

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

BY MR. O'NEILL:

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

A Yes.

Q Is that your signature?

A Yes, it is.

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

A That's correct.

Q And you reviewed the transcript before you signed it?

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

agreement.

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

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

Q Okay.

A So with that caveat or explanation, yes.

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

A Yes, I did.

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

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

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

A I suspected that.

Q -- to have that already in the record.

Since February of 1999, have you been promoted at UCS?

A No.

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

A No, I'm not.

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

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

Do you see that?

A Yes, I do.

Q What is the spent fuel pit cooling system?

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

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

most pressurized water reactors?

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

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

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

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

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

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

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

they called it there?

A That's correct.

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

A The ultimate was the Delaware Bay.

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

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

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

A There are differences, yes.

Q What are the differences?

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

procedures are structured and set up.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A I don't know.

Q You don't know?

A I don't know.

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

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

Q Okay.

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

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

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

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

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

BY MR. O'NEILL:

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

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

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

A No, I'm not aware.

Q Are you aware that it was videotaped?

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

Q You can take my word that it was videotaped.

A I trust you then.

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

A I believe I did make that statement, yes.

Q And on what do you base that statement?

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

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

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

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

A I'm sorry. Could you --

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

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

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

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

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

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

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

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

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

Q Right.

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

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

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

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

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

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

A In addition to the previous answer?

Q Correct.

A Nothing in addition to the previous

answer.

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

A Yes, I have.

Q And what plant was that?

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

Q And that's a boiling water reactor?

A Yes, it is.

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

A Yes, it is.

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

A That's correct.

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

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

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

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

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

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

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

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

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

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

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

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

A Yes, I have.

Q And what plant was that?

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

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

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

A It was on the operations side.

Q As a start-up engineer?

A As a start-up engineer, yes.

Q Have you had any experience as a construction engineer?

A No, I have not.

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

A No, I have not.

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

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

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

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

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

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

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

So I wrote the procedures for the

independent safety and engineering group to perform that audit function.

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

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

Q Do you know what NDE stands for?

A Yes, I do.

Q What is it?

A Non-destructive examination.

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

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

Q Have you ever qualified as an NDE examiner?

A No, I have not.

Q Have you been responsible for NDE

examiners at any nuclear plant?

A No, I have not.

Q Have you ever welded materials together?

A No, I have not.

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

A That's correct.

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

A No, I have not.

Q Have you serviced on any ASME code committees?

A No, I have not.

Q Are you an expert in material science?

A No.

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

A No, I'm not.

Q Are you an expert in stress analysis?

A No, I'm not.

Q Are you an expert in failure analysis?

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

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

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

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

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

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

A No, I'm not.

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

A No.

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

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

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

A I don't know.

Q Any idea?

A No.

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

A I don't know.

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

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

Q What kind of stainless steel?

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

Q Are there more than one kind of stainless steel?

A Yes, there are.

Q Do they have different properties?

A Yes, they do.

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

A Yes, they do.

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

A I don't know.

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

A I don't know.

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

A No.

Q Total welds?

A No, I'm not.

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

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

Q What was the range?

A Between zero and a hundred.

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

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

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

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

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

point of suction discharge in feet?

A I don't know.

Q How deep were the spent fuel pools at Harris?

A I don't know.

Q Approximately?

A Approximately 45 feet.

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

A The pump suction?

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

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

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

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

A That's correct.

Q So it's open to atmosphere?

A That's correct.

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

A That's correct.

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

A That's correct.

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

A Approximately 45.

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

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

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

A That is not correct.

Q That is not correct?

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

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

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

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

BY MR. O'NEILL:

Q Well, let me reformulate the question.

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

A So you don't inadvertently drain the pool.

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

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

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

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

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

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

Q Okay.

(Discussion off the record.)

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

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

BY MR. O'NEILL:

Q Did you write this, Mr. Lochbaum?

A No, I did not.

Q Who wrote it?

A Anita in our Cambridge office.

Q Did you review it?

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

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

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

And the last sentence or last paragraph

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

Q Where is this document from?

A You handed it to me.

Q I understand, but where did it come from?

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

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

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

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

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

A Supposed to be, yes.

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

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

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

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

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

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

A Yeah.

Q -- at this plant with NRC complacency?

A Yes, I do.

Q And what is it?

A One of the contentions we raised had to do

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

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

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

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

Q So you think asking questions is complacent?

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

believe to be an issue is in that complacent arena.

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

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

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

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

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

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

that's that serious.

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

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

Q You weren't?

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

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

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

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

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

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

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

A That is correct.

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

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

A I do remember that statement, yes.

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

say or is that what you really believe?

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

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

A That's my understanding, yes.

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

A No, I'm not aware of that.

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

A No, not that I recall.

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

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

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

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

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

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

MR. O'NEILL: Your objection is noted.

BY MR. O'NEILL:

Q You may answer the question.

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

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

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

A That's correct.

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

A Yes, it was.

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

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

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

relate to spent fuel pools, criticality, cooling systems?

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

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

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

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

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

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

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

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

A No, I really haven't.

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

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

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

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

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

Q And what was that?

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

Q When was that?

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

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

A That's what it suggests, yes.

Q What about Seabrook, when was that?

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

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

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

Q The one you have listed here?

A Was also Citizens' Awareness Network.

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

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

Q But you did provide a declaration?

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

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

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

Q But you're not sure?

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

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

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

A That's correct.

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

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

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

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

months to 24 months.

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

Q What happened?

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

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

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

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

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

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

Q It was a technical specification change then?

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

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

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

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

A Which facts?

Q What facts can you attest to?

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

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

A That is correct.

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

A Yes.

Q -- relating to this proceeding?

A That's correct.

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

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

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

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

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

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

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

to contention TC3."

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

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

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

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

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

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

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

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

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

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

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

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

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

MR. O'NEILL: Off the record.

(Discussion off the record.)

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

MR. O'NEILL: Sure.

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

BY MR. O'NEILL:

Q Yes.

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

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

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

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

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

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

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

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

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

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

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

Q And as I understand it, in connection with

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

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

Q Okay.

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

Q Okay.

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

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

BY MR. O'NEILL:

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

A I've seen the contention written before,

yes.

Q Did you draft this contention?

A No, I did not draft this contention.

Q Did you assist in the drafting of the contention?

A I assisted in the drafting of the contention.

Q Do you believe in this contention?

A I do believe in this contention, yes.

Q Let's look at it.

A Okay.

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

A (Witness complies.) Okay.

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

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

paragraph of the contention?

Q The first paragraph of the contention.

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

(Pause.)

(The record was read as requested.)

BY MR. O'NEILL:

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

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

A That's correct.

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

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

A That is correct.

Q Okay.

A Among others. That is not the only --

Q I understand. One at a time.

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

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

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

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

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

Q Yes.

A "Fails to satisfy the requirements of 10

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

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

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

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

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

A That is correct.

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

A That is its purpose.

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

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

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

Is that not what the contention says?

A That's what the contention says.

Q Is that what you mean?

A Yes.

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

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

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

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

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

A You're talking about the ASME code requirement?

Q Correct.

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

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

A The purpose of the code is to ensure, or

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

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

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

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

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

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

A That's correct.

Q Because the 50.55a plan only goes to what

is an exception to the code requirements.

A That's correct.

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

A That's correct.

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

A That is correct.

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

A Would you read that again?

(The record was read as requested.)

THE WITNESS: In this case it does, yes. I think it's been used in other applications elsewhere.

BY MR. O'NEILL:

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

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

A I don't believe so, no.

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

A That's correct.

Q Why doesn't it address the heat exchangers?

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

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

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

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

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

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

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

Q Do you happen to know how the heat

exchangers were stored?

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

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

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

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

A The pumps can be similarly inspected, yes.

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

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

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

A Would you --

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

A Yes, it could.

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

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

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

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

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

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

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

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

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

A No, it does not.

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

A That is correct.

Q The only thing that this contention

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

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

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

A That's correct.

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

A I understand that.

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

A Yes, I did.

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

That's your bullet.

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

Q And when you discussed this bullet --

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

Q I certainly would not want to be politically incorrect.

A I appreciate that very much.

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

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

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

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

A I believe that. I don't --

Q And that's your position?

A That's my position, yes.

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

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

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

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

'80s when the system was originally constructed.

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

A Thank you very much.

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

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

A No.

Q Explain what you meant.

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

So to look at that letter and the letters immediately after that and say, that's all my concerns on the Harris spent fuel pool is inappropriate, just as looking at that document where, in a very short presentation you're trying to highlight the problems with a proposal, that cannot be -- should not be, I guess it was, but it should not be interpreted to be the broad and comprehensive concerns with the proposal.

MR. O'NEILL: I ask the court reporter to mark as Exhibit 7 the Declaration of David A. Lochbaum, Nuclear Safety Engineer, Union of Concerned Scientists, Concerning Technical Issues and Safety Matters Involved in the Harris Nuclear Plant License Amendment for Spent Fuel Storage.

(Lochbaum Deposition Exhibit Number 7 was marked for identification.)

BY MR. O'NEILL:

Q Do you have in front of you what has been marked as Exhibit 7?

A Yes, I do.

Q Did you prepare this declaration?

A Yes, I did.

Q Turn to paragraph 14 on page 7.

A Okay.

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

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

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

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

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

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

met all the requirements of 10 CFR 50.

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

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

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

A Within that scope?

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

And I think that's where some of the

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

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

BY MR. O'NEILL:

Q Are you confused, Mr. Lochbaum?

A Not on that point.

Q Thank you.

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

A I thought you were getting ready to say something.

Q No.

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

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

Had the system been turned over for

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

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

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

Q I want you specify here today specifically

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

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

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

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

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

Q Yes.

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

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

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

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

Q The entire system was not turned over.

A Right.

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

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

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

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

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

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

A I don't recall every single document request.

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

A No, I did not.

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

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

Q Okay. Did you ask for any of it?

A We asked for some of those documents, yes.

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

reviewed them?

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

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

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

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

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

A Okay.

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

A No.

Q -- or opinion that you have?

A No.

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

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

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

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

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

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

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

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

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

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

A I know that some were done.

Q Are you aware of the results?

A I saw some of the results, yes.

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

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

raised a concern.

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

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

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

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

I'm saying that, looking at one section of

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

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

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

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

A Did the volume.

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

A We went through that once before, I remember.

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

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

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

Tell me any reason why that could happen.

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

Q Um-hum.

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

Q So if you inspect all the welds or inspect

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

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

Q Give me any more examples.

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

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

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

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

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

What's the basis of that statement?

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

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

Q It certainly is different --

A It is different.

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

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

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

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

which it was designed?

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

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

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

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

A I could not cite them to you.

Q Is any internal inspection actually required?

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

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

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

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

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

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

Q Okay.

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

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

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

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

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

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

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

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

Q Did you review it?

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

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

Would that satisfy that concern that you just hypothesized?

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

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

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

Q If you have this entire inspection of all

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

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

Q Okay. Did you review the videotapes?

