UNITED STATES OF AMERICA

BEFORE THE

NUCLEAR REGULATORY COMMISSION

In the Matter of:	)	
	)	
HOUSTON LIGHTING & POWER COMPANY, ET AL.	)	Docket Nos. 50-498 OL
	)	50-499 OL
South Texas Nuclear Project Units 1 and 2	)	

Bankruptcy Courtroom
Third Floor
Federal Building
San Antonio, Texas

Friday,
June 26, 1981

PURSUANT TO ADJOURNMENT, the above-entitled matter came on for further hearing at 9:00 a.m.

APPEARANCES:

Board Members:

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Atomic Safety & Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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C O N T E N T S

E X H I B I T S

NUMBER	IDENTIFIED	IN EVIDENCE
CCANP No. 32	(previously marked)	6758
CCANP No. 33	(previously marked)	(Rejected - 6764)
CCANP No. 34	(previously marked)	(Rejected - 6773)
CCANP No. 35	(previously marked)	(Rejected - 6776)
CCANP No. 36	(previously marked)	6784
CCANP No. 37	(previously marked)	(Rejected - 6786)

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P R O C E E D I N G S

9:12 a.m.

JUDGE BECHHOEFER: On the record.

Good morning, Ladies and Gentlemen.

Are there any preliminary matters before we begin?

The Board has none.

MR. AXELRAD: Yes, Mr. Chairman, just a couple.

One is that yesterday Mr. Sinkin asked us whether CCANP Exhibit No. 19 had been authenticated, and we have been able to authenticate that one, so it is now admitted.

JUDGE BECHHOEFER: Could you refresh my recollection as to what the status of that is?

MR. AXELRAD: I believe it had been admitted, but subject to authentication by Applicants.

JUDGE BECHHOEFER: Okay. Fine.

MR. AXELRAD: We had forgotten that, until he reminded us yesterday. So there's no need to take any further action.

JUDGE BECHHOEFER: Right.

MR. AXELRAD: Another matter is that last week in Houston we had asked, as an additional discovery matter, for the Intervenors to provide us all documents

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in their possession, with the term "documents" being broadly interpreted, relating to I&E 80-34, 81-11 and 81-17, and we indicated we would be discussing that subject with the Intervenors.

Counsel for both Intervenors have told us that they will provide us that materi. by July 10, and if there is any material that they have which they're not providing because of any claim of privilege, they will identify that by that time.

I believe that correctly reflects my understanding.

MR. JORDAN: Yes, it does.

MR. AXELRAD: The last matter deals with the individuals whom the Board has requested that we provide at the hearing.

The remaining two individuals are Leon English and Jim Williams and --

JUDGE BECHHOEFER: Can you speak a little louder?

MR. AXELRAD: The remaining two individuals are Leon English and Jim Williams.

Leon English was a former site manager, and Jim Williams is the current site manager for HL&P.

We had indicated that we would be pleased to do so, and we're still willing to do that.

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Jim Williams, of course, is at the site and is readily available.

We were wondering if the Board would be willing to reconsider with respect to Mr. English. We have provided many witnesses from HL&P management, starting with Mr. Jordan, Mr. Oprea, Mr. Goldberg, Mr. Turner, Mr. Barker.

We are still perfectly willing to bring Mr. English back, but he is settling down in a new job out in the State of Washington and if the Board, on the basis of what it has heard so far, still would like us to bring Mr. English back, we'll be pleased to do so, but we would ask the Board to consider whether it considers his appearance necessary.

(Board conference.)

MR. AXELRAD: If the Board wishes to discuss it and let us know later, that's fine. We don't need to know right now.

(Board conference.)

JUDGE BECHHOEFER: Based on what we know now, we will withdraw the request, subect to something coming up that would show some particular matter that we think Mr. English might have knowledge of, but for now we will withdraw the request.

We do want the current site manager.

MR. AXELRAD: Yes, Mr. Williams will be available, probably during the week of July 20th, and we appreciate the Board's reconsideration with respect to Mr. English.

JUDGE BECHHOEFER: Right.

MR. AXELRAD: We have no further preliminary matters.

MR. SINKIN: CCANP has only one matter.

JUDGE BECHHOEFER: Yes.

MR. SINKIN: Mr. Chairman, there was a motion made yesterday regarding the scheduling of the meetings in September, and we were just wondering when the Board would rule on that motion.

(Board conference.)

JUDGE BECHHOEFER: With respect to the September sessions, the Board is going to deny the motion.

Should we need further sessions after that, we will consider your request and the request of the City of Austin as well.

We have made no decisions on that, so that will stay open until we decide whether we need further sessions.

MR. SINKIN: Were you able to reach Mr. Duncan last night?

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JUDGE BECHHOEFER: Yes, I was.

MR. SINKIN: Well, in a sense, we thank you, Your Honor, because we suspected this ruling will help us defeat the nuclear plant in the November election in Austin.

That's all I have for this morning.

MR. GUTIERREZ: The Staff has one preliminary matter, Mr. Chairman.

In light of the amount of time yesterday afternoon spent on moving various documents into evidence, the Staff would suggest that to the extent that Intervenors have additional documents that they will move into evidence in the upcoming hearing sessions, and to the extent these documents are not going to be used for impeachment purposes, the Staff thinks it would be wise, so all parties can have adequate time to review the documents and intelligently discuss their admissibility in the hearing sessions, if some kind of a requirement to serve all parties before the next hearing be put upon the Intervenors, just so we have adequate time to read the volume of documents and familiarize ourselves with them and, of course, to the extent any kind of rebuttal is needed, or cross-examination preparation is needed, this would also be helpful.

JUDGE BECHHOEFER: Do the Intervenors have any objection to that?

MR. JORDAN: With respect to documents that we are aware that we are going to provide and that we have the capability of copying in time to do that, we'll be pleased to, within the parameters that Mr. Gutierrez suggested.

We have been copying full steam since, as soon as we knew which documents we were to use and had the copying facilities available in San Antonio, which was about a day after we expected we would be able to, due to the lateness of the Saturday hearing.

But we began providing copies of documents as quickly as we could, and we'll certainly do that.

JUDGE BECHHOEFER: It would save a lot of time, for instance, before the next hearing session to the extent you will have other documents to offer, and again the ones not being used for impeachment purposes but to establish a particular point, it would be much easier if you could circulate them to the parties.

MR. JORDAN: Yes. Well, I think I just said we'd be glad to do it.

JUDGE BECHHOEFER: Right. I'm just saying it would assist matters, speed up things.

MR. SINKIN: As far as CCANP is concerned, we will also be happy to try to comply with that. I believe that the document introduction situation reflects the adverse conditions of the initiation of this hearing, that forced us into the hearing without adequate time to prepare, and we've been trying to play catch-up ever since, and we will continue to try to play catch-up.

JUDGE BECHHOEFER: Right. Well, there is going to be some time before the next hearing session, and considerable time before the September session, so hopefully that will give you some more time.

I assume the Applicants don't have any objection to that arrangement.

MR. HUDSON: No, Your Honor, if it will relieve any copying burden, however, Intervenors can simply identify the documents to us and we'll get our own copies.

JUDGE BECHHOEFER: Right.

Is there anything further before Mr. Sinkin resumes his cross-examination of the panel?

(No response.)

JUDGE BECHHOEFER: Mr. Sinkin, you may proceed.

MR. SINKIN: Thank you.

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Whereupon,

GERALD L. FISHER
CHARLES M. SINGLETON
DAVID G. LONG
GERALD B. MURPHY
JOSEPH F. ARTUSO
RALPH R. HERNANDEZ

having been previously duly cautioned to tell the truth, the whole truth and nothing but the truth, resumed the stand and did testify upon their oaths as follows:

CROSS-EXAMINATION (Continued)

BY MR. SINKIN:

Q I want to return to one matter that we discussed briefly yesterday, and perhaps the panel can refresh my memory as to with whom I discussed it.

It was the matter of the tendon sheathing and the rats and the rabbits.

Was that with you, Mr. Murphy?

BY WITNESS MURPHY:

A Yes, I think I had something to say about it, and I think also Mr. Hernandez.

Q Mr. Hernandez was also addressing it.

BY WITNESS MURPHY:

A Yes.

Q We did explore what could make the clearance too small for the rat to pass through, and as I remember it, the falling of concrete into the duct would be one

of those things.

BY WITNESS MURPHY:

A. That's correct.

Q. And I was looking for other things that could cause the rat to be able to pass through, and I asked a series of questions about possibilities and got mostly, I think all "no's" to the other possibilities.

Can you tell me of another possibility that would prevent the rat from passing through the tendon duct?

BY WITNESS MURPHY:

A. An object in the tendon duct.

Q. Any others?

BY MR. HERNANDEZ:

A. Not that I can immediately call to mind.

BY WITNESS MURPHY:

A. There's one additional thing, Mr. Sinkin, that could possibly do it, would be a deformation of a duct by a vibrator or something falling on it.

Q. If I said a kink in the duct, would that be what you're referring to by a deformation?

BY WITNESS MURPHY:

A. No, I wouldn't necessarily refer to that. I would think that a kink would be put in while the section of the duct was outside the area, in other words,

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the thing bent over something.

A deformation will be something falling on it, a vibrator falling on it.

Q Okay. Thank you.

BY WITNESS MURPHY:

A I might add one thing; no matter what happens to it, we have to fix it to get the tendons through it.

Q I assume, yes, and have you ever had any particular difficulty in fixing it?

BY WITNESS MURPHY:

A To my knowledge now, no.

MR. SINKIN: Let me just check with counsel for the Applicants.

I approached them this morning about Exhibits 31 through 39 to see if there were any that we just stipulate, and I didn't have a chance to talk to the Staff about this, but if there were any that we could just stipulate into evidence without having to go through the process of questioning the panel, and I believe Mr. Hudson indicated there might be at least one.

MR. HUDSON: I'm not sure exactly what you mean by stipulate into evidence. I said I would have no objection to No. 36, because I believe it deals with

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a subject matter that is discussed in the direct testimony of this panel.

I'm not saying that I agree that everything, every statement in there is true. I don't know that. I think you'd have to ask the witnesses that to get it into the record.

I'm just telling you in advance I won't object to that one.

MR. SINKIN: I see. Okay. Well, we didn't get very far there. Maybe I'll just go through them.

BY MR. SINKIN:

Q Does the panel have Exhibit 32, CCANP Exhibit 32 in front of them?

BY WITNESS SINGLETON:

A No, we do not have.

Q I believe copies were provided yesterday.

BY WITNESS SINGLETON:

A We don't have them.

MR. SINKIN: Do you have them, Mr. Hudson?

MR. HUDSON: As I recall, yesterday at the very beginning we requested that the discussion of these be put off until today, and for that reason I don't think they were given to the witnesses at all. We've got the set at the counsel's table that we marked for identification, but that was all we did with them.

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MR. JORDAN: To speed things up, I'll be glad to provide the copies that CEU has for the witnesses to use.

MR. HUDSON: Thank you, Mr. Jordan.

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MR. SINKIN: Mr. Hudson, was CCANP Exhibit 32 authenticated?

MR. HUDSON: No. None of these have been authenticated yet.

BY MR. SINKIN:

Q Mr. Murphy, I think you're looking at the document, are you not?

BY WITNESS MURPHY:

A Yes, I am.

Q Do you recognize the type of document that this is?

BY WITNESS MURPHY:

A Yes.

Q Actually, I see in the box on "Reported By," there's a C. Singleton. Would that be you, Mr. Singleton?

BY WITNESS SINGLETON:

A That's correct.

Q Do you remember this particular Deficiency and Disposition Report?

BY WITNESS SINGLETON:

A I do.

Q Can you tell me what it is? What's it about?

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BY WITNESS SINGLETON:

A. It's a Deficiency and Disposition Report dealing with a procedural violation on a repair.

Q. Is it true and correct, to the best of your knowledge?

BY WITNESS SINGLETON:

A. To the best of my knowledge.

MR. SINKIN: I would move CCANP Exhibit 32 into evidence, Your Honor.

MR. HUDSON: Your Honor, the Applicants will oppose that motion.

The document on its face covers the Fuel Handling Building, Unit 1, a honeycomb area there which was repaired.

There's no contention regarding the Fuel Handling Building No. 1 voids. Therefore, it's not relevant to a contention.

Secondly, it's outside the scope of this panel's testimony, which deals with the contentions as written.

The Reactor Containment Building shell walls are the only part of the concrete that has been called into question.

I think we're going to have a number of objections of this type. Perhaps, it would be best just

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to thrash this matter out now, rather than doing it individually.

It seems to me we produce a very cumbersome, disjointed, unusable record if we try and introduce a number of selected NCR's in other areas of the plant that aren't even called into question. It's also very misleading.

We don't write conformance reports. We only document the things that go wrong.

Therefore, the view of the plant that's given is very misleading and doesn't help the record at all.

I think that this is going to be a recurring situation.

The Intervenors' contentions have been on the books now for almost three years. They've had these documents since January of 1980.

If they had wanted to expand the contentions, to include a lot of other areas, they could have tried to do that.

But, no, they haven't done that. Instead, they're simply trying to dump onto the record a bunch of documents that identify and document the existence -- the catching of a problem and the resolution of the problem in other areas of the plant that aren't in

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question.

I really don't think that that advances this hearing at all.

MR. GUTIERREZ: If the Staff could be heard.

JUDGE BECHHOEFER: Yes.

MR. GUTIERREZ: With respect to the first of Mr. Hudson's points, I think Issue (e) of the December 2, 1980 prehearing conference calls into question and states: "Is there reasonable assurance that the structures now in place at the STP are in conformity with the construction permits and the provisions of the Commission regulations," et cetera.

And the Staff reads that to not limit it just to the containment structures. So I think with respect to relevancy to this proceeding in general, I think it is relevant.

The second point Mr. Hudson brings up -- that is, that this might be an isolated incident -- at this stage of the record, the Staff can't form an opinion whether that's the case or not.

It could be an isolated incident. And, therefore, it may not be too relevant to the overall issues.