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

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

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

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

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

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

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

A Hypothetically, that's correct.

Q Okay.

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

Q I understand.

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

MR. O'NEILL: Off the record.

(Discussion off the record.)

BY MR. O'NEILL:

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

A That's correct.

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

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

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

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

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

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

BY MR. O'NEILL:

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

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

relied upon this information notice.

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

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

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

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

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

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

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

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

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

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

that way.

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

A No, I do not.

Q Do you know the source of the water?

A No, I do not.

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

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

Q And what was the evidence of that pitting?

A The documentation was this information notice.

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

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

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

Q What was the mechanism that caused the pitting?

A According to this information notice, it was MIC.

Q During what period of time did the MIC occur?

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

Q In a period less than a year?

A A period of less than a year.

Q Relatively rapid?

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

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

A Yes.

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

A This information notice does not exclude that.

Q Does it include it?

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

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

Is demineralized treated water fairly included in that list?

A I would not include it, no.

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

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

Q You believe that, too?

A Yes, I do.

Q Okay.

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

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

BY MR. O'NEILL:

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

A Yes, I have.

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

A Yes.

Q Tell me how you've relied on this

document.

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

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

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

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

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

Q Did they know what kind of water it was?

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

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

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

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

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

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

A Nine Mile Point, unit 2.

Q Nine Mile Point.

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

A I strongly suspect it, yes.

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

A That's correct.

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

BY MR. O'NEILL:

Q I've asked the court reporter to mark as Exhibit 10 an NRC Information Notice, 94-38. Results of a Special NRC Inspection at Dresden Nuclear Power Station Unit 1 Following a Rupture of Service Water Inside Containment.

Mr. Lochbaum, have you had a chance to look at Exhibit 10?

A Yes, I have.

Q Is this one of the documents that you referenced in your declaration, which is Exhibit 7, and which you stated you relied in forming your opinions in that declaration?

A That's correct, it is.

Q Would you tell me how you relied on this document and a problem at Dresden 1 in giving opinions about Shearon Harris spent fuel pool cooling system piping.

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

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

A That is the cause, yes.

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

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

In addition --

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

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

the same document.

Q Um-hum.

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

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

A Yes, it is.

Q And what kind of water was in there?

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

Q And what did that result in?

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

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

A Yes, I do.

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

A Yes, it was. Still is.

Q It was shut down in 1983?

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

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

A That's correct.

Q What does this have to do with Shearon Harris?

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

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

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

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

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

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

A No, I do not.

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

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

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

A Over that time period, which was not --

Q Whatever time period you have any information on.

A It was within the last couple of years.

Q Um-hum.

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

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

A What statistics are you referring to?

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

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

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

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

A No, we have not.

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

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

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

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

Q Okay.

A So it was neither good, bad or ugly.

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

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

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

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

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

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

A That's my understanding, yes.

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

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

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

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

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

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

A No.

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

BY MR. O'NEILL:

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

Do you have that document, Mr. Lochbaum?

A Yes, I do.

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

declaration?

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

Q What was the severity level of that violation?

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

Q Do you want to look at that again?

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

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

A Yes.

Q Is the violation you're referring to B?

A Yes.

Q What does that say with respect to severity level?

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

just --

Q Roman numeral VI, V-I, right?

A Yes. Severity level VI.

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

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

Q Right because they are so trivial?

A And IV's are very rare, too.

Q Right. Okay.

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

Does that suggest this was a very significant item?

A No, it does not suggest that.

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

A Yes, it is.

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

A That's correct.

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

A That is correct.

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

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

Q Was this a problem?

A It is representative of a problem, yes.

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

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

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

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

Q Correct.

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

So I have to disagree.

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

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

Q Okay. So we have your first inspection

report that has this one little minor violation.

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

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

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

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

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

BY MR. O'NEILL:

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

A Yes, I have.

Q Did you rely on this document in forming

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

A Yes, I did.

Q How did you rely on this document?

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

Q What was the violation here?

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

Q What activity was this relating to?

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

Q What kind of weld?

A Cadweld.

Q Is a Cadweld different than a piping weld?

A Yes, it is.

Q What was the problem?

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

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

Q That was it?

A That was the violation, yes.

Q What was that violation categorized as?

A Category VI, severity level VI.

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

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

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

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

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

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

A No, it did not.

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

A Yes, that's what it says.

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

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

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

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

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

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

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

AFTERNOON SESSION

(1:57 p.m.)

THE WITNESS: I do have two additional clarifications I'd like to make.

MR. O'NEILL: It seems after lunch you always have these clarifications.

THE WITNESS: I had two before lunch. It's on balance.

The clarifications are on the issue of how I relied on the document prepared by Gordon Thompson.

When I answered that question this morning that I did not rely upon it for contention 3, I was thinking in terms of quality assurance, alternative plan adequacy or inadequacy, that realm.

I did rely on Gordon Thompson's declaration for the last statement in my declaration as far as the seriousness and the severity of the consequences, in part. It wasn't totally based on his report, but it was in part to rely on the information in his report.

The second clarification I need to make

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

BY MR. O'NEILL:

Q Okay. I appreciate that.

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

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

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

There were also, from the book and some other research I had, that this system has a safety function, and if that safety function is challenged in any way, it is serious.

So it wasn't entirely upon his report, but it was in part based on his report.

Q We'll get back to that issue, but I want to finish up on the documents on which you have relied.

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

MR. O'NEILL: I've asked the court reporter to mark as Exhibit 13 an NRC inspection report with a cover letter dated August 13, 1981; two-page letter from R.C. Lewis to J.A. Jones with a two-page attachment notice -- appendix A, notice of violation, and a ten-page results of the inspection.

BY MR. O'NEILL:

Q Do you have Exhibit 13 in front of you, Mr. Lochbaum?

A Yes, I do.

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

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

Q What was the violation that you focused on?

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

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

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

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

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

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

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

A Yes, it does.

Q Beginning on page 3.

A Yes, it does.

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

A Yes, it does.

Q And with respect to those sections, there were no violations or deviations, except for 6(a)(1) which is nonwelding activities; is that not correct?

A Paragraph 8, page 7 states that, "Within the areas examined, no violations or deviations were identified except as noted in paragraph 8c."

Q I think you've gotten ahead of me. I was just focusing first on the welding which is

described in paragraph 6.

A I thought your question was in the inspection report.

Q No, I just focused now on the welding activities.

My earlier question was, with respect to the observation of welding activities, the visual inspection of welds and welder qualifications, as you can see on the bottom of page 4, within those areas there were no violations or deviations.

A What is your question again, please?

Q I'll break it up.

Is it not true that this inspection included observations of welding activities, visual inspections of welds and welder qualifications?

A Yes, that is true.

Q Within those areas enumerated in the last question, is it not true that there were no violations or deviations identified?

A What were the three areas in your previous -- these questions are way too long and I'm having trouble following what it is you're asking me.

So can we do this a little bit simpler for me?

Q Absolutely.

A Thank you.

Q Is it true that the inspectors observed welding activities?

A Yes, that is true.

Q Did they find any violations or deviations in inspecting welder activities?

A They didn't -- they did not have any violations or deviations in that area, that's correct.

Q The same for visual inspection of welds, they have reviewed it, no violations or deviations; is that not correct?

A That is correct, with the qualification that there was an unresolved item. But there were no violations or deviations.

Q Same question with respect to welder qualifications.

A There were no violations or deviations identified.

MS. CURRAN: Mr. O'Neill, we would be willing to stipulate that these documents say what they say.

MR. O'NEILL: Thank you.

BY MR. O'NEILL:

Q How does this inspection report which you cited in your declaration and which you brought here today, at least an incomplete version of it, support your position in any way whatsoever?

A It supports it in that we contend that the spent fuel pool cooling system on unit 2 was not -- no evidence was provided showing that it was properly laid up and maintained during the period between construction being terminated or deferred and the decision to put the system in service at this time.

Q Isn't it true, Mr. Lochbaum, that the company has stipulated that they did not in any way in their quality program lay up and maintain the spent fuel pool cooling system for unit 2 between the period 1983 and 1999?

A I don't know if they stipulated that or

not.

Q That was the predicate for the 50.55a request in the first place.

A I thought we discussed this morning that that was because the welding records were thrown away, not because they didn't do any layup.

Q That was also part of it is that they had not -- if you read the application, the first thing it says is that was abandoned in place. No lay up. No quality control.

A I don't recall the no quality -- well, the abandoned in place implies it, that's correct.

Q Okay. Let's go through the last document that you cite in support of your declaration.

I've asked the court reporter to mark as Exhibit 14 an inspection report dated September 14, 1981, a cover letter of two pages from R.C. Lewis to J.A. Jones at CP&L, one page notice of violation, and an inspection report consisting of ten pages.

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

BY MR. O'NEILL:

Q Do you have Exhibit 14 in front of you, Mr. Lochbaum?

A Yes, I do.

Q How is it that you view this document, Exhibit 14 supports the opinions set forth in your declaration of Exhibit 7?

A On page 7 of my declaration, which is Exhibit 7, paragraph 13, I explained that this inspection report involves a failure to follow procedure for inspection of the fuel pool liner welding.

Q What was the severity level of this violation?

A This was a severity level V violation.

Q What was the resolution of this issue?

A I don't know that we know the resolution of this issue because the notice of violation required a response and we don't have that response in front of us.

Q Setting aside the paperwork violation, did the inspector also inspect the welds during this

inspection?

A Yes, according to page 8 of Exhibit 14.

Q And including the welding activities, the welder qualification?

A That is correct.

Q And other than the procedural issue that you've identified, there was no other violations or deviations identified by the NRC inspectors, were there?

A Well, as page 8 points out, the visual examinations that were done by the NRC inspector were prior to the welds being final inspected by quality control.

So it wasn't -- there were no violations or deviations cited, but the work hadn't been done on the liner. There was still some work left.

Q And there's no issue that you're raising in this proceeding with respect to the liner welds in spent fuel pools A, B, C or D, is there?

A That is correct.

Q Okay. Now, if you turn back to Exhibit 7, you say, having reviewed the documents that we've

just gone over, "it's my professional opinion" -- yours, I'm reading from paragraph 8 -- "that CP&L's proposed use of an alternative plan per 10 CFR 50.55a to demonstrate that the unit 2 fuel pool cooling system was 'designed, fabricated, erected, constructed and inspected to quality standards commensurate with the importance of the safety function to be performed' raises significant safety concerns for persons living near the facility."

I want you to detail in as much detail as you can what you mean by that.

What are the significant, emphasizing significant, safety concerns for persons living near the facility that you believe that the information referred to in paragraph 7 raises?

A That statement was based on my judgment that this system provides a safety function. The alternative plan lessens the ability and reliability of that system to perform that safety function.

If that safety function is not performed or is performed at a degraded manner, then it increases the potential for reactor material to be

released to the environment or to the atmosphere, and thereby challenging or jeopardizing the health of people living around the facility.