But until the record is fleshed out, we don't

know if this represents one of a pattern.

For that reason, I think it's premature to say it's, per se, irrelevant.

MR. SINKIN: And if I might respond to those, Mr. Chairman.

When the Nuclear Regulatory Commission on September 22nd, 1980 instructed this Board to add to the contentions in this proceeding contentions dealing with character and competence, our view was that the Commission was creating a very broad area for examination by this Board.

During the course of that hearing, you have narrowed that area substantially by excluding a number of evidentiary matters that we thought went to the heart of the Applicants' character.

They were generally excluded because they had nothing to do with the construction of the South Texas Nuclear Project directly.

You are now being asked to exclude matters that are directly related to the construction of the South Texas Nuclear Project, because they don't relate to a particular building.

I don't believe the Nuclear Regulatory Commission on September 22nd said, "Please evaluate the Reactor Containment Buildings to see if the Applicants

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have the character and competence to receive a license."

I don't remember it being quite that narrow.

MR. HUDSON: Your Honor, could we be allowed to respond to the Staff's point regarding Issue (e)?

JUDGE BECHHOEFER: Right. I would like to know whether you're going to have a panel on Issue (e).

MR. HUDSON: Yes. I think the panel was the concrete verification panel that just finished. They tested every Category 1 structure out there, except the reactor containment shells.

And they gave you their opinion that it was extremely good concrete. That directly addressed Issue (e).

And if these documents were relevant to any panel's testimony, it was to that panel's testimony.

These documents are clearly outside the scope of the contentions panel, which is what we're dealing with here.

And what they want -- If the Intervenors want to put these in and want to make a case on Issue (e), they should have gotten some witnesses; and they should come forward and make a direct case on Issue (e),

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using these documents ... if they want to do that.

But it's not our responsibility to put on witnesses who can put in the documents that the Intervenors would like to have in as part of their direct case.

This evidence has to be relevant to this panel's testimony ... within the scope of the direct. And it's not.

(Bench conference.)

MR. SINKIN: Mr. Chairman, I would point out that on this panel -- is the last panel.

(Bench conference.)

JUDGE BECHHOEFER: The Board has decided to accept this document.

The principle that we are going to use -- and we will use this to guide all of them -- is the document has to relate either to the testimony of the panel in question, or must be a document specifically involving -- either sent by or to one of the individuals on the panel.

Mr. Singleton specifically signed off on this one. He is the proper person to identify this for the record.

So we will allow this one. We will use the same principle for the others.

The fact that the panel may be -- any people on the panel may be generally familiar with the type of document isn't enough.

But if one of the panel people prepared it or had it sent to him, then that will be enough for this purpose.

So 32 goes in.

(The document heretofore marked for identification as CCANP Exhibit No. 32 was received in evidence.)

BY MR. SINKIN:

Q Moving to Exhibit 33, Mr. Murphy, do you recognize the style of the document -- Brown & Root?

BY WITNESS MURPHY:

A Yes, Mr. Sinkin, I do.

Q In the response box, it says "B&R Design Engineering (G. Murphy)," is that you, Mr. Murphy?

BY WITNESS MURPHY:

A That's right.

I might point out that this is Part II of this document. It is not complete.

Q Well, it's what we received in discovery, and perhaps it was not complete at that time. I'm not sure.

Could you explain, in the second response

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document, what that event was -- the form movement?

A (No immediate response.)

Q Do you see the second box on the first page of the response?

BY WITNESS MURPHY:

A Right.

Q Could you just elaborate a little on the form tie failure?

BY WITNESS MURPHY:

A That's exactly what happened. The form tie came loose.

Q Okay. What is a form tie?

BY WITNESS MURPHY:

A A form tie is what holds -- goes between two forms and holds them together while concrete is being placed in between.

Q And that came loose?

BY WITNESS MURPHY:

A That's right.

Q And what would be the result of that tie coming loose?

BY WITNESS MURPHY:

A A concrete sloughing.

MR. SINKIN: I would move CCANP Exhibit 33 into evidence, Your Honor.

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MR. HUDSON: Your Honor, we would question whether this falls within the rule that you just annunciated.

Mr. Murphy didn't initiate the document, nor was he a recipient on it. He apparently provided some advice to whoever was resolving the deficiency.

Does the fact that his name appears on it anyplace means that it comes into evidence?

MR. SINKIN: Well, Mr. Murphy is referred to in the document. He's familiar with the document, and he is the one that advised what the repair procedure to be used would be ... that this Deficiency and Disposition Report actually records.

MR. HUDSON: We would also note that this is not within the scope of this panel's direct. So it doesn't come within the first part of the rule.

And the contentions that we're dealing with here are set out at the first of the testimony under Contention 1, Parts 2, 3, 4, 5 and 6.

I would ask Mr. Sinkin, how is this document relevant to any of those contentions?

MR. SINKIN: Mr. Chairman, I would call your attention to Page 82 of Mr. Long's testimony, Question 13: "Has HL&P investigated the possibility that voids may exist in other areas of the plant?"

Answer 13: "Yes, we have."

So this panel does testify to areas outside the Reactor Containment Building shell wall.

(Bench conference.)

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JUDGE BECHHOEFER: Does the Staff have any comment on this one?

MR. GUTIERREZ: Well, the Staff would only make the observation that perhaps some of the difficulty, this direct testimony I think we do disagree with the Applicants to the extent that they say this only refers to the narrow contentions drawn.

As we read the testimony it does address specific contentions, but it does at other times, Mr. Singleton talks about how Quality Control, Concrete Quality Control Inspectors generally performed, or general concrete practices.

So, it is not a discrete line as to what this panel is addressing.

On the other hand, the Staff is sensitive to the fact that having inundated with instances that may or may not eventually develop into a pattern, there is no basis of judging the overall relevancy to these documents at this time.

(Bench conference.)

MR. BECHHOEFER: On this one the Board has decided that it does not technically fall within the criteria we announced before. We are going to deny it for the present, but under the provisions of 10 CFR Part II, Appendix A, Part V, Section D(7), it states

that the Board may receive evidence reserving for later determination the question of admissibility. We are going to do that in this case.

If this proves to be material to a particular point that the Intervenors raise in their case, then we may later reconsider this one.

At this time we do not have an adequate showing of materiality or relevance, so we will deny it at this point, but it has been identified. At least one individual has said he is familiar with the topic of it, the topic becomes relevant to the Intervenors' case, we may consider this later in the hearing.

MR. SINKIN: Mr. Chairman, if the detection of void is not relevant to the Applicants' case, then I am not sure what we have heard that is relevant to the Applicants' case.

This document deals with the detection of voids. We weren't planning on putting on very much direct case about detection of voids. The Applicants are doing the case on voids. The burden of proof was on them.

MR. HUDSON: I object to the characterization of the document, Your Honor. It does not deal with detection of voids. It deals with the problem concerning how you mix the cement, I think, the fix of the grout to

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fix the void, and it deals with the form tie system that created the void.

JUDGE BECHHOEFER: That's correct. If there's a particular issue whether that was done correctly, then we will later reconsider this. I am not saying that it cannot come in, ever, but at this point it cannot.

(CCANP Exhibit No. 33 was rejected.)

BY MR. SINKIN:

Q. Moving right along, CCANP Exhibit 34, Mr. Murphy, do you recognize the nature of that document?

BY WITNESS MURPHY:

A. Yes. I do, Mr. Sinkin.

Q. What is that document?

BY WITNESS MURPHY:

A. It is Part 1 of a Deficiency and Disposition Report.

Q. In the first box titled "Observations" you see a specification referred to by number in that box?

BY WITNESS MURPHY:

A. Yes, I do.

Q. And what does that specification address?

BY WITNESS MURPHY:

A. Concrete construction.

Q. Any particular element of concrete construction?

BY MR. MURPHY:

A I am not sure I understand that.

Q Well, the specification itself addresses everything concerned with. Are you familiar with Paragraph 3.3 of that specification in Revision (e)?

BY WITNESS MURPHY:

A Revision (e). It appears that it addresses the consolidation of concrete.

And I might point out that it says that it has paraphrased the specification language, and it -- particular attention shall be given to the consolidation of all concrete in Category I structures such that the concrete in place shall be practically free of both internal and external voids, which means that the concrete construction specification did not ever expect that there would be no voids in the concrete.

And the rest of this is the documentation of where this occurred.

Q And turning to the last page of the document, there is a sheet titled "Non-conformance Routing Sheet." Do you recognize the general nature of that sheet?

BY WITNESS MURPHY:

A The last sheet of Exhibit 34?

Q Yes. Do you have a Nonconformance Routing Sheet?

BY WITNESS MURPHY:

A No. I do not.

The last sheet of this is a field request for engineering action No. 2C0563.

Q Well, apparently on your copy one page was left out, and I will show you mine.

(Document handed to witness.)

BY WITNESS MURPHY:

A This is a copy that you --

Q Do you see that sheet now?

BY WITNESS MURPHY:

A Yes. I do.

Q Is that customarily on the back of an NCR or a DDR?

BY WITNESS MURPHY:

A I would assume that it was customarily on the back of the NCR's in this period of time that were covered by the NCR procedure at that time.

I do not think that this is on all NCR's that have been written on this project.

Q There was a time that it was used --

BY WITNESS MURPHY:

A That's right.

Q -- and there was time it was not used?

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BY WITNESS MURPHY:

A Yes.

And, obviously, this must be the time it was used.

Q Do you have any idea what that time frame was as to when it was used, and when it was not used?

BY WITNESS MURPHY:

A No. I would have to defer to Mr. Singleton or --

BY WITNESS SINGLETON:

A I don't recollect, either.

Q Okay.

MR. SINKIN: I move the admission of CCANP Exhibit 34, Your Honor.

MR. HUDSON: Applicants would oppose the admission. Once again, the scope of this panel's direct testimony is the contentions. That's the thrust of the testimony.

The fact, as Mr. Gutierrez points out, that they occasionally have to give some background information to make the thrust of their testimony make sense to everyone does not open up all areas of the plant for questioning.

JUDGE BECHHOEFER: Mr. Hudson, let me ask you something. The way I read it -- maybe I am just a

layman reading this -- it looks to me like this relates to Reactor Containment Building No. 2, the Emergency Access Shaft. It looks like from the third page of that document that that is the containment --

MR. HUDSON: The particular pour that is referenced on Page 1 is CI2M9, which stands for Containment Internal Unit 2 Mat, or slab, No. 9.

Contention 1.2 says there has been a field construction error, and as a result extensive voids exist in the concrete wall enclosing the Containment Building, i.e. the reactor shells.

This panel is sitting here equipped and ready to tell you everything you could possibly want to know about the voids that are the subject of that contention.

They are not prepared to talk about every NCR, every DDR that has ever been written about concrete in the building.

If these documents come in, we are going to have to reserve the right to put on a rebuttal panel of witnesses to deal with these. We cannot handle all of this in redirect. And I think this document clearly falls outside the scope of the direct, and there is no one on this panel whose name appears on this, or who is in any way involved in this DDR.

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Therefore, under the rule you announced earlier it is clearly not admissible.

MR. SINKIN: Mr. Chairman, I would call your attention now to Page 78 of Mr. Long's testimony, where in answering Contention 1(2) he talks about the lower side of the Unit 1 spent fuel pool slab.

MR. HUDSON: That's correct, Your Honor, and that and that was Exhibit 36 that I said earlier I would have no objection to. That exhibit clearly deals with this topic that is raised in our direct, and I have already said we will have no objection to that being introduced into evidence once it is proved up as a valid document, and we get some understanding of what the document is.

MR. SINKIN: Not being a lawyer, Your Honor, it is not readily apparent to me. Does that mean if they talk about the slabs of the buildings it is only the parts of the slabs that they raise that we get to talk about?

We don't get to explore the rest of the slab and other problems it might have had?

MR. HUDSON: We are exploring the contention that you phrased, Mr. Sinkin, that you have had a chance to amend, and if you want to address Issue (e) through a direct case, you have plenty of time to give us a list of

witnesses and develop that case.

We are not to be faulted for the fact that you have failed to make a case.

MR. GUTIERREZ: Mr. Chairman, if the Staff can be heard, it would only make the observation that this particular exhibit seems to deal with the improper concrete vibration.

The Applicant has acknowledged in the past that they have had faulty procedures. They have told us how they corrected it, and they have been cited for it in the past, so in that sense an objection as to it being cumulative may lie, but with respect to its relevancy, improper concrete vibration ....

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MR. SINKIN: I would also point out, Mr. Chairman, if you'll refer to the pictures in the back -- turn to the third page of the document, the second page of pictures -- and maybe I'm not reading it right.

But it says, "RCB II, emergency access shaft, northeast face."

Now, "face" says to me "not slab," but "wall."

MR. HUDSON: Is Mr. Sinkin under oath and testifying as to the meaning of these pictures and what all these initials mean?

MR. SINKIN: I'm just trying to help the Board understand the documents. If you'd like to correct my interpretation, you're welcome to do so.

MR. HUDSON: I'll correct it real simply. I'll ask a question -- Well, I can't ask a question.

Why don't we ask the witnesses what it means?

JUDGE BECHHOEFER: All right. That's a good idea.

WITNESS MURPHY: The slab is not one dimensional. It does have a depth.

BY MR. SINKIN:

Q Are you saying, Mr. Murphy, that --

4-2

BY WITNESS MURPHY:

A. This is the side of the slab.

Q. Is the side of the slab then the same as the wall?

BY WITNESS MURPHY:

A. As the mat.

Q. Is that the outside edge of the Reactor Containment Building as you come up to it? Is there a wall built outside that, or is that the wall itself?

BY WITNESS MURPHY:

A. The wall is built on the top of this.

Q. Well, when I think of a wall of a building, I think of the wall as running from the bottom of the building to the top of the building. And that wall may be composed of a floor that's done at one level and the outside face of that floor becomes the wall, or it could be bricks built up from the base, and that becomes the wall.

Is this the outside face of that building?