Q What would it take for radioactive material to be released to the environment?

A It would take fuel damage.

Q How would you get fuel damage in a spent fuel pool -- in spent fuel pool C or D which, pursuant to this license amendment request, will contain a maximum of 1 MBtu of used fuel that has been cooled five years or more? How will that happen?

A You can either have a criticality concern or you can have an overheating problem.

Q Okay. With respect to contention 3, we don't have a criticality concern.

A That's correct.

Q So let's look at contention 3.

How could you get an overheating problem?

A If your fuel pool cooling stops working properly, then even 1 million Btus per hour could cause overheating and damage.

Q All right. Isn't it true that there is a redundant system to the spent fuel pool cooling system, the unit 2 system which would cool pools C and D?

A There is a redundant system, yes.

Q Okay. And in fact, for there to be any radioactivity released, you would somehow have to uncover the fuel, right?

A No, it's not.

Q How would you have radioactivity released from the fuel if is not uncovered and still sitting in pool water?

A For contention 3 -- let me think about this.

Q You're an expert only on contention 3 you may recall?

A Yeah, but your questions are broader than that sometimes. I just want to make sure I'm answering them fully.

You're correct. Without, uncovering you're not going to have fuel damage.

Q How would you get fuel damage in a spent

uncover the fuel, right?

A No, it's not.

Q How would you have radioactivity released from the fuel if it is not uncovered and still sitting in pool water?

A For contention 3 -- let me think about this.

Q You're an expert only on contention 3 you may recall?

A Yeah, but your questions are broader than that sometimes. I just want to make sure I'm answering them fully.

You're correct. Without uncovering you're not going to have fuel damage.

Q Let's assume that one of the welds, all of the welds even, that are embedded in concrete have some flaw, have a crack, have a pinhole corrosion, and notwithstanding all of the control quality in which they were installed, welded, inspected, or your concerns have been validated that there is some microbiologically-induced corrosion and we've got some pinholes in there, how does that result in

significant safety concerns for persons living near the facility?

Tell me how that happens. Show me the path from which you get from that concern to radioactivity released into the environment.

A The path is, again, is that if the system stops working properly, the spent fuel pool can overheat, can boil. The boil-down can cause fuel to be uncovered, can cause fuel damage, can cause releases to the atmosphere, can cause harm to the people living around the plant.

Q And how can your pinholes in a couple of welds encased in concrete result in a loss of water to the pool? How does that happen?

A They are not my pinholes, sir. I've said that the quality of the welds and the piping is suspect. You have postulated that there will be only pinholes.

Q You postulate whatever defect you want in the welds and tell me how that results in the spent fuel becoming uncovered.

A The piping is supposed to be designed for

seismic qualifications. If the piping integrity is degraded, or welds, piping or welds is degraded due to any reason, the ability of that piping and welds to withstand an event such as a seismic event is challenged. If the plant has a seismic event and the piping is broken, then the system may not work.

If the system does not work, the water in the fuel pool can heat up and boil, can uncover, can be fuel damage, can cause harm to the people living around the plant.

Q Are you a seismic design engineer, Mr. Lochbaum?

A No, I am not.

Q Are you an expert in seismic design?

A No, I am not.

Q Isn't it true, notwithstanding the fact you're not an expert but because of your general familiarity with nuclear power plants, that the spent fuel pools themselves are designed to withstand seismic events?

A That is true.

Q Isn't it true that the reinforced concrete

of which the spent fuels are constructed are designed to withstand a seismic event?

A That is true.

Q Isn't it true that if that, in fact, is correct that there's no way in the world that the embedded piping in that concrete can be adversely affected by a seismic event?

A As you astutely pointed out, I'm not a seismic design engineer, so I'm not qualified to answer that question.

Q Then why did you postulate an event which can't possibly happen?

A I didn't say it couldn't happen. If you recall, I said I can't address that question. So I did not say it could not happen, sir.

Q I want you to try again, tell me in your professional opinion in an area in which you have some qualifications how the postulated defects, any one you want to postulate, in that piping that's embedded in concrete can result in uncovering the spent fuel in that pool and raise a significant safety concern to persons living near the facility.

A If the piping or the welds fail for any reason, then the system may not function.

If the system does not function, the water in the spent fuel cooling will heat up, can reach boiling, cause uncovering of fuel in the pool, fuel damage, release of radioactivity and cause harm to people living around the plant.

Q How can the piping result in the system not functioning such that the pool loses water and the spent fuel is uncovered? You have to tell me how you get there.

A I'm saying the piping can fail.

Q How?

A Any number of ways. It's -- you can have through-wall cracking. You can have --

Q Where is the water going to go?

A Through the crack.

Q Where to?

A To the outside the pipe.

Q How is it going to get outside of the pipe if it's encased in reinforced concrete?

A Concrete is relatively porous. Water can

get through.

Q Isn't -- the Dresden pool doesn't even have a spent fuel liner because the concrete itself holds the water?

A That is absolutely true, and it was designed to withstand water.

The piping that we're talking about was not designed the same way because the piping is supposed to retain the waters.

Q How do you know?

A That general knowledge you referred to earlier.

Q You know that this concrete is such that, if there was a leak, that the water is going to leak through two-and-a-half, three, four feet of concrete; is that your testimony?

A No, I'm not testimony --

Q The how does the water get out of the pool?

A Through the crack in the piping.

Q Through the concrete?

A No, no. Excuse me. The pipe -- the water

does not get out of the pool through the pipe in the concrete because eventually the water will drain down to where the suction and discharge of the suction stops.

So the water doesn't get out of the pool through the pipe. That's not what I was testifying to or stating.

I'm stating that the cracking could cause the pipe or the system to stop running.

Q How?

A If the crack is large enough that allows water to flow through the system, you can get run-out on the pumps and the pumps won't work anymore.

Q How can the crack get large enough if it's embedded in concrete?

A That's one of the reasons -- if what you're saying is true, then why worry about the quality assurance at all? Why not just -- the piping is there, who cares?

Q Because there is a lot of redundancy. But my question to you is not why the company spent a

lot of money on a system that could just as well have worked without pipe, but why you, as an expert, are testifying and telling the people of Orange County and the surrounding counties that there is a significant safety concern because of the welds and because of this piping.

A Because I believe that to be true, sir.

Q And you haven't yet told me how the water could ever get out of the pipe.

A I have told you.

Q How?

A Your judgment is that you don't believe me. That's a little different than saying that the water can get out through the pipe and through the concrete. You chose not to believe that and I can't do much about that.

Q Is it your testimony that the water can go through two or three or four feet of concrete if there was a leak in the pipe?

A My testimony is that the water can get through the pipe. Whether it drains back on the outside of the pipe because there is a gap and it

drains back inside the building or it goes through the porosity of the concrete or a combination of those two, I don't know. All I know is that if the water leak rate through the pipe is sufficient, the system will stop working. The water in the spent fuel pool will heat up and so on.

Q Have you calculated how large a defect would be required in order to in any way exceed the capability of the pump to pump water into that pool?

A No, I have not.

Q Do you have any guess as to how big a hole or a defect it would have to be?

A I'd prefer not to guess, sir.

Q Do you have an estimate?

A I have no estimate. That's a different word for guess in this case.

Q Okay. So let me ask this: Do you have any other scenarios other than the ones you've just testified to as to how you could get to a point where there is a significant safety concern for persons living near the facility relating to the piping and the welds in the spent fuel pool in C and

D?

A No, I think that's a serious enough threat.

Q On page 4 of your declaration, (d), 9(d), you state, "The alternate plant and the license amendment application do not describe any program for proper storage and preservation of materials and components as required by appendix B to 10 CFR Part 50. Nor do they describe any effort to determine if the installed piping and equipment experienced any deterioration over the many years of non-use since the piping and equipment were installed."

Is your testimony that nowhere has the applicant described what they are going to do to inspect and to determine whether or not there has been any deterioration of the piping? Is that your testimony?

A My testimony was the alternative plan and the license amendment application do not describe that. They might be in another document somewhere. I didn't address documents outside of the documents cited.

Q Did the license amendment request refer to other documents which describe how the applicant planned to inspect the piping to determine whether there was deterioration, or do you remember?

A It's been a while. I don't recall. It referred to a commissioning plan. I can't remember if the commissioning plan --

Q Have you reviewed the commissioning plan?

A Yes, I have.

Q Okay. We'll get to that.

On page 7, paragraph 14, second sentence, you say that "The NRC inspection reports cited in paragraphs 11 and 13 suggest that these quality standards may not have been met in December 1983."

We've gone over each of these inspection reports. Is there anything else on which you relied in stating that there is a suggestion that quality standards may not have been met by the spent fuel pool cooling system piping in 1983?

A No, and I need to make -- point out one problem. My paragraph numbering was suspect here. I've got two paragraphs 11s and two paragraphs 12s

it looks like.

Q Yes. I assume that that was the paragraphs previous as opposed to the --

A It was the first sets of 11 and 12, yes.

Q Right. Setting that aside --

A No. To answer the question, I did not rely on anything else.

Q So you relied on those four documents and that's it?

A Those four documents and the license application.

Q The license application? Where in the license application do you infer that quality standards may not have been met in the construction of the spent fuel pool piping?

A In looking where the plant was when the construction was terminated, the system had not been turned over for operation, hadn't been end-stamped and all that.

Had that been done, then the issue really would have been one of paperwork, not of quality, because you have to -- that would have been a higher

level of assurance, that all the items were closed out and so on.

So the application which indicated where the plant was at the time when construction was stopped and these inspection reports combined led to this conclusion.

Q Turn to page 8 where you opine and state here "that the risk to the general public could be increased by the proposed activity and that the risk and potential are foreseeable, not highly speculative, and potentially significant."

Other than what you've just discussed in the last few minutes about your postulated break of the piping and the weld and leaking through concrete somehow or around the pipe inside the concrete to the extent the pump couldn't pump water into the pool any longer, do you have any other basis in which you are of the opinion that the risks are significant?

A Well, as I said earlier, some of that was -- relied upon the information in Gordon Thompson's report, but it was primarily dependent upon my only

issue concerns about the fuel pool cooling system not being able to cool the pool.

So it's predominantly my own conclusions as we went through. There is a secondary reliance on Gordon Thompson's work.

Q Dr. Thompson does not in any way discuss the spent fuel pool piping, does he?

A No, he doesn't. At least not in his report.

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

MR. O'NEILL: I've asked the court reporter to mark as Exhibit 15 a 13-page document with a cover sheet which is entitled Shearon Harris Nuclear Power Plant, Docket Number 50-400/License Number NPF-63, Request for License Amendment, Spent Fuel Storage, 10 CFR 50.55a Alternative Plan.

This was enclosure 8 to the license amendment application.

BY MR. O'NEILL:

Q Do you have that document in front of you,

Mr. Lochbaum?

A Yes, I do.

Q Do you recognize it?

A Yes, I do.