BY WITNESS MURPHY:

A. The outside face of the building begins at the top of this slab. A wall has generally two sides. This doesn't. This has got one side.

(Bench conference.)

JUDGE BECHHOEFER: The Board has decided to

4-3

treat this the same as we treated the last one, to reject it now. But if the specific matter comes up later as part of the Intervenors' case, it can be moved into admission at that time. It has been identified.

(CCANP Exhibit No. 34 was rejected from evidence.)

MR. SINKIN: The next exhibit is CCANP Exhibit 35.

BY MR. SINKIN:

Q Mr. Murphy, I think I know the answer to this question. But, are you familiar with that style of document?

BY WITNESS MURPHY:

A Yes, I am, Mr. Sinkin.

Q Can you tell me in that document where the Pour CI2-M7 is?

BY WITNESS MURPHY:

A It is the basemat of the Unit II containment.

MR. SINKIN: I would point out, Your Honor, that the pictures attached reflect precisely the quality of the pictures we received in discovery.

BY MR. SINKIN:

Q I would ask you to turn to Page 4 of this document, Mr. Murphy.

4-4

BY WITNESS MURPHY:

A. Yes, sir.

Q. In the first big box marked "Description," what is it that's ing described?

BY WITNESS MURPHY:

A. What is it that is being described?

Q. That's my question, yes.

MR. HUDSON: Your Honor, we'll object to the question because the document is exactly the same document as the previous one. It just deals with a different slab. Therefore, following the rule that you have already announced, it's not admissible into evidence through this panel.

We don't see any reason to have any questions about it. Just speed things up and get along with the next one.

(Bench conference.)

MR. SINKIN: Mr. Chairman, before you --

JUDGE BECHHOEFER: Do you need further questions for identification or not, because -- it looks to me like the document is the same; and the ruling will be the same.

But if you need more questions for identification purposes, if it comes up later --

MR. SINKIN: I don't think we need more for

4-5

identification purposes, Your Honor; but I would stress that what we're talking about here, if you read the nonconformance routing sheets at the back, they're talking about vibrators in 34; they're talking about repair procedures in 35.

This panel is here to testify about the use of vibrators, the use of repair procedures and all of the things that went on in the concrete.

These are documents that relate to that. And you are excluding them from evidence.

MR. HUDSON: Your Honor, this panel is not here to give a seminar on the use of vibrators. The panel is here to talk about how the voids in the reactor containment shells were repaired.

They're here to talk about a field document sketch being lost. They're here to talk about membrane seals.

They're here to talk about steel reinforcing bars omitted in the containment structure and possibly other Cadwelding problems; i.e., they're here to discuss Contentions 1.2.3.4.5 and .6. That's all they're here to talk about.

MR. SINKIN: They give extensive testimony about how concrete is placed, how it is vibrated and the whole trip on what they do with concrete, in order that

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everyone understands what's going on.

Now, they're being allowed to put in testimony on "Here's how we do it, and it works." And we are not being allowed to put in evidence on "Here's how maybe it doesn't work sometimes."

MR. HUDSON: He can put on as much evidence as he wants. All he needs is a witness.

JUDGE BECHHOEFER: I might add: You do have witnesses, and some of them are -- could probably testify to these matters.

In fact, I expect they will. So to the extent that it becomes -- you may be able to do that at that time.

MR. SINKIN: CCANP --

JUDGE BECHHOEFER: Anyway, the ruling is the same as on the last one. Rejected for now.

(CCANP Exhibit No. 35 was rejected from evidence.)

MR. GUTIERREZ: Mr. Chairman, I don't believe the Staff was heard on that.

JUDGE BECHHOEFER: I'm sorry.

MR. GUTIERREZ: I want to bring up a separate issue, and that's the cumulative issue we raised in the last exhibit.

We'd only like to call the Board's attention

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to the fact that the Applicant was cited for improper concrete vibration in 79-04, 79-15. They addressed it there. They addressed it in response to Show Cause as one of the reasons for some of the voiding.

In that context the documents that Mr. Sinkin is producing, a good argument could be made that they're cumulative.

If, on the other hand, what he's saying is they knew about it way back in '77, and the problem continued on into '78, '79 and here we are in 1980, it might be relevant for that reason.

MR. SINKIN: And that is precisely what we are doing, Your Honor.

JUDGE BECHHOEFER: But he also will have a witness who can testify about the '77 period.

And as I said, these documents have been identified; and it's a question of their showing the relevance to a particular point.

MR. SINKIN: Mr. Chairman, could you enlighten me as to the witness you're referring to?

JUDGE BECHHOEFER: Well, there are several of the ones on your list.

MR. SINKIN: On the CCANP list?

JUDGE BECHHOEFER: That I can't tell you. There are -- either on the CCANP or CEU list ... either

one. I'm not sure. I could look. It may well be CEU's list.

But we are allowing you to combine your cases, to the extent possible, on this. We will not preclude you from using CEU's witnesses for purposes of your own case.

MR. REIS: Mr. Chairman, the Staff is very concerned about expanding the hearing beyond the scope of what it should be.

The hearing is already taking a long time. However, against that, we do have the Commission in this case telling us that we are to look at things with a little more depth than usual.

And in connection with what you've said before, I just want to call your attention -- and I can't think of the precedent offhand -- but there are some cases where the Appeal Board has indicated that intervenors may make their case through cross-examination.

JUDGE BRIGHHOEFER: I'm aware of that --

MR. REIS: It may be that they should have introduced it in the last panel and not try to do it now. Many of those same people who were on the last panel are there now.

I don't think necessarily we should reopen the

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last panel. That's over and done with.

But I think all of these things should be weighed in the considerations of the Board: The remand from the Commission, its charge and the questions -- the general questions that this proceeding is to consider.

(Bench conference.)

JUDGE BECHHOEFER: These documents have been identified. And to the extent that the Intervenors' witnesses can address some of these problems (the existence of voids, et cetera), they may be introducable at that time.

Also, at that time we will have to consider whether they are cumulative or not.

MR. SINKIN: CCANP Exhibit 36.

JUDGE BECHHOEFER: I understand there's no objection to that. So --

MR. HUDSON: That's right, Your Honor. It's within the scope of the direct.

We have not authenticated it yet, by the way; but I don't expect that to be a problem.

JUDGE BECHHOEFER: Well, in each case -- all of these things are subject to authentication.

MR. HUDSON: That's correct.

BY MR. SINKIN:

Q Mr. Murphy, are you -- or any members of the

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panel that has seen this document, generally familiar with the type of document that it is?

BY WITNESS SINGLETON:

A I believe I am, Mr. Sinkin. It's a Brown & Root Deficiency and Disposition Report for the Fuel Handling Building concerning voids in areas in the under side of the 21-11 slab.

Q And you're familiar with that particular event?

BY WITNESS SINGLETON:

A I reported the deficiency.

Q To the best of your knowledge, are the documents here true and correct?

(Witness reviews documents.)

MR. HUDSON: Mr. Sinkin, what do you mean by "what documents"? Are you asking for the witness' opinion on each document that you've bundled together as CANP 36?

If so, I'd like to go through them individually, if you're asking Mr. Singleton has he seen each one of them, does he know if each one is true and correct; are you addressing that question to the panel at large?

I don't understand your question.

MR. SINKIN: The document refers to a

4-11

particular deficiency. There are 12 pages in the document that trace the history of the deficiency and its disposition.

BY MR. SINKIN:

Q To your knowledge, Mr. Singleton, is that history as recorded in these documents accurate?

BY WITNESS SINGLETON:

A I'm not familiar with the Page 1 of the attachment, of the interoffice memorandum, or Page 2.

I am familiar with Page 3, 4; Page 5 I am not familiar with, or 6. Page 7, which is Part 2 of it, I am familiar with. I am familiar with the nonconformance routing sheet. I am familiar with the FREA and the attached sketches and pictures.

I may also note that these pictures, like you're talking about the quality of them, there was only one set of pictures taken, and the set of pictures was attached to the original, and this sketch and the set of pictures, what you can make out, is the extent of the void area after all the exploratory chipping was done in the removal of loose laitance and unsound concrete.

The pictures do not reflect the extent of the void as discovered. It reflects the extent of the void after exploratory chipping, removal of the concrete to define the limits of the repair.

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To the best of my knowledge, these are the documents related to that subject.

MR. SINKIN: I move the addmission of CCANP Exhibit 36, Your Honor.

MR. HUDSON: In light of the witness' testimony, we would move to strike those pages that he has never seen, can't identify, that no one on the panel has testified about.

I believe those pages --

MR. SINKIN: Pages 1 and 2, I believe, were the pages, and I would ask that the exhibit --

MR. HUDSON: And 5 and 6, I believe he named.

My understanding of the witness' testimony is that he was familiar with the DDR itself, both Parts 1 and 2, with the routing sheet, and with the FREA and the attached sketches and pictures, but not any of the other documents.

BY MR. SINKIN:

Q Mr. Murphy, looking at Page 1, is that your name, distribution, G. R. Murphy?

BY WITNESS MURPHY:

A That is correct.

Q And looking at Page 2, is that your name, CC, G. R. Murphy?

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BY WITNESS MURPHY:

A. That's right. I am familiar with these.

Q. And you are familiar with those pages?

BY WITNESS MURPHY:

A. Yes.

Q. Mr. Murphy, turning to Page 5, there is a request for clarification from Mr. Crane to Mr. Gardner.

Were you aware of that request being made?

BY WITNESS MURPHY:

A. No, I do not recall this.

Q. You do not recall this specific request?

BY WITNESS MURPHY:

A. Not this specific request.

JUDGE BECHHOEFER: Could I interrupt a minute?

MR. SINKIN: Sure.

JUDGE BECHHOEFER: Would it be possible for us to accept these documents subject to striking the only two that have not now been identified?

Mr. Peverley, I notice, is on the list, and he's a later witness.

MR. SINKIN: We would be satisfied with that.

JUDGE BECHHOEFER: He could be asked, and if there's no recollection about them -- I think it would save time.

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MR. HUDSON: That's agreeable with us, Your Honor.

MR. SINKIN: That's fine.

JUDGE BECHHOEFER: Okay. So it will be accepted, subject to two pages being struck if Mr. Peverley cannot identify them.

(CCANP Exhibit No. 36 was received in evidence.)

BY MR. SINKIN:

Q. Turning to CCANP Exhibit 37 -- I'll give you a break, Mr. Murphy -- Mr. Singleton, do you recognize the form of that document?

BY WITNESS SINGLETON:

A. I appreciate that.

Yes, I do, Mr. Sinkin. It's a Brown & Root, Incorporated, Deficiency and Disposition Report, Part 1.

Q. And on the first page in the "Observations" box there is CI1-W18, can you tell me where that -- what that identifies?

BY WITNESS SINGLETON:

A. CI1-W18 is a secondary shield wall. It's an internal wall of the reactor containment building, Unit 1.

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In the W18C is also secondary shield wall, an internal wall Reactor Containment Building, Unit 1.

Q Are you familiar with the event of the voids being found, or the void being found uderneath the block-out in that west wall, and another completely through the thickness of the north wall?

BY WITNESS SINGLETON:

A No, sir, I am not, Mr. Sinkin. The Reactor Containment Building at that time was not my assigned area of responsibility, so I am not familiar with this particular void.

Q Is any other member of the panel familiar with the voids that were found in the second shield wall of Reactor Containment Building No. 1?

BY WITNESS MURPHY:

A Yes, Mr. Sinkin, I was aware of these, and I know that we had design engineer representatives involved in the repair of these.

MR. SINKIN: Mr. Chairman, I would move into evidence CCANP Exhibit 37.

MR. HUDSON: Your Honor, we would oppose that motion. Again, we are dealing with something outside the scope of this panel's testimony.

I would also note that this is reported, this DDR is reported by Mr. Shah, who has been called as an

5-2

Intervenor witness. If they wish to put the document in through him, they may attempt to do so.

MR. SINKIN: Mr. Chairman, I think that Mr. Gutierrez has earlier made an excellent point in these proceedings, and that is that the burden is on the Applicants and we can, if we choose, make our entire case through cross-examination.

MR. HUDSON: On the testimony we present, that's right.

Ask questions. You've got the testimony, Mr. Sinkin. Ask questions about that testimony, instead of trying to throw in a lot of irrelevant trash.

MR. SINKIN: I'm surprised to hear you refer to your own DDR's as trash, Mr. Hudson.

(Bench conference.)

JUDGE BUHHOEFER: The Board will exclude this one. We note that Mr. Shah prepared this one. We also note that Mr. Peverley is on the distribution list, and so we reserve the right later to reconsider, but at this time we are rejecting it.

(CCANP Exhibit No. 37 was rejected.)

BY MR. SINKIN:

Q CCANP Exhibit 38, Mr. Singleton, again the nature of the document, are you familiar with it?

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BY WITNESS SINGLETON:

A Yes, sir. It is a Brown & Root Quality Assurance Deficiency and Disposition Report, Part 1.

Q And the designation in the first observation box o CA1-W7, to what does that refer?

BY WITNESS SINGLETON:

A It deals with doing the Quality Control final preplacement inspection of a containment access wall in Unit 1, it is noted that two embed plates and numerous shear ties were omitted.

This is an NCR that was written on a procedural violation, and it shows that the program did work as far as quality assurance being the final inspection did so denote that they was missing shear ties in embed plates, and, therefore, the concrete pour was not made. The shear ties were installed and embed plates were installed.

Q I believe the record will reflect that my question was in observation box No. 1 what does CA1-W7 refer to?

BY WITNESS SINGLETON:

A Is that a question?

MR. HUDSON: Is that a question? I believe it has been asked and answered.

JUDGE BECHHOEFER: He answered that.

5-4

MR. HUDSON: I believe Mr. Singleton gave a very full and complete answer. I don't see how counsel could ask for more.

BY MR. SINKIN:

Q Mr. Singleton, W7 in CA1-W7, what does the "W7" stand for?

BY WITNESS SINGLETON:

A The letter "W" stands for wall, and the 7 is just a number assigned to that wall pour.

Q Is that a lift number; is that similar to a lift number?

BY WITNESS SINGLETON:

A No, sir. It is a number, a unique number assigned to a unique wall or unique area in that area. On the interior walls we did not assign them numbers like lifts, like we did not number the shell like Lift 5 or Lift 6. Each one of them had a different pour number.

Q Thank you for explaining to me what CA1-W7 means, which was my question.

You are familiar with the event that is covered by this DDR, Mr. Singleton?

BY WITNESS SINGLETON:

A I did not have first-hand knowledge of the event, only through hearsay conversation.

Q You have heard about it from people at the site?

BY WITNESS SINGLETON:

A I heard about it through people in the Quality Control Department.

Q Mr. Murphy, are you familiar with this particular event?

BY WITNESS MURPHY:

A No. I do not recall this. This would be something that I wouldn't have any knowledge of. Nobody would bring it to my attention. It would be purely a QA matter, QC matter. During the course of an inspection they found something wrong and they prevented a pour from being made until it was corrected.

Q That sort of matter would not come to your attention?

BY WITNESS MURPHY:

A No.

MR. SINKIN: Mr. Chairman, I'm going to save this document until Mr. Peverley is on. It is marked for identification, and I will bring it up with him.

BY MR. SINKIN:

Q The final exhibit is CCANP Exhibit 39. Mr. Murphy, are you familiar, either of you, with this event?

BY WITNESS MURPHY:

A I do not recall this specific event, Mr. Sinkin.

Q Mr. Singleton?

BY WITNESS SINGLETON:

A Let me glance through it just a second, if you would.

Q Surely.

BY WITNESS SINGLETON:

A No. I am not.

I know that it was reported by HL&P. Perhaps Mr. Long may be familiar with it.

Q Mr. Long?

BY WITNESS LONG:

A Let me have a chance to glance through it for just a second.

BY WITNESS LONG:

A I recall this document.

Q Let me just ask you, Mr. Long, in Box 8 of the document that says "Reported by HL&P," as Mr. Singleton noted, does that mean HL&P QA would have reported it, do you know?

BY WITNESS LONG:

A I think during that time period it could have been HL&P Construction or HL&P QA. Anybody at the site could prepare a Nonconformance Report.

MR. SINKIN: Mr. Chairman, I will save this one for Mr. Peverley, too, since he is on the distribution

5-7

list at the bottom.

JUDGE BECHHOEFER: I note that Mr. Kesarinath is also on the last page.

MR. SINKIN: Yes.

JUDGE BECHHOEFER: He seems to have been involved in this.

MR. SINKIN: That completes the exhibits that we intended to introduce very quickly this morning, but it has not been so quick. It seems that we are near our normal break time. I would be perfectly willing to break and then do cross-examination. However the Board wants to handle it.

JUDGE BECHHOEFER: Let's have a break, 15 minutes.

(A short recess was taken.)

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6-1

JUDGE BECHHOEFER: Back on the record.

The Applicants have asked us to outline a schedule for the first night of the July session. That will be a night only session, 7:00 to 10:00.

We expect the oral argument to take not more than about an hour, which means approximately ten to fifteen minutes each, and we do expect you to try to organize your arguments within that time frame, so that we will have a couple of hours for evidentiary hearings that evening.

Mr. Sinkin, you may proceed.

MR. SINKIN: Yes. Just one administrative matter, Mr. Chairman.

I did discuss briefly with Mr. Hudson the nonconformance log for the plant. We have a copy that has been updated to some extent, and we wanted to submit that into evidence, hopefully on a stipulated basis, where it would go straight in. But we don't have the facilities to copy the large pages, and we would not be able to present it until the July 20th session. I just wanted to raise that matter.

MR. HUDSON: Do you want a response, Your Honor? I don't hear a motion that it be admitted. It hasn't been proved up as relevant, accurate, or anything else.

6-2

I will state generally that we would be opposed to putting it in.

JUDGE BECHHOEFER: I don't think -- certainly without it in front of us we are not going rule on it, but do you need these witnesses to put it in, or could you use other witnesses?

MR. SINKIN: I think any witness that has ever dealt with the nonconformance can probably put it in.

JUDGE BECHHOEFER: Including your own?

MR. SINKIN: Yes.

JUDGE BECHHOEFER: Okay. Well, why don't you save that for your own witnesses, then.

MR. SINKIN: Again, Mr. Chairman, we are hesitant to save anything for our witnesses, because we may decide that we can rest on what the Applicants have done and base our case on cross-examination.

So I am hesitant to save anything. I would rather introduce it through their witnesses. But we can deal with that matter in July.

JUDGE BECHHOEFER: All right.

BY WITNESS SINKIN:

Q Mr. Hernandez, we left you with an unanswered telephone call. At least an answer from a telephone call not received, as to the date of the mapping of the voids

6-3

in Lift 8, and the first date for drilling of the voids in Lift 8.

Can you give us those dates now?

BY WITNESS HERNANDEZ:

A. I can give you the information that I received from my Engineer in Houston Lighting & Power.

March 14th, 1979, HL&P Quality Assurance received a memo from Brown & Root Quality Assurance regarding the mapping of the Lift 8 potential voids.

On June 1st, 1979 a FREA was signed with regard to exploratory drilling that authorized exploratory drilling for the Lift 8 investigation.

On June 13th, 1979 an NCR was written and received by Houston giving the information concerning the exploratory drilling.

As previously stated, June 18, 1979 this was reported to the NRC as an item of concern under 10 CFR 5055(e).

Q. Let me just understand. The memo on March 14, did that say mapping has been done?

BY WITNESS HERNANDEZ:

A. Yes, sir. That provided the results of the mapping.

Q. Mr. Murphy, on Lift 15, to just wrap up a few unanswered questions, how far was the concrete pumped

from the truck to the pour?

BY WITNESS MURPHY:

A. How far was it pumped?

Q. Now, I may not understand the process, but if I understand correctly, you would bring the truck in and the concrete would be pumped from where the truck is up to the pour and poured; is that correct?

BY WITNESS MURPHY:

A. That is correct.

Q. How great a distance was that?

BY WITNESS MURPHY:

A. That would be from ground level, which is approximately at Elevation 28 to Elevation, probably around Elevation 130.

So there would be a vertical distance of approximately 100 feet, and then circumferentially around the containment, half way around the containment.

Q. Were any tests made of the concrete already in the pour during the pour?

BY WITNESS MURPHY:

A. Yes. There were the normal control tests taken.

Q. From concrete already poured, that is already down in the pour, I'm talking about, not --

6-5

BY WITNESS MURPHY:

A Yes. Concrete is sampled every 100 yards.

Q Was there any indication in those samples that the concrete was thickening? Is such a test done?

BY WITNESS MURPHY:

A This --

Q In other words, we discussed yesterday one of the problems about the pumps breaking down --

BY WITNESS MURPHY:

A That's right.

Q -- was that concrete was moving too slowly, thickening up, and, therefore, wasn't able to penetrate as it normally would. Is that a correct --

BY WITNESS MURPHY:

A That's essentially --

Q Essentially what happened?

BY WITNESS MURPHY:

A Yes.

Q Were any tests done that would show that the concrete was thickening up in that manner?

BY WITNESS MURPHY:

A No. This is a visual observation from, well, made by the vibrator operators. As long as the concrete moves and is responsive to vibration, it is adequate.

6-6

Now, the flowability could be decreased with time.

Q Was anyone monitoring the flowability,-- I believe is the word you used?

BY WITNESS MURPHY:

A Yes. The Inspectors, and the individuals vibrating.

Q Let me give you a hypothetical situation. If the pump had completely failed, both pumps, and you were unable to fix them, and you had to stop the pour in the middle, what would be the situation you would face? What would you do at that point?

BY WITNESS MURPHY:

A Well, --

Q After you stop the pour, you can't restart it, the machine burns out, so you can't restart it at all that evening, you have no backup, what would you do?

BY WITNESS MURPHY:

A Well, you would have two alternatives. You could go to alternate means of conveying the concrete which would be crane and buckets, or you could just form a joint where you ran out of concrete.

Q The pumps that you were using, were they Diesel, gasoline, electric, what kind of pumps?

6-7

BY WITNESS MURPHY:

A. It would have been either gasoline or Diesel. I am not going to --

Q. One or the other?

BY WITNESS MURPHY:

A. One or the other, yes.

Q. That's what I wanted to find out. That's fine. They were not electric?

BY WITNESS MURPHY:

A. They were not electric.

Q. Mr. Artuso, you have testified in the previous panel, and at that time you were talking about containment, so I am taking your testimony with this panel now, you testified that you expect to find more voids than generally expected in a containment wall, unless special precautions are taken.

Do you remember that testimony?

BY WITNESS ARTUSO:

A. Yes.

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6-8

BY MR. SINKIN:

Q You were comparing a non-containment wall and a containment wall.

BY WITNESS ARTUSO:

A Yes.

Q Okay. What special precautions do you think should be taken when a containment wall is being poured to avoid the creation of voids?

BY WITNESS ARTUSO:

A There are a number of planning steps that should be taken.

First of all, you must have a concrete mixture that has the proper workability.

Secondly, you must look at the section that you are placing. Look for any possibility of congested areas where the concrete will not flow readily.

Provide a means of assuring that the workmen understand where the most likely areas are that they should concentrate on for vibration.

Provide means of eliminating any serious obstruction.

During the placement careful attention must be given as the concrete is placed and is vibrated that it does in fact flow to the corners, to the crevices around the reinforcements, around the embedments.

This is done visually. You can see the response to the vibration.

After this is completed, the next step would be the post-placement inspection of the placement, because even with all of these steps that I have given you, concrete is not a perfect material. It is an imperfect material.

It does form -- there are formations of voids when you place concrete. The intent is to minimize this.

Q Were there any other particular special precautions?

BY WITNESS ARTUSO:

A As I say, if during the placement there are any indications or questions of a likelihood of a void then it should be investigated and examined, much as was done at STP.

Q Are you familiar with the type of pour that was done in Lift 15?

BY WITNESS ARTUSO:

A Yes. I evaluated the report.

Q And you are familiar with the conditions, the adverse conditions under which the crews were working, in terms of the equipment, and length of the pour, and all of that?

BY WITNESS ARTUSO:

A. Yes. I am familiar with those.

Q. Would it be your opinion that that pour should have been stopped sometime before completion?

BY WITNESS ARTUSO:

A. I know that there were problems. I really don't know how serious the problems were.

I would say that in retrospect it would have been easier to have stopped the pour. There is nothing magic about another construction joint.

For example, at Three Mile Island we had a classic case. During the placement we knew -- I am not speaking of the case that you are probably familiar with. I mean the construction of the unit that did not fail.

That particular unit we placed the concrete in the shell, and we had blockouts, severe congestion of rebars. It was a similar-type of containment. It was a prestress containment.

We all kind of suspected it was going to be a difficult placement. I had maybe 20 years of experience at that point, and I looked at it and I questioned it. But had I been smarter I would have said, "You are crazy. Don't do it." I would have screamed to the high heavens, "You are going to save yourselves $10 million if you don't do that." But I did not. I thought, well, let's see what

5-11

happens.

They started placing it. I was not there when they placed it, but the reports I heard was they knew they had voids developing around the blockouts.

After they had been into the pour ten hours, if they would have gotten fire hoses and washed out all of the concrete that they had there, they would have saved themselves six months of work and probably $10 million.

Q. Thank you.

On Pages 9 and 10, I believe it is Mr. Murphy that is testifying that there discussions of modifications to CCP-25, the concrete placement -- I'm sorry, the Quality Construction procedure for concrete placement.

Do you see that?

BY WITNESS ARTUSO:

A. Yes, sir. Mr. Sinkin.

BY WITNESS ARTUSO:

A. Are you addressing me?

Q. Either of you.

In Answer 9 there are three particular items that are mentioned, a written placement plan, a pre-placement meeting, and a post-placement meeting.

My question is: Would those fall within your category of special precautions, Mr. Artuso?

6-12

BY WITNESS ARTUSO:

A. Yes. Very definitely.

Q. My question of Mr. Murphy is: You used the word -- I guess it was used in the question to you -- "modify."

Are these things that were not done prior to July 1980? Was there a written placement plan for each placement prior to July 1980?

BY WITNESS MURPHY:

A. No. Not a formally written one for each placement.

Q. Was there a preplacement meeting to review the informal plan?

BY WITNESS MURPHY:

A. To my knowledge, for all of the containment pours, there were meetings held with the field , on a field level, the superintendent to the foremen, prior to these.

Q. Then can you elaborate for me a little bit what changed from pre-July 1980 to post-July 1980 in terms of the preplacement meeting?

BY WITNESS MURPHY:

A. They were formally required now, and there were meeting minutes developed, and there were specific people that had to attend them.

5-13

Q. Is there a similar difference then in No. 3, the post-placement meeting; were there post-placement meetings prior to July 1980?

BY WITNESS MURPHY:

A. Not to my knowledge.

Q. I see. So that's a new requirement and a new procedure altogether?

BY WITNESS MURPHY:

A. I would say yes.

BY WITNESS SINGLETON:

A. Mr. Sinkin, could I clarify something on that, please?

Q. Sure.

BY WITNESS SINGLETON:

A. There were at the time in the procedure CCP-25, and the specifications, there was a requirement for a preplacement plan on complex pours.

And there was a preplacement plan for this complex pour on Lift No. 15.

I do not believe there was a formal requirement for the preplacement and post-placement meeting, but I do know that we had the requirement for complex, plan on complex pours.

The 1980 date that you mentioned, June or July, I believe what the CCP-25 was modified at that time

6-14

was to make the requirement of a written preplacement plan for each safety-related placement.

Prior to that we just had them for pours that were termed or deemed to complex in nature.

Q. There would be pours in a reactor containment shell that would be safety-related, but not complex?

BY WITNESS SINGLETON:

A. No, sir.

All of the pours in the reactor containment shell were deemed to be of a complex nature.