Q Did you review it?

A Yes, I did.

Q Do you have any reason to take issue with CP&L's statement that, with respect to the unit 2 fuel pool cooling system, they were constructed to the same codes and standards using the same procedures and personnel as unit 1, which was fully completed and licensed, and appropriate records documenting field activities were generated at the time of construction as required by the construction codes and plant procedures and maintained in storage under the control of the construction quality assurance program pending system completion and turnover?

Do you have any reason to doubt that?

A In general I don't doubt it. The only reason I hesitated is same personnel, you know, over a period of time, you may use slightly different

welders, so they're probably not exactly the same people, but --

Q That goes to an earlier question.

Do you have any understanding of the sequencing of the welding activities for the piping that was embedded in concrete in the four spent fuel pools?

A You said they were done at the same time as I recall.

Q I suggested that, but I don't testify here. Do you have any reason to know one way or the other?

A I have no reason to know one way or the other.

Q Okay.

A But either way I don't think it changes my answer because if they were done the same time, you know, a person can't be in the same places, and if they were staggered in any way, then a guy who did work on unit 1 might not have been around for unit 2. But I'm not contending that they used the similar people. You know, there is mostly overlap.

Q Mr. Lochbaum, you haven't raised any issue with respect to the pedigree of filler material that was used in the welds, have you?

A No, I have not.

Q Do you have any reason to doubt that hydrotesting was performed on all of the ASME code 3 piping that comprises the spent fuel pool cooling system?

A I have no reason to doubt that, no.

Q And do you understand that when the system is completed, it's all hooked up again with the pumps and the heat exchangers, that they will do a hydrotest again?

A That is my understanding.

Wait. When you asked me that question, did you refer to original construction or part of the proposed plan?

Q Both.

A Okay. I only answered for the original construction, but it is my understanding that they will do it in the future, too. I just wanted to clarify.

Q By the way, if you look at page 5 of 13.

A Yes, sir.

Q Bottom of the page, it will inform you of the size of the piping, the diameter piping is both 12-inch and 16-inch. Do you see that?

A Yes, I do. I did not recall it earlier but I see it.

Q And you don't have any reason to doubt that, do you?

A No, I have no reason to doubt it.

Q And none of the 160 vendor welds are being questioned by you here?

A Well, I'd have to clarify. See, I'm not sure which ones were the vendor welds. Anything that's invited, no matter who does it, is --

Q If you look at the paragraph above, you'll note that, of the 40 field welds, 37 are fuel pool cooling system piping welds, 15 of which are embedded in concrete. So we're talking about field welds.

A But I don't know who did -- were those vendor or not?

Q Do you know the difference between a field weld and a vendor weld?

A No.

Q Okay.

A I'm not a weld expert.

Q Okay. If you look on page 6 of 13 which talks about hydrotesting, the middle of that paragraph says, "Of these 15 embedded field welds" -- does that refresh your recollection as to whether the welds we're talking about are field welds or not?

A No, because I didn't have a recollection on this. I see what you're talking about, but --

Q But you hadn't read this before so you don't know?

A No. I've read that, but I didn't -- I didn't put that -- burn that into my memory.

Q Attached to the response to the first RAI was a matrix which listed every one of the welds. Did you study that matrix?

A No, I did not study.

Q So the matrix would have told you which

welds are field welds, which welds are vendor welds, which welds have QA records, which welds don't. But you didn't take a look at that?

A No, I said I took a look at that. I didn't study it.

Q Do you remember that matrix?

A Yes.

Q Do you know the difference between Section III piping and B31.1 piping?

A Yes, I do.

Q What's that?

A B31.1 is a different code, a different portion of the code, so it has different standards that you meet than ASME Section III.

Q And we're not talking about any of that piping here, are we?

A Well, when you say "that," are you talking about --

Q B31.1.

A No. At least not the embedded welds. I believe the system does have some B31.1 welds, but not in the portion that we're talking about.

Q Beginning on page 5 of 13 and going over to page 11 of 13, is a discussion of the -- let me start over. Strike that.

Beginning at page 8 of 13 over to page 11 of 13, CP&L lays out why the 50.55a plan establishes an equivalent quality of the welds notwithstanding the fact that the weld data reports are not available for those 15 welds.

If you would take a moment to review each of those issues and tell me which ones you find fault with.

A I think on the bottom of page 8 there is a discussion of no direct records of welder identification have been located for 15 welds.

Q Yes.

A That is a lower or different standard than had those records been available for review.

So that is a part of the overall concern.

Q Did you look at the end of that paragraph which indicates "Of the 15 welds, QC construction reports provide the identification of welders associated with at least three"?

A That was actually before my sentence, but I see that.

Q Okay.

A I did see that, yes.

Q So now we're down to 12 with respect to welder identification.

And then did you see the next sentence, which says, "But hydrostatic test records have been located which attest to the existence of completed WDR packages for these welds at the time of construction."

Do you understand what that means?

A Yes, I do.

Q Good.

MR. O'NEILL: I've asked the court reporter to mark as Exhibit 16 a one-page document entitled Weld Data Report with various dates on it, but the one under the welding engineer's verification is 12/27/78.

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

BY MR. O'NEILL:

Q With respect to weld I.D. 2-SF-1-FW5, have you seen this document before, Mr. Lochbaum?

A It might have been in the stack we looked at at discovery, but I don't have specific recollection of this document.

Q Do you know whether this weld is one of the 15 welds?

A I do not.

Q Are you aware of information that was provided by the applicant in response to the RAI that indicated that a couple of the WDRs had been obtained because they were attached to other QA/QC documentation?

A I did see that RAI response, yes.

Q Okay. So in any event, does this -- do you understand this to be a weld data report? You said you were familiar with them.

A It is a weld data report.

Q All right. What does this tell you? If you read this, what do you now know about the weld that you didn't know before you looked at it? Walk

through it. Tell me what you understand from the weld data report.

A I know the system that the weld is for.

Q And what system is this?

A SF, spent fuel.

Q Correct. Okay.

A I know the category, category 3.

Q Um-hum.

A I know which drawing this weld appears on.

Q Right.

A I know the weld record for this joint. I know the weld I.D. for this weld. I know the design line that this weld is within. I know what the base metal for the piping is. I know what the joint type would be if I knew what those codes were. I know what the -- well, I can't, because I can't read it.

I don't know what that PC and HT -- heat treatment and stuff like that, but I don't know exactly what that is.

I know the weld procedure that was followed and also the revision level. I almost know the material thickness, but it's not full copy. I

know the fill metal type, if I knew what that code was.

I know the welding engineer who verified the data. I know who reviewed the weld data and I know who released it.

Q Who reviewed the hold points.

A Reviewed the hold points, excuse me, yes. And who released it for welding.

Q Okay. What else does it tell you?

A It tells me the welders who worked on this for the tack, the root, the intermediate and the final.

Q In this case it was all the same welder, wasn't it?

A Well, let's assume -- I don't know -- it seems like it was, but I don't know if they use one code for --

Q Welder A-15.

A But I don't know what CP&L's terminology is. I don't know if that's a group of welders or an individual welder. It sounds good.

Q Okay. Now, what else can you tell about

the inspection of the weld?

A It tells me that a QA inspector signed off, or initialed off in this case, that the spools were joined. I don't know what the H and A stands for.

Verified the fit-up, pre fit-up and fit-up. Checked the purge gas for the weld, which was also -- the fit-up and inspection check purge gas was also verified by the ANI inspector.

Q What's the ANI?

A American Nuclear Insurers.

Q What's his role?

A His role is similar to a quality control function.

Q Who does he work for?

A He works not for the utility, he works for the company that provides basically the insurance for the facility, ultimately.

Q It says -- is that an independent check?

A They are both independent checks. The QA is also an independent check. But it's independent of the company in addition.

Also tells me that the QA had checked the preheat temperature, N/A on the root pass, NDE and interpass temperature check, independent NDE -- intermediate NDE. It says that the QA visually inspected the final weld. And I assume that's the nondestructive examination procedure that was followed to do that.

It tells me that the QA inspected for joint identification.

Check QA inspected for -- or check for final cleanliness, and that QA checked for final nondestructive examination. Again, I assume that's the procedure that was followed to do that.

Q And at the bottom of this you see a number of signatures, don't you?

A Yes, I do.

Q The first one is the QA inspector; is that right?

A That's correct.

Q The next one is QA final acceptance.

A That's correct.

Q And the last one is verified by the ANI.

A That's correct.

Q And this is one weld?

A That is correct.

Q Okay. Now, isn't it true we know that one of these was filled out for every one of the welds that were embedded in concrete that we've talked about now? We know that, don't we?

A CP&L has stated that.

Q And --

A We do not have the record because they were thrown away.

Q We do not have the WDRs or we wouldn't be here?

A That's correct.

Q But we do have something else with respect to paperwork that indicates that the WDR was done properly, don't we?

A Well, procedurally you wouldn't do the hydrotest until these packages were completed.

Q Have you reviewed hydrotest reports before?

A Yes, I have.

Q And do you know what a hydrotest traveler requires?

A For the ones I've reviewed, I do. That's not a universal requirement, so I don't know what CP&L's requirements are.

Q Have you reviewed the hydrostatic test records for the welds in question --

A No, I have not.

Q -- that were provided in the documents rooms and were produced in discovery?

A Again, we may have -- I may have requested some, I know I didn't request all of those. I may have requested some. I have not yet reviewed the discovery documents.

Q Okay.

MR. O'NEILL: Let me ask the court reporter to mark as Exhibit 17.

(Recess.)

MR. O'NEILL: I've asked the court reporter to mark as Exhibit 17 a two-page document entitled Carolina Power & Light Company, Corporate Quality Assurance Department, Hydrostatic Test

Record, with a date under the mechanical discipline engineer of March 3rd, '82.

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

BY MR. O'NEILL:

Q Mr. Lochbaum, do you have in front of you Exhibit 17?

A Yes, I do.

Q Have you seen hydrostatic test records before?

A Yes, I have.

Q Do you know what hydrostatic test records can inform you of?

A Yes.

Q Why don't you do what you did with respect to the weld data report and go through and tell me what you now know about the hydrostatic test record and the line of piping that it relates to.

A This tells me that this was for units 2 and 3. The system was the spent fuel system and it was turnover page -- telling me the turnover

package.

The code class of the piping being hydrostatic Kelly tested. The drawings that showed the piping in question. And it explains the test boundaries.

Q What does the test boundaries mean?

A The test boundaries describe the portions of the piping that are being subjected to hydrostatic test pressure and the boundaries between that part of the system, if it's not the entire system, and other piping that's connected but not tested.

Q So, for example, where it says under test boundaries, from and including 2-SF-144 FW-515, what does that designation refer to?

A I don't know CP&L's designation. It sounds like that's a valve, but I cannot attest to it. That looks like what it is. I'd have to look at the drawing to verify that.

Q And if you -- well -- and so one test boundary was a valve, you believe, and it goes to the spent fuel liner ring weld and all welds

between; is that correct?

A That's correct. That's the two boundaries.

Q Okay. Now, what else does this tell you?

A It tells me the design pressure of the piping, the test pressure, the hold pressure, the maximum pressure and the time at the test pressure and what was used to test whether it was air or water, in this case water.

It tells me it was prepared by a mechanical discipline engineer and reviewed or verified by the QA/QC specialist, mechanical QA/QC specialist.

It tells me the components within the test boundary.

Q Do you know what those components might be?

A No, I don't.

Q Okay.

A I don't know what those are.

It tells me, whatever they are, that the manufacturing fabrication records were accepted.

There were no open DDRs or NCRs, probably design and discrepancy reports, nonconformance reports, and that that had been verified, that condition had been verified by somebody.

Q It look likes TG. If you look on page 2, it's Tommy Gilbert. You see his initials throughout and his signature, test inspected by Tommy Gilbert.

A Okay.

Q Okay. What do we learn at the bottom of the page?

A It tells me that they verified that the openings were plugged, the system was filled and vented of air.

It tells me that items that were not being tested were disconnected and/or isolated or disconnected and isolated.

It tells me that surfaces that were to be inspected during the hydrotest were clear and unobstructed.

It tells me that the temperature of the water and also the minimum temperature during the hydrostatic test that it could be.

And the MTE, the maintenance test and equipment number for the thermometer that was used or pyrometer that was used to record that temperature or measure that temperature.

And it tells me the pressure gauges that were used to check pressures during the hydrostatic test.

Q Going on to the second page.

A It tells me some more components. These are welds that are within the test boundaries. Shows me the test records that were complete as shown on the isometrics, that they were inspected for visual leakage.

Q Now, let's stop there for a second.

What do you understand weld data records complete, yes, to mean?

A That the weld data records were complete for those welds listed on this page.

Q And what would the QA/QC inspector have done before he would have initialed this pursuant to procedures?

A He would have verified that the weld data

records were complete.

Q So if we go back to what was marked as Exhibit 16, which is a weld data record, he would have checked that the information that you read off in some detail was complete; is that correct?

A No, I don't think that he would have -- he would have verified that that record had the proper signatures. I don't think he is going to go back and verify all that data that I just read.

If the form is complete and signed off at the bottom, I think that's what he would do for signing off this column.

I don't think he would go back to the individual to verify all the boxes on that sheet.

Q But certainly this signature indicates that Mr. Gilbert looked at this weld data report?

A That's correct.

Q If it was one of the ones included in this list?

A With that stipulation, yes.

Q All right. What does it mean when he says, "Yes, shown on isometric"?

A I take that to mean that the weld is shown on the isometric drawing.

Q And what do you understand visual leakage inspection to have included? Do you know what the visual leakage inspection would have required by procedure at CP&L?

A At other places I've worked, and I assume it's the same at CP&L, it would have meant during the hydrostatic test you would have eyeballed the weld and ensured that there were no signs of leakage.

Q And that's while the system was at pressure that that inspection was conducted?

A As long as it was above the test, the minimum test pressure, yes.

Q And that would have not just been looking at one point, but looking at the entire weld, 360 degrees, is that not correct, by procedure?

A I don't know that that's what CP&L's procedure called for. My recollection is other plants didn't make you do a 360-degree eyeball check. So I wouldn't -- I can't say that.

Q But we can ask that question of somebody at CP&L?

A You can do anything you want.

Q All right. So with respect to each of these welds, we show that the weld data records were complete, that they were shown on the isometric for as-builts, and that there was an inspection of each individual weld while the system was at the test pressure. Is that a fair statement?

A That's a fair statement.

Q All right. Now, maximum pressure applied is shown here as 43 psi?

A That's correct.

Q And if we go back to the front page, we note that while you had some problems because you weren't aware of what this was, the design pressure, operating pressure was 25 psi for this system. That's not much pressure in that because it's opened atmosphere; is that correct?

That's how you would read design pressure versus the maximum pressure applied which, of course, would be above the design pressure; is that

true?

A Could we break that into --

Q Sure. Let's go back to page 1. You have a design pressure that's 25 psi.

A That's correct.

Q And the minimum test pressure is listed as 32 psi.

A That is correct.

Q And if you go to the second page, we see that actually the maximum pressure applied was 43 psi.

A That is correct.

Q And it was held for at least 11 minutes.

A No.

Q No?

A No.

Q Actual time of test pressure?

A Yeah, but test pressure doesn't necessarily correspond to the 43 pounds. So the test pressure was maintained for 11 minutes, but not necessarily 43 pounds.

Q But it would certainly have to be between

32 and 43?

A For 11 minutes. That's what that says --

Q Okay.

A -- tells me.

Q Then what else do you understand from the rest of page 2?

A Well, it says that after the test, they basically rechecked the test gauge, the pressure gauge that was used. And apparently it was signed off as okay.

The welds were signed off on the isometric drawing and then it's got the people who participated or did the QA for the test, the QA inspector, the ANI inspector, the mechanical QA/QC specialist and what was N/A for the start-up group.

Q Okay. Now --

A One thing about this I don't understand is at the top of page 1 there is a correction to correct the document date of September 1983. And I don't see, with exception to the weld procedure maybe, what was changed, because the rest of the document is signed off in June of '82.

But I don't think that alters what we just went through.

Q Right. Do you know how many of the 15 welds have a hydrotest record that includes that weld, 15 embedded welds?

A I'm sorry. What was the question?

Q Do you know how many of the 15 embedded welds have available one of these hydrotest records which includes a segment of the piping that includes that embedded weld?

A I do not.

Q If you -- hypothetically, if all of the embedded welds were identified in one of these hydrotest records, where a QA inspector established that he had reviewed the weld data report, would that resolve your concerns about the quality of the welds?

A It would resolve portions of them, and the portion being the -- the first part, in that the alternative plan where you don't visually inspect all the welds, it would resolve that part.

The part of the concern, the contention

that dealt with what has happened since 1983 are really not affected by it.

Q Okay. So let's have another hypothetical.

Suppose that CP&L was able to find a remote crawler to get to all of the welds and was able find a hydrostatic test report that included all of the welds. Would that resolve all of your concerns?

A Well --

Q Assuming, of course, that the visual inspection showed that there was no material degradation to the welds or to the piping.

A The contention that I have is that there was no provision for checking for deterioration. Now, hypothetically, if a remote crawler or some other means was done to do that, then I'd have to look at that to ensure that that addressed all the potentials that -- questions that I raised.

If it did, then that would address the second half of it, yes.

Q Okay.

MS. CURRAN: We need to take a break.

MR. O'NEILL: Sure. I thought we just took one.

MS. CURRAN: I'll be right back.

(Recess.)

MR. O'NEILL: I've asked the court reporter to mark as Exhibit 18 a document entitled Carolina Power & Light Company, Shearon Harris Nuclear Plant, Plant Operating Manual, Volume 4, Part 8, Special Plant Procedure.

(Lochbaum Deposition Exhibit Number 18 was marked for identification.)

BY MR. O'NEILL:

Q And it's a temporary procedure for remote visual examination of interior welds and surfaces of an embedded unit 2 spent fuel pool cooling piping. And it's Rev. 0 and it includes six pages.

Do you have before you Exhibit 18, Mr. Lochbaum?

A Yes, I do.

Q Have you seen this document before?

A I recollect that this seems to be one of

the documents we requested in discovery, but I wouldn't want to swear to that without checking it, but it seems like it was.

Q The number at the bottom of the page is called a Bates number and is an indication of one of the documents that was put in the document room that you requested and was produced to Ms. Curran.

A That's correct.

Q Did you review this document while you were looking at it?

A Well enough to the point where I did request it. Like I said, I think I requested this. I don't want to --

Q I would like you to take a few minutes and read it cover to cover.

This is the procedure for visual inspection.

(Pause.)

THE WITNESS: Okay.

BY MR. O'NEILL:

Q Now, it is true that the intent of CP&L to do a visual inspection on at least some of the welds

was noted in the first license amendment request and then in response to the RAI and in public statements that were made and briefings relating to the license amendment request; is that not true?

A That is correct.

Q Okay. And this appears to be the procedure by which the visual inspection was carried out; is that not true?

A It is a procedure for doing visual inspections. I don't know if that's the one they intended to use or not.

Q Okay. If you note on page 3, Purpose, this includes an inspection of the interior welds and surfaces of the embedded piping.

Anything missing there? So far so good?

A No. So far so good.

Q Okay. There is a list of references at 2.0 which indicate relevant documents relating to this procedure. Are you familiar with those documents?

A Not all of them, no. CP&L letters and stuff, I don't.

Q Did you review them when you were at the CP&L documents room?

A I can't attest to each and every one of these, so I don't know. I can't answer that question.

Q Okay. Any problem with the prerequisite? Something that's missing there?

A Before we get that far, the purpose is for -- it says interior welds and surfaces?

Q Yes.

A We had this morning talked about the potential for an external contaminant attacking the pipe surface, so this only would have looked at the interior of the pipe.

Q That's certainly true.

A But in any event. Prerequisites.

Q And it would be impossible to look at the exterior of the pipe that's encased -- embedded in concrete.

A I'm not sure it's impossible, no.

Q Well, unless you rip out the concrete.

A Well, you said impossible.

Q Right. Okay. Any problem with prerequisites that you see in this procedure?

A No.

Q Do you understand the calibration that's being done with respect to the camera?

A Yes, with one mil resolution. Yes.

Q Okay. Any problem with precautions?

A No.

Q Any problem with 4.2 and limitations?

A No.

Q Do you disagree with the equipment that was being used?

A I'm not familiar with the equipment, so I don't agree or disagree.

Q Okay.

A It looks appropriate, but I --

Q I want you to look hard at the acceptance criteria and tell me if you have any disagreements with the acceptance criteria.

A The acceptance criteria would -- as supported by attachment 1, which is the remote visual examination data sheet, would seem to focus

or narrow the scope down to the welds themselves.

Q But if you look at 6.01, it does also talk about the welds/surface. So while many of these would only be applicable to a weld, to be sure, it is clear that this is also to look at the surface.

A I'm not sure -- I wouldn't make that leap, because if it was me performing this procedure, when I go down to B in the attachment as to what I'm supposed to look at, the focus is on the welds.

Q Okay. By the way, what is the most susceptible part of the piping to -- I know you're not an expert in corrosion, but in corrosion, MIC or otherwise, if you know?

A The most vulnerable is the portion that has stress -- well, if it's stress corrosion, it would be the portion of the pipe that sees stress and also sees some corrosive agent.

If it's from the water, it would be the piping that has water in it that has the highest stress, or -- it's anything that combines the corrosion agent and a flaw or a weak spot in the weld or piping.

Q Do you know where most of the pits were in the piping at the Robinson plant that you referred to in your IE notice?

A My understanding is it was in the welds, around the weld areas.

Q And do you know why that's true?