Q. Well, then I don't understand Mr. Murphy's answer that, number one, a written preplacement plan for each placement, which refers to modifications to CCP-25 applicable to all RCB snell placements. So there was no modification. That's the same that it was before.

BY WITNESS SINGLETON:

A. The preplacement plan at that time was in the form of a FREA, F-R-E-A. And we realized that there would be areas that we would have to take special precautions to.

There may be areas that we would have to deviate a little bit from the procedure to insure that we had a quality placement.

This written placement plan was in the form of a field request from engineering action from site

5-51

to design saying "This is how we want to place this pour. Give us your approval.

Now, these placement plans, like I say, were in the form of a FREA.

Now, what the modification done was made a written placement plan for each one, not to handle it on a FREA, a request from site to design, but just made up a form and said this is a placement plan, and this is going to be for each pour.

Q Okay. Referring you to Page 24, Mr. Murphy, Mr. Artuso, and Mr. Singleton, in your testimony, we are dealing with Cadwelds at the South Texas Project.

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My question is, around Lines 30 through 35 you talk about the fact that Cadwelds at the South Texas Project meet all STP design requirements and that unique identification and location of the Cadweld is unnecessary once the batch of materials from which the Cadweld was made is found to be acceptable.

My question is really in the nature of a hypothetical situation. If you were informed subsequent to a group of Cadwelds being shot, installed, covered over in concrete, that there was indeed some problem about those Cadwelds, perhaps the inspector discovered that the tests run on his batch were not run properly, and the batch did pass because the tests were improper but probably would not have passed and the batch was perhaps no good, how would you go about checking those Cadwelds?

BY WITNESS MURPHY:

A. Seeing it's a hypothetical question, I will say that we would do it with great difficulty.

If in fact that could have happened, and the Cadwelds had to have been removed, several things would have happened.

There would have been no testing or inspection of the Cadwelds that were put in there, which is not the case that's occurred, and we would have had to go in and

7-2

dig them out.

Q. You would have to go in and dig them out and test them, or perhaps just reject them out of hand?

BY WITNESS MURPHY:

A. That's right.

Q. And how would you locate them?

BY WITNESS MURPHY:

A. That would be -- we would know that they were in that placement, walls would be taken down.

Q. Is there a specification that requires that Cadwelds be located on a drawing when they are placed?

BY WITNESS MURPHY:

A. That Cadwelds be located --

Q. That the location of a Cadweld in a building be noted on a drawing? Is there a specification at the plant that requires that?

BY WITNESS MURPHY:

A. The specification requires that the designer shall approve the location of splices.

Specifically in the containment building, the designers show where the Cadwelds may not be added, other than in this area.

Q. May not be added?

BY WITNESS MURPHY:

A. Right. Without their approval.

7-3

Q. Without their approval.

Is that a changed specification from what it originally was?

BY WITNESS MURPHY:

A. No.

JUDGE BECHHOEFER: Mr. Sinkin, could you come up? We want to talk about time.

(Discussion off the record.)

BY MR. SINKIN:

Q. Let me just clarify one thing for the record, Mr. Murphy, the procedure that was modified, that is CCP-25?

BY WITNESS MURPHY:

A. Correct.

Q. Thank you.

The witness mark on a Cadweld, Mr. Singleton, is a mark placed on the bar before the bar is inserted in the sleeve, is that correct?

BY WITNESS SINGLETON:

A. That's correct.

Q. And the purpose of that mark is to assure that after the Cadweld is fired that the sleeve is still centered, is that correct?

BY WITNESS SINGLETON:

A. That's correct.

7-4

Q. Are you aware of instances in which Cadweld witness marks were placed on the bars after the Cadwelds were fired?

BY WITNESS SINGLETON:

A. Are you asking, Mr. Sinkin, do I have personal firsthand knowledge, or have I looked at documents or have I seen documents that reported such incidents?

Q. Those are all good questions.

BY WITNESS SINGLETON:

A. I have no firsthand knowledge. I have never participated in an investigation nor have seen where one of that situation occurred.

However, I have seen nonconformance reports that described such a deficiency.

Q. Have you ever seen an NRC I&E report that described such a deficiency?

BY WITNESS SINGLETON:

A. I didn't see too many of the I&E reports. I heard about most of them and participated in some of them, but I couldn't say yes, I've seen one of them.

Q. Were there ever any cases where Cadwelds were shot by Cadwelders who were not qualified?

BY WITNESS SINGLETON:

A. Mr. Sinkin, to the best of my knowledge, no.

7-5

Q. Are you aware of document problems on more than 2,000 Cadwelds, in terms of adequate documentation?

BY WITNESS SINGLETON:

A. As it appears in the testimony of Mr. Murphy where we have said that -- Mr. Murphy has said that we lacked 36,300 Cadwelds that were shot between '76 and '79, about 34,000 of those they could find a unique location, and as I denoted further on in the balance of those 2,300 there were some where we did not have a complete location; for example, we needed an elevation, an X and a Y dimension, and we probably had two out of the three, or one out of the three and we wasn't able to tie it down to a unique location.

Q. Then it's the unique location you would need if my hypothetical example came true, is it not? If you had the Cadwelder come forward and say, you know, we've got this information that the batch was bad and the Cadweld is probably bad, you would need the unique location to find that Cadweld, would you not?

BY WITNESS SINGLETON:

A. If you had -- the only reason, to the best of my knowledge, that you would need to know the unique location of a Cadweld, that if a test splice failed you would need to know the location of that test splice so you could go back on either side of that and pull --

7-6

cut out those two test splices and test it.

Q. Now, Mr. Singleton, I'm referring to the hypothetical example I offered to Mr. Murphy earlier; the batch was bad, you found out after it was covered in concrete, you had to find those Cadwelds because they were probably bad. He said you'd find them and cut them out and get rid of them.

How would you find them if you didn't have the unique location?

BY WITNESS SINGLETON:

A. We would utilize several methods of locating these. One would be the field sketch prepared by the civil quality control. The other one would be either design drawing, the cut sheet, the Cadweld inspection book, or the Cadwelder material handler's log.

Q. As a QC superintendent, you have personnel in QC working under you, do you not, Mr. Singleton?

BY WITNESS SINGLETON:

A. That's correct.

Q. Do you ever have occasion to discipline them for taking acts that you feel are improper?

BY WITNESS SINGLETON:

A. What I'm hedging on the word "discipline."

Q. Let's try a specific example. Did you suspend Mr. Roger Forte for writing a memorandum about a

7-7

pour that he didn't want to sign off and you did? Did you put him on probation?

BY WITNESS SINGLETON:

A. I did not place Mr. Forte on probation.

Q. Were you involved in that decision?

BY WITNESS SINGLETON:

A. I was not involved in the decision. I contributed information to the events, but I was not involved in the decision whether to place Mr. Forte on probation or not. That was done at a much higher level of management than myself.

Q. Did you make a recommendation one way or another?

BY WITNESS SINGLETON:

A. No, sir, I didn't. My job was just to contribute the events as they happened.

Q. Who would make that kind of decision?

BY WITNESS SINGLETON:

A. Well --

Q. You were at that time a --

BY WITNESS SINGLETON:

A. We were called quality control supervisors.

Q. Supervisor. So it's not the supervisors that made that decision.

Who made that decision?

BY WITNESS SINGLETON:

A That decision was made by the project QA manager and the site QA manager.

Q Can you give me their names at that time, if you remember?

BY WITNESS SINGLETON:

A The project QA manager was Mr. Chuck Vincent, and the site quality assurance manager was Mr. G. T. Warnick.

Q Thank you.

On Page 32 of your testimony you say that in 1979 field engineering took over from QA the task of identifying the location of Cadwelds.

Why was that change made?

BY WITNESS SINGLETON:

A It was felt that field engineering were better equipped to make such field survey books. They had the equipment. They had the levels and the transits and everything to do a much more efficient job than we could.

It's hard to be hanging off the side of reinforcing steel that's 130 feet off the ground and try to get an accurate measurement, and the field survey perso-nel, or field engineering personnel were better equipped to do that, and at that time they had more time available.

8-1

BY MR. SINKIN:

Q Moving to waterproof membrane, was there ever installation of a waterproof membrance without QC inspection, to your knowledge?

BY WITNESS SINGLETON:

A Not to my knowledge.

Q You're not familiar with NCRS-C-880? I believe you reviewed the NCR's, did you not?

BY WITNESS SINGLETON:

A That particular NCR, Mr. Sinkin, I would have to look at it.

Q Let me just give it to you to refresh your memory.

(Document handed to witness.)

MR. HUDSON: Is this being identified as an exhibit or just used to cross-examine the witness?

MR. SINKIN: It's merely being used at this time to refresh the witness' memory, Your Honor.

WITNESS SINGLETON: I am not familiar with this -- Excuse me. I'm not familiar with this nonconformance report, Mr. Sinkin.

BY MR. SINKIN:

Q You are not?

BY WITNESS SINGLETON:

A No, sir.

8-3

detection and subsequent repair program for the Units I and II Reactor Containment Building."

My question is: Was HL&P involved in void detection before Lift 15?

BY WITNESS HERNANDEZ:

A I believe Mr. Long can better answer that. But, basically, the HL&P QA and HL&P construction provided the surveillance of the concrete activities prior to that time.

BY WITNESS LONG:

A HL&P Quality Assurance did not have a per se -- an ongoing void detection program. As stated in my testimony earlier, the only void that we had identified -- the major void before Lift 15 was the FH-1 S2 spent fuel pool slab at Elevation 2111.

Q Fine. Let me just be sure with the entire panel.

Are there any defects that are of concern that are similar to voids, but are not called voids, or called something other than voids, but are similar?

You're missing concrete. You have -- maybe you call them cracks. Maybe you call them something else. I don't know.

But are any defects that -- Mr. Hernandez,

you seem prepared on that.

BY WITNESS HERNANDEZ:

A Mr. Sinkin, I don't understand your question. That's the problem.

Q A defect similar to a void in that you have a defect in concrete; there's concrete missing. But you don't call it a void. You call it something else.

Are any of you aware of anything like that?

BY WITNESS HERNANDEZ:

A Mr. Sinkin, from my standpoint I cannot think of another name.

JUDGE BECHHOEFER: Well, Mr. Sinkin, I think the time period we were talking about has run out.

Were you essentially through?

MR. SINKIN: I have a few more questions, Your Honor.

JUDGE BECHHOEFER: I think this time we will end this, because the time has run way over. Perhaps ... let's go to the Staff now.

MR. SINKIN: I would like to note for the record that I have been involuntarily cut off in my cross-examination.

8-5

JUDGE BECHHOEFER: I'd like to note for the record we had mentioned the timing to Mr. Sinkin several times. So ... And the last cutoff was at the time he said he needed to finish.

MR. HUDSON: Mr. Chairman, could you also state for the record the amount of time that Mr. Sinkin has had in excess of that which you originally allotted him?

MR. SINKIN: Mr. Chairman, that would involve an analysis of the record as to how much time was used in objections to the introduction of documents and other objections.

I don't think any such analysis has been made. And such a statement into the record at this time would be ridiculous.

MR. HUDSON: Mr. Chairman, it's not our fault if Mr. Sinkin chooses to use his cross-examination time to put non-relevant evidence in the record.

He should have thought of that in planning his cross-examination. He should have carefully selected the documents for relevance.

MR. SINKIN: We can hardly judge ahead of time what this Board will consider relevant.

(Pause.)

JUDGE BECHHOEFER: I don't think we'll put

8-6

that in the record. Let's go to the Staff.

MR. GUTIERREZ: Thank you, Mr. Chairman.

CROSS-EXAMINATION

BY MR. GUTIERREZ:

Q Mr. Murphy, first going to Page 7 of your testimony, do I understand it correctly -- from your testimony yesterday -- that the standards and codes that you're referring to in Answer 5 are what you consider the technical requirements, as opposed to the QA/QC requirements?

Those aren't listed in the answer to Question 5.

BY WITNESS MURPHY:

A Yes, that is essentially correct. I have addressed the QC/QA requirements in the tail end of that ... on Page 8 where I have gotten into the basic requirements of 10 CFR Part 50.

Q Going to Question and Answer 6 then, when the question is asked, "Was the STP Reactor Containment Building concrete shell placed in accordance with these standards and requirements as then applicable?"

You answer, "Yes."

In that answer, do you mean to take issue with any of the items of noncompliance issued to HL&P relative to concreting practices prior to the filing of

8-7

this testimony?

BY WITNESS MURPHY:

A No.

The answer to Question 6, Mr. Gutierrez, is meant to say that to the letter, we did not comply with every requirement in these documents that were mentioned.

When we didn't, these deviations were documented and resolved through a fixed procedure; namely, that the deviations were analyzed and approved through design engineering, and that the final structure would meet the intent of these documents.

Q So I'm correct then in saying that the exception you're referring to is the deviations that either you picked up, or the deviations that were cited to you by the NRC?

BY WITNESS MURPHY:

A Correct.

Q Going to Question and Answer 8 on Page 9, your time frame for changing these procedures is July 1980. Weren't these procedures changed as a direct result of the Show Cause Order in 79-19?

BY WITNESS MURPHY:

A As a result of the Show Cause Order, I think that this was in progress -- this concept of

8-8

combining these procedures was in progress prior to the Order to Show Cause.

The Order to Show Cause certainly did cause this procedure to be revised much more rapidly.

Q Well, let me ask you this: Even prior to the Show Cause Order, hadn't you been notified by the NRC relative to defective concrete consolidation practices, difficulty in access for pre-placement inspections, lighting around pours, et cetera?

BY WITNESS MURPHY:

A I --

BY WITNESS LONG:

A Mr. Gutierrez, may I make a comment here?

Q Sure.

BY WITNESS LONG:

A As I recall, approximately in January of 1980 the existing procedures, CCP-3, 4 and others that governed the concrete placing of construction practice at STP were revised.

And as a result of the need to consolidate all of these various procedures, CCP-25 was then made.