A No.

Q Okay. There may be -- I understand you're not an expert in this area, but there may be some reason to really focus on the welds, too, that's logical because of materials and because of susceptibility to corrosion and where that's more likely than not to occur; is that not true?

A That is true.

Q Okay. Do you have a concern regarding the -- any piping that was inspected by CP&L and any weld pursuant to this procedure, if they properly identified any -- any deficiencies as indicated by the acceptance criteria that they saw?

A My concern was that the focus was on the welds. And if there were defects or indications in areas other than the welds, this procedure would not

necessarily -- it wasn't -- this procedure didn't give me the confidence that they would have been detected and identified.

Q On the other hand, if somebody who was responsible for and that was an expert in corrosion, for example, were to testify that he reviewed carefully all of the videotape of both the segment of the piping and the weld, that might resolve some of those concerns I take it?

A Well, I notice that the procedure says, on section 4.2, limitations, item number 4, "The vendor personnel operating the closed circuit television system need not be certified visual weld examiners. The television system operators shall display proficiency in performing their required functions."

As I interpreted that, and I may be wrong, as I interpreted that step in this procedure, the videotapes were made by technicians who were trained in the use of the equipment and so on, not people who were necessarily qualified or not backed by people who were NDE or qualified to detect corrosion, these experts you referred to.

Consequently, with the focus of the procedure as I see it being on the welds, there might have been a temptation to move the camera focus quickly from weld to weld to get the job done and not look at the portions in between.

So, again, this procedure doesn't tell me conclusively that all of the piping inner surfaces were examined. The welds sure looks like it was.

Q And, again, you didn't decide to take the tapes and look at them to see whether people were running past sections of piping or going very slowly or not?

A I did not.

(Lochbaum Deposition Exhibit Number 19 was marked for identification.)

BY MR. O'NEILL:

Q I've asked the court reporter to mark as Exhibit 19 a document entitled Engineering Service Request. It's a five-page document with Bates numbers on the bottom CP&L 02300008. And it's a draft, so that it's not dated yet.

Do you have Exhibit 19 in front of you, Mr. Lochbaum?

A Yes, I do.

Q Did you review this document when you were visiting the CP&L documents production room?

A I may have. Again, I don't specifically recall this document. It may have been one of the ones we requested.

Q Okay.

A The number, the Bates number seems in the range that we looked at, so that would lead me to believe that I did review it.

Q So you haven't reviewed it carefully?

A I have not reviewed it carefully.

Q Would you take a few minutes to review it carefully, please.

(Pause.)

THE WITNESS: Okay.

BY MR. O'NEILL:

Q By the way, based on your review of this document, do you now know what the wall thickness is of the 12- or 16-inch diameter spent fuel pool

A No, I don't know how much.

Q Okay.

A And also I couldn't -- I assume that .375 is correct, but I also don't know what the right thickness is.

Q You could look at the isometrics and determine that?

A That would tell me what the thickness was. You said for the safety function, so I'd have to look at the seismic design qualification and everything else to find out what the right thickness is.

Q An area, I note, that you indicated was outside your expertise to actually calculate?

A To calculate, I can look at the drawing and see what it says.

Q Right.

A That's a little different.

Q Do you have any concerns about the results of the inspection on these six welds and associated piping?

A Yes. It reiterates -- this, as I

understand it, is the follow-up to this test. It's the evaluation of the results from --

Q The draft, I might note.

A That's what it's intended to be ultimately, as I understand it. It's to review the test results of this visual inspection using the camera to see if it's adequate or not.

Q Right.

A As -- my concerns with the test were that it was focused on the welds. And this ESR, engineering service request, pretty much only talks about the quality or the adequacy of the welds, so that confirms the concern from the test that I had.

In addition, the only other concern that was raised was this one defect or indication that was observed and discussed, the lack of fusion for the one weld.

Q An incompletely-consumed insert on the root pass is a more correct statement.

A Indications of incomplete fusion is the last sentence.

Q Um-hum.

A I'd have to pull that string a little bit further to see why these weld data records which look for things like this --

Q Wait a minute. Would you go back to what is Exhibit 16 and show me where there is any indication of an inspection of an ID of a weld in that weld data report.

A Well, in this case it was N/A, which is a root pass NDE. Isn't that looking for things such as this?

Q Well, it was N/A for what reason?

A I don't know why this weld was N/A.

Q Right. Could it be that there is no requirement for that type of inspection for a code Section III piping that's used for this application at this pressure?

A It could be, yes.

Q So you haven't found anyplace on the weld data reports that would have required an internal inspection as opposed to an external inspection of the welds?

A Could you repeat that question.

Q You haven't found anyplace on the weld data report that requires an internal inspection; that is, ID inspection, as opposed to an external inspection?

A That's correct.

Q Okay. Now, did you see at the top of the last page that the root pass is backed up by multiple weld passes?

A I did see that, yes.

Q And I believe you testified you had no idea how many?

A How many passes?

Q Correct.

A That's correct.

Q Okay. Presumably enough passes to get to at least .375 inches, however?

A Presumably, yes.

Q Okay. And that that was inspected on the weld data report; that is, the external inspection to show that the welding was properly done?

A But we don't have the one for that one.

Q Correct, but I mean in general.

A In general, that's correct.

Q Okay. By the way, do you understand what the requirement is as discussed in the last paragraph on the last page with respect to the joint efficiency?

A No, I do not.

Q Okay.

A I'd have to look at that part of the code.

Q Okay.

MS. CURRAN: I need to confer with the witness for a minute.

(Recess.)

THE WITNESS: Did I leave you that answer, last answer, or did I leave you hanging.

MR. O'NEILL: No, you answered.

THE WITNESS: Okay. I couldn't recall.

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

BY MR. O'NEILL:

Q I've asked the court reporter to mark as Exhibit 20 what is enclosure 16 to CP&L's response

to the RAI on the 50.55a alternative plan. It's entitled Supplemental Quality Assurance Requirements for the Design Change Packages Associated with Completion of the Unit 2 and 3 Spent Fuel Pool Cooling System. It has 15 pages.

Have you reviewed Exhibit 20 before, Mr. Lochbaum?

A I seem to recall having gotten a copy of the RAI response, but I didn't -- I was saving all of the reviews to do at once, all the discovery packages. So the answer to your question is no, I have not in detail.

Q I'd like you to take some time, as much time as you want, an hour if you want, to review this.

Your contention is that CP&L has not provided a plan to inspect and determine there is no degradation. Months ago, you've had what effectively is that plan and you say you haven't reviewed it yet.

So if you're the expert on this contention, I would like you to review it, and take

an hour to review if you want to, because I want to ask you some questions about it.

MR. O'NEILL: Why don't we take a break.

THE WITNESS: Okay.

(Recess.)

BY MR. O'NEILL:

Q Mr. Lochbaum, have you had a chance to study carefully Exhibit 20?

A Yes, I have.

Q Does this adequately address your concerns about the alleged failure to implement procedures to deal with the period of time between 1983 and 1999?

A No.

Q Why not?

A It doesn't address the quality of the piping, embedded piping.

Q Let's set that aside for a moment because we've spent some time discussing that.

With the exception of the embedded piping, the welds and embedded piping, does this equipment commissioning plan and the quality assurance procedures related to it address any concerns you

have with respect to the condition of the equipment of the spent fuel pool cooling system that will be commissioned and placed in service?

A Well, this plan by itself doesn't indicate what examinations would be done for the accessible piping.

The commissioning plan with the matrix of which components are verified by walkdowns, paperwork checks and so on provide, you know, essentially the meat on the bone. This is the skeleton of the program.

So it could, depending on what that meat looks like.

Q And I take it that you haven't reviewed all of the other procedures and all of the other test results from the inspections and reviews of the accessible piping and the welds that were provided in the CP&L document production?

A I have not studied them. I did see quite a bit and I saw the matrix, equipment matrix and some of the resolution of the problems and some of the acceptance of the installed, but I can't say

I've reviewed all of it, which is what your question was.

Q But right now you also cannot point to a particular disagreement that you have with what was done?

A Not for the accessible piping, any components, that's correct.

I do have one question about this, an observation, not a question -- I'm not sure I'm allowed to ask questions.

On page 3 of 15, this document refers, under the Responsibilities section for both the AIA and the modification engineer, it refers to the ESR. The -- I don't see that the ESR is identified anywhere within this document, but it's a relatively minor point.

Q Okay. If you look at page 3 of 15 where you were referring to a second ago, you see the role of the authorized inspection agency or the authorized nuclear inspector, do you not?

A Yes, I do.

(Lochbaum Deposition

Exhibit Number 21 was marked for identification.)

BY MR. O'NEILL:

Q I've asked the court reporter to mark as Exhibit 21 a one-page document which was a letter from Dr. Richard E. Feigel, vice president, engineering of the Hartford Steam Boiler Inspection and Insurance Company to Mr. Steve Edwards, manager of the spent fuel pool activation project at Carolina Power & Light Company, dated March 8, 1999.

Have you seen this document before?

A Yes, I have.

Q Do you know who Dr. Feigel is?

A He is the author of this letter.

Q And have you -- do you know what his position is at the Hartford Steam Boiler?

A It says he's the vice president of engineering.

Q Have you read his resume which was provided to BCOC?

A I have seen it. I couldn't recall specific points off of it. I did see it.

Q Do you recall what his responsibilities are with respect to ASME code committees?

A No, I do not.

Q Okay. Does the fact that the independent Hartford Steam Boiler who has agreed to be the authorized nuclear inspector for the activation of the spent fuel pool, does the fact of their endorsement of the alternative plan provide you any additional confidence as to the efficacy and effectiveness of that plan?

A For the parts that we feel are within -- that I feel are within the scope of the plan, it is good to have Hartford's endorsement of that plan.

My concern is that that plan is not all-inclusive, as it should be, so this doesn't give me any confidence regarding that scope problem.

Q Now, if we go back to what is Exhibit 20, isn't it true that the ANI is an independent reviewer every step of the way on the implementation of this plan?

A I couldn't say every step all the way through the plan.

Q If, in fact, it were true that, in addition to, as set forth in some detail in Exhibit 20, the quality assurance requirements to which the commissioning will be performed and the quality assurance, independent quality assurance and inspections and reviews, that indeed the ANI will provide independent review of all aspects of the commissioning of the spent fuel pool cooling system, doesn't that provide additional assurance that it will be done in a way that is quality and ensures protection of public health and safety?

A Yes, that independent review does add assurance.

Q What would you have required in this commissioning plan to have satisfied any concern that you might envision with respect to the commissioning of the spent fuel pool cooling system?

A If this plan would have addressed complete visual inspection of the interior piping surfaces of the embedded piping portion and an assessment or evaluation or inspection of the external piping for the embedded portions, that would have addressed the

concerns with the scope.

Q Are you saying that you would have required, to satisfy your concerns, Carolina Power & Light to cut out reinforced concrete around the spent fuel pool to take a look at the external welds and the piping to satisfy your concern? Is that your position?

A That would have satisfied the concerns. I'm not saying that's the only way to satisfy those concerns.

Q Okay. Well, let's eliminate that as impractical for purposes of the hypothetical.

If we assume for the moment that that is impractical and, in fact, could damage the piping and would cause other problems, what, in addition to what is in this commissioning plan and in addition to what you've said with respect to a visual inspection of all of the piping, would you require to be in the commissioning plan to satisfy your concerns?

A A complete visual inspection of the interior piping surfaces, all of the welds of the

embedded portions, and some evaluation, analysis or inspection of the exterior piping surfaces.

Q And, of course, the evaluation has been done of all of the accessible exterior piping surfaces.

A That's my understanding.

Q And what you're talking about is some evaluation of the exterior that is embedded in concrete?

A That is correct.

Q I want you to tell me what evaluation that you would propose as one that would satisfy your concerns, particularly since we've agreed, for this opinion, that we are going to eliminate ripping out all of the reinforced concrete, tearing up the spent fuel pool to get to the piping?

A If it had been me in charge and I had to answer that question and document that, some walkdown of, was there any history of spills or anything that would have gotten into the concrete or around where these pipes came through walls that could have been an external contaminant, an

inspection of where it went into the pipe, into the walls and out of, things like that, that would have given me some basis for saying that there was not, or no apparent indications of an external contaminant source.

Or could have walked through areas where there was signs that water was collecting as if some kind of water from some unknown source was collecting in the building that could have contaminated the external surfaces. I would have tried to eliminate those potentials and documented that in some kind of evaluation.

Q Are you familiar with the second prong of the 50.55a(3) which allows for an exemption to ASME code requirements that you can make certain demonstrations?

There's two tests, alternate tests. One is you can demonstrate adequate quality and safety. That's the test we've been talking about; is it not?

A Right.

Q But there's a second test, isn't there? In fact, the board referred to it in its order.

A That's correct.

Q What's the second test; do you recall?

A I don't recall offhand because that wasn't the one that's the subject of the application.

Q Isn't it true that, as an alternative to demonstrating an accurate level of quality of safety, you can also demonstrate that it would result in hardship or unusual difficulty without a compensating increase in the level of quality of safety? Do you recall that as being the second test?

A I recall words to that effect, yes.

Q Okay. Isn't it true that where we are right now, that the second test is also not only applicable but a lot easier to meet? To meet your test that you've just established, assuming for the moment that you could inspect a hundred percent of the internal surfaces, the only thing that you would have CP&L do is somehow inspect the exterior of the piping which would certainly, if anything would fall into hardship or unusual difficulty, that might be a definition of it, and it would be pretty hard to

justify that you'd have some increase in quality and safety for doing that, wouldn't it?

A No, because, again, if it was me, I would have to weigh whether -- opine for that exemption or that provision is indeed a hardship versus dry cast storage which does not require me to do that.

So to say that it's impractical to inspect that, I have alternatives available that might allow me not to require that hardship.

So I don't know that, if I was making that determination, I would indeed be forced into the hardship one.

You know, you've presupposed that we've ruled out dry cast storage, and I'm not sure that I have enough information to do that. Or other options -- I don't mean to limit it to dry cast storage, but that was the one that came to mind.

Q Setting aside some alternative outside of the plan, but here we have a system that CP&L believes is a perfectly good system; in fact, they've done a lot of inspections and a lot of work and they've replaced anything that had any question.

They have redone welds, they have inspected outside and inside, and now they are ready to commission the system.

The only thing that David Lochbaum would have them do more would be inspect a hundred percent of the interior of the piping and somehow inspect the outside.

If the only way to inspect the outside would require the removal of reinforced concrete, wouldn't you agree that, for purposes of this application, what we're looking at, that that additional step would result in hardship or unusual difficulty, and would not provide an increasing -- a compensating increase in quality of safety?

A No, because you've misstated what I've said twice here already today in that I did not at any time state that the only way to satisfy me is by an inspection of the exterior portions of the piping. I said an analysis, an evaluation or an inspection.

You're presupposing that an evaluation would be a greater hardship than ripping out the

piping and all the stuff like that, and I'm not sure that that's necessarily true, so I could not leap to that conclusion.

Q What kind of evaluation could be done without ripping out the reinforced concrete to get to the exterior piping?

A I went through that once just a few minutes ago. Do we want to repeat it now or do you want a different answer?

Q No, I want to understand. I may have missed something there.

A I said if it was up to me, I said I would do an inspection, look for things that could be --

Q Okay.

A That one.

Q I understand what you're saying. It is inspection of the outside of the spent fuel pool to see if there was any --

A Well, it's the fuel handling building. You know, the piping traverses -- not traverses, it runs through the building.

Q Correct.

A So you'd look for things that could be a source of or evidence of water collecting.

Q Let's assume that the company has already been smart enough to do that, unbeknown to you perhaps, but suppose that they, in fact -- in fact, if you'll read this, it says they did walk down the entire system, okay. Every pipe, every weld. Every part of the system. Let's assume that they were smart enough to look for exactly what you suggested. They have lots and lots of engineers and they have a lot of experience, okay.

So assume they did that. What else would you have them do?

A Instead of?

Q No, anything else in addition, instead of cutting out all of the reinforced concrete.

A You're asking me to theorize. I'd have to look at that evaluation and ensure that that satisfied the concerns.

It's possible they might -- I haven't seen any evidence that that has been done, which doesn't mean that they are not smart enough. I don't mean

to imply that. That isn't a logical derivation of that.

But I'll stick with the original answer. Complete inspection of the interior surface and some evaluation, inspection or analysis of the exterior.

Q Notwithstanding the fact that you're not an expert, are you of the opinion that the piping at the spent fuel pool at Shearon Harris may have been subjected to MIC corrosion?

A There was a potential because there was a long period of time where there may have been stagnant water and high humidity, the conditions that could induce or the environment that we used earlier that could have produced them.

Q Now, setting aside what could have happened, in light of the visual inspection of which you saw was a draft report --

A Right.

Q -- which didn't report any observation of corrosion, and in light of the fact that all the accessible piping which was subject to the same water not only has not reported any corrosion, which

has been inspected both from the inside and the outside, and no one noticed any water leaking on their heads when they walked under it for ten years, does that suggest to you that it has not been subjected to MIC corrosion?

A No.

Q No?

A No.

Q What would it take to satisfy you that there has been no MIC corrosion?

A Well, for at least the third time, a complete visual inspection of the interior piping surfaces, including the welds, and an evaluation and analysis or inspection of the exterior piping surfaces of the embedded portion.

Q If you inspected 75 percent of all the piping and all the welds, that doesn't get you there that the probability is extraordinarily low that there would be MIC corrosion somewhere up in a pipe high up into the spent fuel pool that's embedded as opposed to lower in the system or anywhere else in the system that was inspected?

A Inspecting 75 percent would give you greater assurance -- assuming the results came back that there was no indication, would give you greater assurance, and give me too, that there was no MIC.

Q By the way --

A But MIC is not the only -- it is one of the things that could cause piping deterioration.

Q What other things could cause piping deterioration?

A Rust. Well, stainless steel is less likely to be rust, but I'm not an expert, but I --

Q I understand, and certainly that comment suggested it, but what else could cause --

A I caught it. I get some credit for catching it.

Q All right. What else could cause degradation in stainless steel piping other than MIC, given the fact that there is no temperature, right? There is no stress --

A There is no temperature?

Q There is no temperature -- there's a high temperature.

A High temperature.

Q What else could cause it?

A There have been things, contaminants, chemical contaminants that caused problems even including stainless steel, that could have been interior or external to the piping.

Q Did you review the results of the samples of the water in the lines?

A I've reviewed one sample that you distributed at the hearing. We've requested in discovery some more that have been done, which -- I hadn't reviewed all the documents that we requested.

Q Okay. Assuming that the sample of the water, not whether or not it has microbiologics in it, but the chemical analysis shows demineralized water with low concentrations of chlorine, fluorine and everything else, as would be in the spent fuel pool. What else could cause degradation of that piping?

A Well, first of all, at the July 1998 meeting --

Q Um-hum.

A -- the CP&L representatives, and I forget which one said it, but stated that the water in the spent fuel pools C and D wasn't real good quality.

So the test that you distributed, the water chemistry test that you distributed at the hearing was from a much more recent vintage after the water in pools C and D had been cleaned up some.

So I'm not sure that that test --

Q But it was -- there was no clean-up of water in the piping. The water in the piping had sat there for ten years. They then sampled it. The sampling you got was what it was and what it's always been presumably because there has been no clean-up, nowhere for it to go.

So I'm now talking about -- remember, there is a plug at the intake and discharge of the spent fuel pools to this system. So that the water that's gotten in there has just leaked by a plug, but there has not been any circulation whatsoever.

So having said that, do you understand that to be true? Is that your understanding?

A The configuration?

Q Yes.

A No.

Q You don't know that there's been plugs there or not?

A I don't know that.

Q Okay. Assume for a moment that I'm correct and there's been plugs there for at least ten years, and that the only water that's ever gotten into the piping has leaked by the plugs and it stayed there until it was finally drained this year. And that water was sampled. So we now have a chemical analysis and analysis of any of any microbiologics.

Is there any concern that we didn't get a representative sample of the water?

A Not under these assumptions, no.

Q Okay.

A However, I don't -- I'm not endorsing those assumptions.

Q Okay, I understand. But Dr. Moccari can certainly tell us that.

(Lochbaum Deposition

Exhibit Number 22 was marked for identification.)

BY MR. O'NEILL:

Q I've asked the court reporter to mark as Exhibit 22 a technical report authored by Dr. Ahmad, A-H-M-A-D, Moccari, M-O-C-C-A-R-I, dated May 12, 1999. Two pages.

And I believe, Mr. Lochbaum, you have that in front of you and you've indicated you've seen it before. In fact, I gave a copy of it to you at the prehearing conference; is that correct?

A That is correct.

Q Did you review this report?

A Yes, I have.

Q Are you familiar with the laboratory tests that were run by Dr. Moccari and the results?

A I see the tests that were written. I'm not --

Q You're not an expert in this area?

A Right.

Q Do you have any reason to take issue with Dr. Moccari's results that there were no nuisance

bacteria present in the water in the spent fuel pool cooling system lines?

A At the time of the tests, I have no reason to doubt his results.

Q Secondly, Dr. Moccari reports on the chemical analysis of the water without giving specifications, but he notes that it was demineralized water with measured very low concentrations of chloride, fluoride and sulfate.

Now, do you have any reason to take issue with his representation of the results of the sampling that was done chemically of this water?

A Well, some of the documents we requested in discovery indicated chemical results that may contradict this. So --

Q Could you tell me what you think you saw that may have convicted this.

A Well, there were some chemistry results that appeared to be of the spent fuel pool water chemistry that showed -- there was a whole series of them. One of them would show chloride was high and then iron might be high or sulfates.