Now, these revisions you're talking about as a result of Show Cause were implemented prior to CCP-25.

Q Mr. Long, is it a fair statement that they were inadequately implemented; and that was one of the reasons why they had to be re-implemented in July 1980?

BY WITNESS LONG:

A It was evident that because of some of the results obtained, that maybe the construction workers needed to be a little bit more well informed about the adequacy of the procedures.

So, therefore, training was implemented in order to familiarize them with the procedures.

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, I believe the next panel will talk about the concrete restart program, which is in line with the activities performed at this date.

I believe one of the statements made by that next panel is that there was an attempt to provide in one specific location a concise listing of all the requirements for concreting practices at STP.

Q Let me direct your attention to Staff Exhibit 47, Page 24, if you have a copy.

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, what page?

Q It is Page 24 on the bottom. It's an attachment to Staff Exhibit 47, which is a letter from Mr.

George Oprea to the NRC explaining HL&P's position relative to its concreting practices prior to the Show Cause Order.

I'd ask you to read it and ask you if you disagree with Mr. Oprea.

BY WITNESS HERNANDEZ:

A Mr. Gutierrez --

Q I'm sorry. To the item of noncompliance 7, 79-19.

BY WITNESS HERNANDEZ:

A May I take a moment and read what you're asking?

Q Yes. Up on the top there, that summary paragraph is what I'm referring to. Paragraph A.

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, I don't take issue with the response listed as Item B, "Reply."

Q I think I asked you to refer to Paragraph A, "Summary."

BY WITNESS HERNANDEZ:

A Okay. I don't take issue with the listing of Item A, "Summary."

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9-1

BY MR. GUTIERREZ:

Q Mr. Singleton, in answer to a question that Mr. Sinkin asked, you said that you were never aware of any Cadweld inspectors not being qualified.

As the QC supervisor, were you ever aware of any quality control -- civil quality control inspectors not being qualified to do their work?

BY WITNESS SINGLETON:

A I think the question that Mr. Sinkin just asked -- and the one you asked -- I believe he was talking about the Cadweld shooter himself. And you're asking me about the Cadweld quality control inspector; is that correct?

Q Yes. I think my question was a little broader. I said any civil QC inspector.

BY WITNESS SINGLETON:

A The only information that I'm aware of on that subject, I believe is one of the NRC I&E reports where they reviewed some records of all the quality control inspectors; and they had two or three, where, in their judgment, they didn't feel that the people were properly qualified or certified.

Q You're saying that the first time it came to your attention that some of your QC concrete inspectors were not qualified was by the NRC; is that correct?

9-2

BY WITNESS SINGLETON:

A. To the best of my knowledge, that's correct.

Q. And are you also saying that it was the NRC's opinion, and it wasn't relative to what your own company felt were the proper qualifications?

BY WITNESS SINGLETON:

A. At the time the people were certified by the applicable personnel responsible for that certification. It's evident that the people responsible for that certification felt that the people were qualified to be certified as an inspector; or, of course, they wouldn't have done it.

It may have been a misinterpretation of a qualification requirement. But if our people responsible for the qualification had not felt that these people were qualified, then I'm sure they wouldn't have been.

Q. Referencing the report -- Staff Exhibit 47 that Mr. Hernandez has, I'd ask you to refer to Page 28.

BY WITNESS SINGLETON:

A. I have Page 28.

Q. Now, you mention that you thought that there were two or three Brown & Root civil QC inspectors that the NRC felt might not have been qualified.

I ask you to review HL&P's response to the

charge that upwards to 14 were not qualified and ask you if you disagree.

MR. HUDSON: I'll object to the characterization of this paragraph, Your Honor.

I believe it says 14 were checked, not that 14 were found to be not qualified.

(Bench conference.)

MR. GUTIERREZ: I'm sorry. I stand corrected on that.

JUDGE BECHHOEFER: Are you referring to the second part, B-1?

MR. GUTIERREZ: Well, I'm first referring to the summary, the first paragraph there.

I stand corrected --

JUDGE BECHHOEFER: Okay.

WITNESS SINGLETON: Would you repeat the question again, please?

BY MR. GUTIERREZ:

Q My question is: First, have you had a chance to review the Summary, Paragraph A in that -- on that Page 28?

BY WITNESS SINGLETON:

A Yes, I have.

Q And my question is: Do you disagree with that in any material way? Or do you disagree with it in

9-4

any way?

BY WITNESS SINGLETON:

A No, sir.

Q And would you review the reply and answer the same question, whether you disagree with that in any way.

(Pause.)

BY WITNESS SINGLETON:

A This reply is a reply developed by the Applicant, HL&P. Are you asking me if I disagree with HL&P's reply?

Q Yes, sir.

MR. HUDSON: Your Honor, we have to object to that question. There has been no foundation shown that this witness would be in a position to know what work HL&P did in developing this response, or that in the normal course of job activities, he would have any reason to know about the qualifications of these people.

I believe, in his earlier testimony, in fact, he may have indicated that another group within Brown & Root certifies inspectors, and that this is not his job.

Therefore, we'll have to object to the question as not having a proper foundation yet.

9-5

MR. GUTIERREZ: Well, if what Mr. Hudson is saying is that the quality control/civil superintendent doesn't know the qualifications of the people under him, fine.

(Bench conference.)

MR. HUDSON: That wasn't, of course, what I said; nor was it the question put to the witness.

If you want to ask the witness, "Do his people perform their jobs properly, in his opinion," that's a valid question.

But if you're asking, "Are they qualified in accordance with certain requirements? Does someone in Brown & Root check that?" That's a proper question.

I was just raising the question: Is this witness, in the course of his normal job activities, the one who checks the qualifications of these people? It's a big company.

There are different roles played by different people within that company.

It has not been established that this witness performs this function.

(Bench conference.)

MR. GUTIERREZ: I was merely following up on a question he readily answered Mr. Sinkin. If he didn't have any basis to answer Mr. Sinkin relative to

the qualifications of the Cadwelders, he was very willing to say that the Cadwelders were all qualified. I assume he had a basis.

That was merely a follow-up question, that ... what did he know about the QC civil inspectors.

JUDGE BECHHOEFER: I think --

MR. HUDSON: That may not have been a foundation for the prior question either.

JUDGE BECHHOEFER: We'll overrule the objection.

If the witness doesn't know, he can say so.

WITNESS SINGLETON: Would you repeat the question again, please?

MR. GUTIERREZ: Yes.

BY MR. GUTIERREZ:

Q Mr. Singleton, my question is simply whether you've had a chance now to review ... reply ... Paragraph B on Page 28 and following in Staff Exhibit 47.

BY WITNESS SINGLETON:

A I've had a chance to review it, yes.

Q And my next question is: Do you disagree with it in any way?

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9-7

BY WITNESS SINGLETON:

A I have no basis ... no firsthand knowledge to base whether I disagree or do not disagree. As Mr. Hudson pointed out, it was not the civil quality control department's function to certify the people.

They were certified by quality engineers, our Level III. And it was not our responsibility to certify the people.

I have no firsthand knowledge whether ... to disagree or not with the reply here.

Q Thank you. I'll just close this line out by asking you, did you have any basis to offer an opinion relative to the Cadwelders' qualifications?

BY WITNESS SINGLETON:

A The basis of my response to that question was that it is a requirement of the quality control superintendent -- I'm sorry -- the quality control inspectors to insure that each Cadwelder is qualified to shoot in that position that he made that Cadweld shot.

That is part of our procedural requirements.

So I have confidence that each Cadwelder that made a Cadweld shot out there was qualified to make that shot, because it is a requirement of our inspectors. That is one of the check points.

9-8

BY WITNESS LONG:

A. Chuck, I'd like to answer something here. Correct me if I'm wrong.

But I do think that the civil quality control inspectors are responsible for the certification of each Cadwelder. Is that correct?

Q. Is Mr. Long engaging in questioning?

BY WITNESS LONG:

A. Excuse me. Mr. Gutierrez, may I make a statement?

Q. You want to supplement Mr. Singleton's --

BY WITNESS LONG:

A. Yes. I'd like to add something to Mr. Singleton's statement.

It is my knowledge that the civil quality control inspectors are responsible and do monitor the actual certification of each new Cadwelder as he comes on the site to begin shooting.

Q. Thank you, Mr. Long.

Mr. Murphy, I wanted to go back to your question and answer number nine on Page 10.

BY WITNESS MURPHY:

A. Yes, sir.

Q. You had mentioned that there were prior pre-placement meetings before the change in these

9-9

procedures, but somehow the procedures changed those pre-placement meetings.

I think you described what the nature of the difference was, but I really wasn't sure.

BY WITNESS MURPHY:

A. In the normal course of placing -- making such a concrete placement the superintendent and the foreman -- concrete foreman would talk to his -- senior foreman would talk to his area and -- I mean ... area ... people responsible for an area in a given placement.

But there was no documentation of this. There was no formal requirement that it was done. There was no, if you will, objective evidence that it was done.

Now, with CCP-25 there are specific requirements, and who must be there, and that they must be -- that these meetings are documented.

Q. Before the changes, was QC involved with the pre-placement meetings?

BY WITNESS MURPHY:

A. I will pass to Mr. Singleton.

BY WITNESS SINGLETON:

A. Yes, we were. We were involved in pre-placement meetings, in the whole development of the plans.

We pointed out different areas that they would have to get approval on to make modifications to. We were involved in it from step one.

BY WITNESS ARTUSO:

A. Mr. Gutierrez -- Joe Artuso speaking.

May I make a comment on CCP-25? Is it appropriate?

Q. You want to make a comment relative to the difference between the nature of the pre-placement meetings before the change and after the change?

BY WITNESS ARTUSO:

A. No. I want to make a general observation of current practice in the industry?

Q. No.

BY WITNESS ARTUSO:

A. You seemed so concerned about the problem of meetings, I just wanted to comment on it. That's all.

Q. Now, going to Lift 15, the pre-placement meeting relative to Lift 15. Mr. Murphy, do you have any knowledge relative to what potential difficulties were discussed in that pre-placement meeting?

BY WITNESS MURPHY:

A. No, I do not have. I was not on the site. I didn't have anything to do with those people that would

9-11

have been involved in that meeting.

Q Do you have any knowledge whether from your level of the corporation downward -- information was passed on relative to any of the -- any of the problems relative to the eight-inch channel -- or the stiffener bars or anything like that ... any problems that might arise in the actual pour?

BY WITNESS MURPHY:

A No, I do not have any knowledge of what was passed on. But I will point out that it was the 15th lift, and it had been assumed (rightly or wrongly) that there had been no problems up until this had been identified.

So with the -- keeping the point in mind that less than one percent of this whole containment shell indicated that there were any voids in it, I think it's about .8 percent -- that voids did occur, which is ... you know, a relatively small percentage of the whole containment did give some credence to the fact that these people didn't have a concern.

So they would not have specifically pointed it out here.

Now, I will say that this particular lift was not the same as the others. There was more congestion here. There were different types of embedments here.

9-12

And, again, these should have been obvious to some people, but they were not.

Q This was not the first lift that had rebar congesion that was poured on the job; is that correct?

BY WITNESS MURPHY:

A That is correct.

Q Now, going to the voids, I believe Mr. Artuso said the other day that with respect to the size of the voids (without regard to their shape or their location in the placement) the size or the volume in and of themselves, that really doesn't tell you very much, does it, with respect to whether they're significant?

BY WITNESS MURPHY:

A I'm sorry, I don't quite understand that.

Q Okay. Let me go back to Mr. Artuso.

Mr. Artuso, I understood you to say the other day that -- I believe I asked you the question: What was a significant void.

And you had said, "Well, the size in and of itself doesn't tell me anything. I have to know the configuration of the void and where it is in the placement."

Is that --

///

BY WITNESS MURPHY:

-13 A. Exactly.

- - -

10-1

BY MR. GUTIERREZ:

Q So I guess my question is, if all you knew that .1 percent of the containment had voids, that figure in and of itself wouldn't tell you anything with respect to their significance, is that true?

BY WITNESS ARTUSO:

A Not if all of that one-tenth percent, or less than one percent occurred at one anchorage, for instance --

Q Well, just if I might interrupt, you're assuming facts, additional facts. What I asked you was assuming all you knew was the gross volume of the collective voids, .1 percent --

BY WITNESS ARTUSO:

A Right.

Q -- that figure in and of itself wouldn't tell you anything?

BY WITNESS ARTUSO:

A Yes. Yes, it tells you, if you knew that that was arrived by a complete survey that you had and that it was scattered throughout that structure, you'd say, great, that's all I have, I'm in good shape.

Q Okay, but again you've added facts scattered out throughout the structure.

/ / /

10-2

BY WITNESS ARTUSO:

A. The point I think that I was trying to make was that if you had an embedment, let's say a hanger, and it had one anchor, one Nelson stud or one "T" angle connected to it, and the only void that you found was completely around that anchor, that would be significant.

If it were, say, X number inches, if those X number inches were scattered over the entire area of that anchor but only a small part of the anchor itself contained a void, then it would be insignificant.

I don't know whether I'm making myself clear.

Q. Well, I can only go back to my original question. I just feel that I'm asking the same question and each time you're assuming a new fact into and qualifying the answer.

BY WITNESS ARTUSO:

A. Well, no. Let me say that the fundamental point that I'm trying to make is that voide size, per se, is not sufficient information to determine whether it's significant or not significant. You must know its location.

Q. All right. That's basically what the question was. Thank you.

Now, you said yesterday, I believe it was Mr. Long, that in gathering information relative to the

10-3

voiding problem on 15 you were led to Lift 8.

I guess I'd like to ask Mr. Singleton, isn't it so that at the Lift 8 was poured you were aware that a QC inspector cited surface voids and suggested additional checking for more extensive voids?

BY WITNESS SINGLETON:

A. No, sir, not to my knowledge, no, sir.

Q. So what you're telling us is that no QC inspector informed you or you did not become aware in your duties as the QC inspector sometime immediately following the pour of Lift 8 that there were surface voids on Lift 8 found?