So I need to look at that information in light of this report.

Q Assume for the moment that there are plugs on the lines and that the only water that got into the lines was that which leaked past the plugs, so there was no recirculation.

Isn't it true that the water that was sampled is the water that we are concerned about here, not which may have been in some pool, whether it's pool C, D or B?

A Even with that assumption, the water that leaks by those plugs is coming from the place that may have been the test I'm referring to.

Q Right.

A So it's not completely different water.

Q I understand.

A It would have carried the sulfates and the chlorides with it in the water.

Q But what actually got in was what is measured in those lines?

A At this time, that is correct.

Q And if you assume that I'm correct that

the -- there has been no circulation of the water for at least ten years, what you got is what you got?

A Well, except that I was sworn in and you were not sworn in, so I'm not going to buy into that assumption.

Q I understand, but if you assume that, then there's no way that the chemistry of the water can be other than what was sampled at the time.

The chemicals doesn't disappear, right?

A I'm not going to buy into that one either because I don't believe that to be true. Chemicals do indeed disappear.

Q Okay. By the way, do you know where the sample points were?

A For this test or for the ones I referred to?

Q Both. No, for this test and for the sampling of the chemistry of the water in the lines.

A No, I do not.

Q Okay.

(Discussion off the record.)

BY MR. O'NEILL:

Q Did you review the resume of Dr. Moccari?

A No, I did not.

MR. O'NEILL: Let me have marked as Exhibit 23 a two-page document entitled Resume of Ahmad Alexander Moccari.

(Lochbaum Deposition Exhibit Number 23 was marked for identification.)

BY MR. O'NEILL:

Q Take a moment, if you haven't looked at this, to review Dr. Moccari's credentials in the area of corrosion and materials and metallurgy.

A Okay.

Q Are you familiar with the Fontana Corrosion Center at Ohio State University?

A No, I'm not.

Q Are you familiar with Dr. Fontana?

A No, I'm not.

Q Are you familiar with Dr. Roger Staley?

A No, I'm not.

Q I guess we've confirmed that you're not an

expert in corrosion.

A I'm not sure that that is the appropriate standard whether I know those individuals or not. I think there's a different standard applied --

Q Let me ask this question. Do you happen to know what the premier corrosion research laboratory in the nuclear field is that has been used for, among others, the Department of Energy, Westinghouse and other major vendors in the nuclear area when they want to have very high-quality research done relating to corrosion of materials that are nuclear power plant components?

A No, but I would hazard a guess it's Dr. Moccari.

Q No. I asked the research laboratory.

A Oh, then I don't. I'm not even going to guess now.

Q Okay.

A But that's still not the standard for whether I'm a corrosion expert or not.

Q No. By your own admission you're not.

A I didn't realize it was that easy, just to

know who that person, you become a corrosion expert.

Q You don't have any reason to doubt or to cast aspersions on Dr. Moccari's qualifications as a corrosion expert?

A No, I don't.

Q Even though you can't confirm any of the people --

A If he knows all those people, he is a corrosion expert. We have established that.

Q -- studied under him.

(Lochbaum Deposition Exhibit Number 24 was marked for identification.)

BY MR. O'NEILL:

Q I've asked the court reporter to mark as Exhibit 24 a letter dated January 22, 1999, from Mr. David A. Lochbaum, Union of Concerned Scientists, to the then sitting commissioners of the NRC, subject: Current examples of risk-deformed regulation.

What instigated this letter, Mr. Lochbaum?

By the way, did you write this letter?

A Yes, I did. I signed it too.

Q What instigated this letter?

A My review of the license amendment application submitted by CP&L dated December 23rd, 1998.

Approximately two weeks earlier, I think either on January -- approximately two weeks earlier, I don't know the date -- I had addressed the commission during a commission meeting or a briefing on risk-informed regulation and what some of the concerns that UCS had about the industry and NRC moved towards risk-informed regulation.

And subsequent to that meeting I reviewed the license amendment application and found what I considered this date to be another example of problems with the move towards risk-informed regulation.

Q I believe we established earlier that you are not an expert in probability and statistics.

A That is correct. I don't even know who is the premier person to be called before the NRC or whatever.

Q Do you still believe, after you've had

some time to reflect on this, that the probability of a fuel handling accident at Harris or any other plant would double if you were to increase the amount of spent fuel stored on site by a factor or two?

A Yeah, because you -- the probability of any individual fuel handling accident during a movement stays the same. If you do twice as many movements, then the probability of a fuel handling accident doubles. That's straight math.

Q That is one of the major mistakes that people who haven't studied probability and statistics make.

If you had a revolver with six chambers and you played Russian Roulette six times, by that logic, the probability of death is one by your logic, and that's not true, is it?

A That is not true.

Q Okay.

A You'd probably die sooner than that.

Q Or you may never die.

A I'm not going to take those odds.

Q Did you receive a reply from the Nuclear Regulatory Commission with respect to this letter?

A I believe I did.

Q What did they say?

A They said they were going to give this careful consideration, or words to that effect, during the license -- their review of the license amendment application.

MR. O'NEILL: I'd ask the court reporter to mark as Exhibit 25 a letter dated March 11, 1999, from Dr. K.P. Singh, S-I-N-G-H, to the chair at that time of the Nuclear Regulatory Commission, Dr. Shirley Jackson, the subject of which was the January 22, 1999, letter from David A. Lochbaum to the commission.

(Lochbaum Deposition Exhibit Number 25 was marked for identification.)

BY MR. O'NEILL:

Q Have you reviewed Exhibit 25 before?

A I don't recall having seen this before, no.

Q Why don't you take a moment to read it.

(Pause.)

MS. CURRAN: Is the relevance to this to contention 3 going to become apparent?

THE WITNESS: Okay.

BY MR. O'NEILL:

Q Do you disagree with Dr. Singh's analysis of the faults in your letter in any way?

MS. CURRAN: Objection to the relevance to this question.

BY MR. O'NEILL:

Q You may answer the question.

A Yes.

Q Tell me where you think Dr. Singh is incorrect in his analysis of your letter of January 22?

A On the second paragraph of the first page, the last sentence says, "The probability function does not change unless the variables attendant to are altered."

I agree with that statement, but in my letter I pointed out that the number the fuel

moments was going to increase, which would double it.

In the next paragraph, Dr. Singh addresses that and dismisses it as negligible, not based on the point I made, but based on his observations of fuel handling experience within the industry.

Then he goes on into the middle of the next page and talks about "the following facts based on over 9,000 plant-years of worldwide wet storage experience."

He states that, "There has never been a case of loss of shielding to the stored fuel in any fuel pool anywhere."

And that is not true. The Haddam Neck reactor cavity seal failure of 1982 or '83 caused quite a bit of loss of shielding to the stored fuel at the Haddam Neck plant.

Q But it was not covered, of course.

A He said loss of shielding. If he had said no uncovery, I might not have argued it. What he said is factually not correct.

Q If you lost one inch due to evaporation,

that would be loss of shielding by your definition, I guess.

A I wouldn't have -- that is negligible, as he pointed out in the first page, so it would not have done it. There have been many, many, as evidenced in the appendix to this book, loss of shieldings of more than one inch. That's not -- in fact, there's a 1997 document that the AEOD branch, the group that was formally known as AEOD, within RNC has put out on loss of spent fuel water, which is shielding.

And they said, based on plant experience over an 11-year period just in the United States, that this happens on average once a year.

That's a little bit more than never.

Q But it's never been -- fuel has never been uncovered?

A He didn't say that. I'm addressing the point he said and not the point he may have wanted to say or you may have wished him to say or anything else.

Q I'm just getting your views as on his --

A Right. His second item states that, "There has never been a nuclear criticality accident in any pool anywhere."

There was in the, I believe, Vermont Yankee back in the 1974 or '75 time frame, they had an inadvertent criticality in the reactor cavity pool.

So to say there has never been a nuclear criticality accident is somewhat bold. There may not have been many. It didn't lead to fuel uncovery, that type of stuff.

"There has never been a significant release of radioactivity to the environment due to the malfunction of a fuel pool." That one --

Q I think you say that in your book.

A I would say that in my book, yes. So he got two out of three correct -- or wrong, in my estimation. So that would be criticism of his critique.

In the last paragraph, despite my disclaimer, "legal intervention in CP&L's project is already reported to have ensued." At the time I

wrote that letter, I had not been contacted by anybody about providing expert witness testimony.

So the statement I made is correct at the time and remains correct.

MR. O'NEILL: Just give me one second, Mr. Lochbaum.

THE WITNESS: Take two.

BY MR. O'NEILL:

Q Mr. Lochbaum, did you understand all the questions that I asked you and you answered?

A I didn't understand them all because I asked for corrections on some of them. So with the exceptions of the ones that I asked for corrections on, yes.

Q Did you answer every question truthfully?

A Again, with the -- there were four questions that I had to provide clarifications on later, so the original answers to those were truthful at the time. I had to explain later because of various reasons.

Q Would you like to change any of your answers?

A No.

Q Thank you very much. I don't have any further questions.

MS. UTTAL: I don't have any questions.

MR. O'NEILL: I think we're complete.

(Reading and signature not waived.)

(Whereupon, at 4:31 p.m., the deposition was concluded.)

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

My commission expires:

ANN RILEY & ASSOCIATES, LTD.
Court Reporters
1025 Connecticut Avenue, NW, Suite 1014
Washington, D.C. 20036
(202) 842-0034

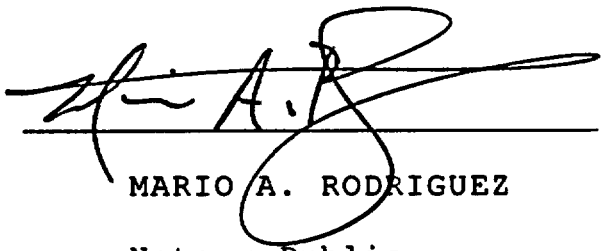
DISTRICT OF COLUMBIA, to wit:

I, Mario A. Rodriguez, before whom the foregoing deposition was taken, do hereby certify that the within-named witness personally appeared before me at the time and place herein set out, and after having been duly sworn by me, according to law, was examined by counsel.

I further certify that the examination was recorded stenographically by me and this transcript is a true record of the proceedings.

I further certify that I am not of counsel to any party, nor an employee of counsel, nor related to any party, nor in any way interested in the outcome of this action.

As witness my hand and notarial seal this 14 day of October, 1999.



MARIO A. RODRIGUEZ
Notary Public

MY COMMISSION EXPIRES: 5/31/2000

E R R A T A S H E E T

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:

_____ _____

Date 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.

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____.

_____

NOTARY PUBLIC IN AND FOR

My commission expires:

E R R A T A S H E E T

Re: Carolina Power & Light Company, (Shearon Harris Nuclear Power Plant)

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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	HVAC
32	2	state class 1E	safety class 1E
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	INPO	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

DAL
11-30-99