BY WITNESS SINGLETON:

A. I'm assuming you're talking about Unit 1.

Q. Yes.

BY WITNESS SINGLETON:

A. Okay. At the time Lift No. 8 was poured, I was not in my current position. I was a QC inspector assigned to another area.

To the best of my knowledge, I have no knowledge of the awareness of the items that you're talking about right now.

Q. Who was the superintendent at that time?

BY WITNESS SINGLETON:

A. The term "at that time," up until July --

10-4

I'm sorry, March of '80, was a supervisor, a QC supervisor, who would have been Mr. A. J. Hammons.

Excuse me. Are you referring to any particular area?

Q On Lift 8.

BY WITNESS SINGLETON:

A That's correct.

Q Do you have a particular area in mind?

BY WITNESS SINGLETON:

A The only thing is that I seem to recall in one of the exhibits yesterday was an area around a personnel air lock.

Q And that was your first -- that's the first time you were aware of it? That didn't refresh your memory that you were aware of that fact at the time?

BY WITNESS SINGLETON:

A No, sir. Another inspector was responsible for that area, and when I first saw that FREA the other day was the first time.

Q Now, on Page 12, Question 16, Mr. Murphy, you're asked whether you reached any conclusions as to the factors that contributed to the void formation in Lift 15, and you cited here, and you cited yesterday, that complex structural arrangements -- referring, I guess, to the rebard --

10-5

BY WITNESS MURPHY:

A. No. The rebar and the geometry of the brackets themselves.

Q. Did congested rebar also contribute to the voids?

BY WITNESS MURPHY:

A. Yes.

Q. Now, I'd like to ask, was that the first pour where congested rebar was in the placement?

BY WITNESS MURPHY:

A. No.

Q. Is that the first time that you made the connection that congested rebar might cause voiding?

BY WITNESS MURPHY:

A. No.

Q. Then prior to this time what precautions were taken to ensure that when pours were made where there was congested rebar voiding would not occur?

BY WITNESS MURPHY:

A. Well, I'll go back to the conversation we had earlier about the planning that did occur.

I wasn't involved in any of these, specifically.

The answer to this question is specifically relating to Lift 15 and other factors besides this

10-6

congested rebar. We didn't have this situation elsewhere. I mean, the complex geometry here did not occur other places.

Yes, there was areas of additional rebar and there were areas of congestion elsewhere.

Q Well, isn't it true that there were other areas, or similar areas elsewhere that had congested rebar, that had the 8-inch channel turned downward, those types of things that you cited as contributing to voiding?

BY WITNESS MURPHY:

A Well, let me make one correction to that statement.

The 8-inch channels are, and always have been, turned up. The thing that we're referring to with the 8-inch channels is that there was just a horizontal surface, but to set the record straight, the channels always have been facing up.

Q Were there always holes drilled through those channels so cement would flow down?

BY WITNESS MURPHY:

A Yes, sir.

Q Since the beginning of the project?

BY WITNESS MURPHY:

A Yes, sir.

10-7

Q. Were there any changes in the hole diameter or anything like that, as a result of Lift 15's voiding problem?

BY WITNESS MURPHY:

A. Yes, sir, I do think they were made slightly larger.

Q. How much larger is slightly?

BY WITNESS LONG:

A. I don't recall exact figures.

BY WITNESS MURPHY:

A. I think they went from approximately one inch to an inch and a half to two inches.

Q. Isn't it also true that the spacing between the holes was narrowed?

BY WITNESS MURPHY:

A. Not to my knowledge.

BY WITNESS HERNANDEZ:

A. Mr. Gutierrez, could you -- I don't understand what you mean by narrow.

Q. In other words, here's two holes. They're this far apart. Now their spacing is narrowed. Now they're this far apart. (Indicating)

BY WITNESS HERENANDEZ:

A. To the best of my knowledge, Mr. Gutierrez, we did not add additional holes. It was my recollection

10-8

that we increased the diameter of the holes in the channel.

Q. Wasn't it your testimony yesterday, Mr. Murphy, that there were voids discovered in Lift 1 around the channel?

BY WITNESS MURPHY:

A. Yes. I think if you look at the 50.55(e) report that was submitted, it shows that there were some down there, and --

Q. Excuse me.

BY WITNESS MURPHY:

A. -- a few, very few.

Q. Was any change made in the design of the channel at that time?

BY WITNESS HERNANDEZ:

A. No.

BY WITNESS MURPHY:

A. These voids that were discovered in Lift 1 were as the restult of the investigation that followed 15 --

Q. Oh, I'm sorry.

BY WITNESS HERNANDEZ:

A. Mr. Gutierrez, this is a complete log of the Lift 8 investigation, which comprised Unit 1 and Unit 2. You shouldn't look at these and take them out of context.

10-9

Q I realize that generally. But I thought yesterday's testimony was that --

BY WITNESS HERNANDEZ:

A I'm sorry if I gave that impression.

Q Okay, I'm sorry.

In your post-placement inspections, do the inspectors tap at all the potential voids, or do they -- Let me just finish.

As far as I know so far, they -- you've told us that they make a visual inspection for surface voids.

BY WITNESS LONG:

A That is correct. They do make visual inspections for surface irregularities. I would like to add that after these new procedures were implemented, we proceeded to pour Lift 7 in the Unit II containment shell.

This lift was the first one that was poured under the new procedures which had been improved. This lift was sounded, and no voids were detected.

Q Who would answer my question then whether tapping is a part of the post-placement QC procedures?

BY WITNESS SINGLETON:

A If during the pour -- and so denoted on the concrete inspection book -- that we experienced some

10-10

type of problem with concrete flow or concrete consolidation ... if we suspect that a potential area may -- we may have trouble, then we'll go back and tap it.

There is no procedure. And if we have a good pour, there's nothing denoted on the concrete inspection book or the inspectors responsible for that pour do not have any areas of concern, we do not normally go back and sound an area.

Only in those areas where we experience trouble.

Now when we --

Q Now --

BY WITNESS SINGLETON:

A May I continue?

Q Sure. Go ahead.

BY WITNESS SINGLETON:

A During a concrete placement where we run into an area where we have difficulties, we just don't make a note of it and go on and come back afterwards. At that time we take all of the steps necessary to remedy the situation.

We never expect that while we're placing concrete, "Yeah, we're going to have a void after we finish this."

Each void we find is a total surprise We

take all of the steps that we feel are adequate at the time, that if we have a difficult area ... additional consolidation or what.

But if during the placement, we run into an area of difficulty -- and we do everything in our power to remedy that situation, and we do have concern -- we'll go back afterwards and tap that.

But there is no procedural requirement at this time.

As Mr. Long said, there is a -- after the forms are removed, we do go back and look at the surface areas for imperfections, blemishes.

Q. In light of the voiding that has been discovered thus far, Mr. Singleton, as a QC civil supervisor, do you think it would be a desirable routine practice to incorporate in the post-placement pour checks tapping tests to insure there has been no internal voiding?

BY WITNESS SINGLETON:

A. Are we limiting this to exterior shells? Or are we just -- to any concrete pour?

Q. Let's limit it to the exterior shell.

BY WITNESS SINGLETON:

A. I believe immediately following Lift No. 7 in Reactor Building Unit II, as Mr. Long has testified, we

went back and sounded it.

It was my suggestion to construction that we do go back and sound this area, because I had a belief that we should sound it to insure that all of our procedures and everything worked.

Yes, I thought it was a good idea that we go back and sound Lift No. 7.

In my own personal opinion for our added insurance and everything, yes, I think it would be a good idea if we sounded these pours. And I would --

Q. You're speaking routinely now?

BY WITNESS SINGLETON:

A. For the exterior shell pours, I think it would be a good idea if we sounded each one of them, for our own added insurance.

This is just -- you know, speaking on my part.

Q. Now, can you visually inspect the side where the liner plate is for voiding?

BY WITNESS SINGLETON:

A. Post-placement after the pour?

Q. Post-placement, yes.

BY WITNESS SINGLETON:

A. No, sir. The only thing you can do is by sounding, by tapping.

10-13

Q Now, just to follow up on one point you raised in your explanation of how the QC inspector observes the in-process pour, I believe you said that they watch it; and if they suspect any voiding problems, tapping is recommended as a post-placement check, among other things, I'm sure.

But what struck me was this: Do you think it's the role of the QC inspector to make an engineering judgment during placement relative to voiding?

BY WITNESS SINGLETON:

A If during the concrete placement a situation arises that we believe we're having trouble getting concrete in an area and consolidated, and that we suspect something may happen, it is -- we notify the construction engineer, and he in turn notifies what we call the civil PSE, which is the civil project site engineer.

He is the design engineer's representative on site.

We stop the pour. We have the engineer come up to that area. And we have him look at the area. We inform him of what has happened up to that point, and we give it to him to make the recommendations on what activities should happen or should occur in that area, to assure that we have a sound area.

11-1

We do not make engineering judgments.

Q. Don't you agree with me that absent the end-process check, the tapping check -- during the pour the QC inspector is forced to make a judgment relative to potential voiding?

BY WITNESS HERNANDEZ:

A. Mr. Gutierrez, the QC inspector is inspecting the pour. If he identifies a situation which he believe does not conform to the performance specification, it is his responsibility to identify that situation in the proper manner.

I don't believe that that's --

Q. Yes. I think you're saying something a little different, I guess, Mr. Hernandez.

BY WITNESS HERNANDEZ:

A. It's not --

Q. He's checking against specifications --

BY WITNESS HERNANDEZ:

A. He's checking against performance specifications.

Q. I understood Mr. Singleton to say something a little different; namely, that the QC inspector is there making a judgment call. Did you do not mean to imply that, Mr. Singleton?

///

11-2

BY WITNESS SINGLETON:

A I'm having trouble defining --

MR. HUDSON: I'm having trouble with the question, too. I think it's common experience. We all use some judgment in our day-to-day work.

What do you mean by "make a judgment call"? About what?

MR. GUTIERREZ: Well, I thought I was clear in that.

An engineering judgment relative to voiding problems that may occur because of the way the pour has been poured is the judgment call I thought Mr. Singleton was referring to.

MR. HUDSON: Again, I have the same -- That doesn't help me. What's an engineering judgment relative to a concrete pour?

MR. GUTIERREZ: That's the question I had for Mr. Singleton.

MR. HUDSON: Okay, ask it that way then.

MR. GUTIERREZ: That's the exact way I did ask it.

MR. HUDSON: No. You didn't ask him, "What is an engineering judgment?" You asked him if he made those.

///

11-3

BY MR. GUTIERREZ:

Q Did you understand the question, Mr. Singleton?

BY WITNESS SINGLETON:

A Could we go back over that one more time?

Q I guess my concern is this, let me put it in perspective and you can add something.

A QC inspector is not -- typically is not a degreed professional engineer. Is that the case?

BY WITNESS SINGLETON:

A I'd say 50 percent of my inspectors are degreed civil engineers.

Q All right. Let me ask you this.

Your QC inspectors inspect to specific criteria ... specifications?

BY WITNESS SINGLETON:

A We inspect to the procedures which are developed from the specifications.

Q And I guess what troubled me in your answer was when you were describing the in-process pour, you didn't reference the procedures that the QC inspector was inspecting against.

But, as you explained yourself, this is what you were referring to?

///

BY WITNESS SINGLETON:

A Yes, sir. We inspect to the criteria set forth in the procedures, as far as the lift thickness, concrete flow, vibrator insertion, freefall.

We inspect to the criteria set forth in the procedures.

BY WITNESS HERNANDEZ:

A I might add, Mr. Gutierrez, that the construction procedures are derived from engineering documents -- engineering specifications. Therein lies the lion.

Q Is there a specific construction procedure when equipment breaks down, or particular pours are unusually long, which requires a QC inspector to notify engineering or red flag somebody that there might be potential voiding as a result of that?

BY WITNESS SINGLETON:

A Would you repeat that question again, please?

Q Yes.

Is there a construction procedure or QC rule -- you can give it whatever name is appropriate -- which requires a QC inspector to notify someone to check out potential voids when a pour takes longer than is expected?

11-5

BY WITNESS SINGLETON:

A. There is no procedure where the QC inspector -- Again, I guess it goes back to what I mentioned earlier, that -- and this is in the procedure -- that if during the placement of concrete, there is a situation that is a nonconformance to the procedure -- to criteria set forth in the procedure.

And one of the criteria is that the concrete be consolidated to prevent the formation of internal voids.

If a situation develops that we feel that everything has been done to prevent the formation of these voids, but there's still a doubt in our mind as to the adequacy of this, yes, then when we notify the construction engineer and he, in turn, notifies the PSE, and the PSE comes down to the pour and says, "Okay, do this or do that, or I accept what you've done here and I feel that what you've done is correct."

Now, we have different criteria dealing with breakdowns of equipment ... of how long concrete from the point it's batched to the point it's deposited ... you know, we have time limitations on that.

Q. So if equipment breaks down or there's too long -- or an exceptionally long pour, do these trigger

11-6

a routine check for voids in the pour that occurred? Do you have procedures that mandate that?

BY WITNESS SINGLETON:

A. No, sir. There's nothing that mandates that.

During an equipment breakdown where we may have a period of time where we're not pouring concrete, then what we're looking for there is the formation of any cold joint that may occur.

Q. Mr. Murphy, to your knowledge, at the time Lift 15 was poured, do you know whether they had on site and were using tensile vibrators to vibrate the concrete?

BY WITNESS MURPHY:

A. To the best of my knowledge, yes, they were.

Q. And how did that knowledge come to you? What's the source of your knowledge?

BY WITNESS MURPHY:

A. Site visits. Seeing them, visually seeing them.

Q. You were there on Lift 15?

BY WITNESS MURPHY:

A. No, I was not there on Lift 15 but I had seen them on site. Now, specifically whether or not they

11-7

were used on Lift 15, I'm not going to say. I wasn't there for that placement.

JUDGE BECHHOEFER: Mr. Gutierrez, at some point we want to take a lunch break. So when you get to a --

MR. GUTIERREZ: Okay.

BY MR. GUTIERREZ:

Q Now, also on Lift 15 you mention there were two pumps?

BY WITNESS MURPHY:

A That's correct.

Q Didn't Lift 15 require both of those pumps for the pour? One wasn't a back-up pump to the other, was it?

BY WITNESS MURPHY:

A That was considered -- One was considered as a back-up for the other. It was a wrong consideration.

Q In other words, both were required to do the job?

BY WITNESS MURPHY:

A That's right.

Q -- simultaneously?

BY WITNESS MURPHY:

A That's right.

11-8

When I was asking questions about this placement, I asked what was considered as the back-up pump. And they said, "We have -- The slick line configuration is such that one pump could pump the entire circumference."

And, in fact, it did.

But they considered the other pump as the back-up for the one next to it.

Q So you'd cite that as a pre-placement shortcoming relative to Lift 15?

BY WITNESS MURPHY:

A I would.

MR. GUTIERREZ: This would be a good place to break.

JUDGE BECHHOEFER: All right.

Could you come up so we can discuss your timing? You don't have to do it on the record.

This is off the record.

(Off the record discussion.)

(Whereupon, at 12:30 p.m. the hearing was recessed, to reconvene at 1:30 p.m. of the same day.)

- - -

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AFTERNOON SESSION

1:40 p.m.

JUDGE BECHHOEFER: Back on the record.

Mr. Gutierrez.

MR. GITIERREZ: Thank you, Mr. Chairman.

CROSS-EXAMINATION (Continued)

BY MR. GUTIERREZ:

Q Mr. Murphy, I just want to clear up a statement you made before lunch.

When you said that the 8-inch channel was always in the up -- was always inverted upwards --

BY WITNESS MURPHY:

A That's correct.

Q -- I just want to make it clear, if you visualize the 8-inch channel as a "U" what you're saying that if the "U" was always right side up, it was never upside down?

BY WITNESS MURPHY:

A That is correct.

Q And that is according to -- your design reflects that?

BY WITNESS MURPHY:

A That's correct.

Q Okay. Thank you.

Turning to Staff Exhibit 101 -- do you have

12-2

that in front of you?

BY WITNESS MURPHY:

A. Yes, sir.

Q. And turning to Figure A in Staff Exhibit 101, I was undertain from yesterday, on Lifts 13 and 14 in Unit 1 what tests were performed to determine whether there were any voids in those lifts?

BY WITNESS MURPHY:

A. There were soundings made on those lifts. I did not recall, and did not indicate that there was as many as there were. I checked last night, and as a matter of fact, there is a void that did exist that is not shown on this.

If you will go to the azimuth to the left of the 304 buttress at 290 and approximately midway between that block that's indicated as 13 you put a dot, a black dot, that will indicate a void that was three inches deep and approximately 15 to 18 inches long.

In addition to that, I think it was -- Mr. Jordan asked this question if there was any voids found in these areas. That is the only one that was found there.

There was upwards of -- well, there was approximately 24, if you will, verification holes drilled in Lifts 12, 13 and 14, and this is the only void that

12-3

was found. The holes that were drilled indicated acceptable concrete.

Q Now, excuse me, I really confused as to where that void was.

Is it in the center of the box that you reach by going up from -- between 290 and 300 and across from 13?

BY WITNESS MURPHY:

A No. Just go straight up the line on 290, and if you come over from the line, the dash 13 there.

Q So it's essentially on the 290 line?

BY WITNESS MURPHY:

A Yes.

Q Okay. Thanks. That's where I was lost.

BY WITNESS MURPHY:

A I must -- somebody asked me, or implied to me yesterday that I wasn't clear enough when I was talking about this figure that it in fact represents all of Unit 1.

Q How many feet are there between the azimuths, approximately?

BY WITNESS MURPHY:

A One degree, I think, is approximately 15 inches.

I will further state that the depiction of

I2-4

voids on here is not to scale. If we were, we wouldn't see many of them on this picture.

Q. Well, this is going to be my next question. I was going to refer you to CEU Exhibit 20 and ask you if those voids were to scale and adequately depicted voiding.

BY WITNESS MURPHY:

A. No, sir. These are sketches only, and it is the best estimate of the sketcher from what was drawn on the containment onto a sketchbook and then transferred onto this document.

Q. I gather from that, then, that they are approximately correct, but I mean it's not exactly drawn to exact scale, would that be fair to say?

BY WITNESS MURPHY:

A. Right.

Q. Okay. Again, just to clarify something in my mind, could you turn to Page 5 of the 24-page attachment.

BY WITNESS MURPHY:

A. In Exhibit 20?

Q. Yes, sir.

BY WITNESS MURPHY:

A. Yes, sir.

Q. Now, was it your testimony yesterday that

12-5

the voids that are indicated here with little dots within them, are those voids that were actually drilled and that the voids that are the squiggly circles that do not have the dots were indicated by either tapping or sound but were not actually drilled?

That's what I understood to be your testimony. I was wondering if that was the case.

BY WITNESS MURPHY:

A. Yes. To clarify this, in the upper right-hand portion of this page here, we see an M-80.

Q. Right.

BY WITNESS MURPHY:

A. Okay. And there's a penetration underneath this. Directly down from there, there is a small round circle with a dot in the middle and an "S" beside it.

That is a hole that was drilled and found to be solid concrete.

Up to the right of that there was a hole drilled in an area that was within this irregular outline, and there was an "S" there.

Over to the right of that is a squiggly area in which no hole was drilled. In this situation, I can't specifically say for certain, but in many other areas when we would see this type of situation there would have been a weldment made to the liner at this area, and

12-6

this accounted for the apparent separation.

There was no congestion, no 8-inch channel in this area, and there was a weldment made there and this was proven from our extensive drilling and investigation on 15 and 8.

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, let me expand on the weldment. The weldment came about when PDM, in the erection of the liner, placed a platform and welded the supports for the platform for purposes of erecting the next continuing session of rings of liner plate.

They subsequently would remove the liner and then grind down that weldment.

However, when they were making the weld area there would be heating of the localized zone where they did make the weld and this would cause the liner to separate a thousandth, two-thousandths of an inch, something of that nature, and cause a void sound, or a hollow sound.

Q Well, this is my area of concern, because it's my understanding that through either a tap test or through an ultrasound test, you can determine that there is some voiding, but you cannot determine the size of the void.

Is that your understanding, Mr. Murphy?

BY WITNESS MURPHY:

A Would you repeat that?

Q Yes. If I perform a tap test and there's indications by that test that there is a void, an internal void, is it correct that from that tap test solely you have no way of judging the extent o the voiding inside?

Is that an accurate statement?

BY WITNESS MURPHY:

A With no other knowledge, that is true.

Q And is that also true with the ultrasound test?

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, what ultrasound test are you referring to?

Q The one you performed during the 30 placements.

BY WITNESS MURPHY:

A Okay. All right. Well, that is not applicable to this situation.

Q All right. Let me ask this direct question, then.

What did you do to satisfy yourselves that the areas where voiding was indicated from the external tap tests were of no significance, other than what I

hear you saying there was the assumption on the weld areas?

BY WITNESS MURPHY:

A. Well, that assumption was based on much prior exploration of these situations where there was weldments and a hollow sound existed, and a hole was drilled and there was no void there.

Lift 15 was extensively investigated this way and we followed the same logic on Lift 8 investigation.

There was an extensive number of holes that were drilled in not only areas that sounded like they were hollow but in areas that didn't sound hollow and were in positions that voids may have occurred.

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13-1

BY MR. GUTIERREZ:

Q So, is what you are telling us is that there was a pattern that developed that the tap test showed voiding around the welds, but as you drilled some of those welds you realized that none of them were significant, and, therefore, just did not go any further?

MR. HUDSON: May I ask a point of clarification here, through the chair?

Is counsel for the Staff equating a separation of the liner to a void?

MR. GUTIERREZ: No. I guess my question is: How did they satisfy themselves that it was a mere separation, rather than a void, on the basis of just a tap test.

What I hear Mr. Murphy saying is that the pattern developed, and you did in fact drill some of them, and they all turned out to be separations, and then, consequently, every time the tap test indicated void when it was around a weld you assumed it was a separation.

WITNESS MURPHY: That is correct.

BY MR. GUITIERREZ:

Q All right.

BY WITNESS MURPHY:

A But let me qualify it one bit further.

13-2

If this area occurred outside of a suspect area that we defined as underneath and eight-inch channel, and additional reinforcing steel, we did have occasion where we had weldments on the surface, and the weldment just happened to be in an area underneath and eight-inch channel in congested areas, and we drilled, and there could possibly be a void there.

So if a weldment did occur there and we got a hollow sound it was investigated.

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, can I point you to Page 14, that would be Mr. Murphy's reply on Answer 20. It would be Line 40.

It is talking specifically about areas where there was no physical interference of concrete in that there was no area of high reinforcing congestion.

Moreover, we examined other areas in the placements where there was no physical interference in the placing of concrete. Where hollow sounds resulted, holes were drilled into the liner.

Over 400 holes were drilled, and as anticipated, solid concrete was found in each instance, this hollow sound being caused by the liner separation.

So, there was an extensive evaluation, and this led us to make the judgment with regard to being able

13-3

to predict where we would anticipate finding voids. And it came to the point that we could predict where we would have the potential for voids.

Q Thank you.

Any number of times Mr. Murphy, and I believe Mr. Hernandez, also, pointed to the fact that congested rebar contributed to the voiding problem.

My question is: Prior to the time the pours, lift pours were made, was there any analysis done, engineering or design analysis done, to check the constructibility of the design?

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, with regard to constructibility as a manner of course, the manner that Brown & Root handled the design drawings, they were sent for review and comment to construction for purposes of constructibility review, so that was done.

Also, with respect to the liner, and with respect to the containment mat, HL&P engineering, design engineering, as a matter of course, also performed a constructibility review with regard to the design of the containment shell.

Q I just missed the last part. Did you also say that HL&P performed a similar analysis?

L3-4

BY WITNESS HERNANDEZ:

A. Yes, sir. We performed a review of selected drawings. Among those selected drawings were the containment liner, and the Reactor Containment Building mat.

Q. With respect to either the Brown & Root constructibility analysis or the HL&P, do you recall whether anything was -- any documentation was produced or anything was pinpointed relative to precautions that should be taken during the pour to counteract these congested areas?

BY WITNESS HERNANDEZ:

A. Holes were drilled -- There were a number of arrangements made when we looked at that. That's why we placed the eight-inch channel with its legs in the upright position.

That's why we also provided provisions for holes drilled into the eight-inch channel.

There were a number of areas looked into with regard to constructibility of the liner.

There was also at that point in time looked at and consideration given to how far PDM could erect the liner so as to allow accessibility with regard to the reinforcement at that point in time.

There was also concerns generated as to what

L3-5

was going to be the specific lift thickness at that point in time.

Considerations like that were made early in the --

Q All right. That was my question.

BY WITNESS MURPHY:

A I might point out also, this is not a unique design. There are other containments --

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, I would also like to point out that there were rebar models made of the specific areas where we thought we would have a difficult problem, such as the equipment hatch.

They were made in anticipation, and review was done on those with regard to constructibility.

Q Just one last thing. I forgot to ask you about Staff Exhibit 101.

I am led to believe that there was a short pour at one point, and I don't see it reflected on either --

BY WITNESS MURPHY:

A That's correct. You don't. It's in Unit 2 that the change was made to the location of the construction joint relative to the eight-inch channel, and this -- I would have to do some research to see at which lift this occurred. I don't recall that, but

L3-6

you will not see it on these diagramatic sketches.

Q Okay, but it was in the second unit?

BY WITNESS MURPHY:

A In Unit 2.

Q Could you explain a little bit, whoever is the appropriate member of the panel, what was the design consideration or the construction procedure consideration for that short lift? What was that an attempt to do?

BY WITNESS MURPHY:

A To eliminate the situation in which we found the vast majority of the voids. Namely, underneath this eight-inch channel.

It relocated the position of this channel relative to the construction joint, from approximately one foot off the previous construction joint, to the top of the placement, which was much more accessible and visible to inspection and vibration.

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BY MR. GUTIERREZ:

Q Now, on Page 12, Answer 16, you give what you think or your analysis has showed you was the main factors attributing to the void problems in Lift 15.

I think we have gone over the major factors, but on the top of Page 13, Line 8, and follow, you cite other factors that you think contributed to the voiding problem.

Among them were access and visibility limitations.

As a result of Lift 15, was this the first time these potential problems, or factors contributing to voiding were discovered by Brown & Root, or cited?

BY WITNESS MURPHY:

A I don't follow your question.

Q Well, my question is: You list a series of contributing factors to voiding --

BY WITNESS MURPHY:

A In Lift 15.

Q -- in Lift 15. Yes.

And what I am asking you is: Did these factors first come to light as a result of your analysis of what caused the voiding on Lift 15, or were you aware that these factors contributed to voiding prior to Lift 15?

L3-8

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, let me provide you with an example with regard to one of the examples would be accessibility.

Q Okay. I want you to do that, but could you first answer my question whether you were aware that these factors were contributing factors to voiding?

BY WITNESS HERNANDEZ:

A These factors are always a contributing aspect with regard to the possibility of the formation of voids.

These would be taken into consideration with any type of pour, concrete construction pour. You would have to insure accessibility.

You would have to insure adequate visibility. You would have to insure that there was proper consolidation of the concrete.

All of these things are a matter of course, or taken in general to providing good, solid concrete.

Q Well, I take it that on Lift 15 you did not provide some of these things.

BY WITNESS HERNANDEZ:

A As we have said, we did not consider them adequately at that point in time. I think that is the point.

13-9

Q Just let me draw one distinction, Mr. Hernandez. You say that these factors are factors, I guess, text book factors any engineers knows contributes to voiding, or potentially could contribute to voiding. Is that the gist of what you are saying?

BY WITNESS HERNANDEZ:

A If I might prompt it with any standard practice for a civil engineer to take into consideration that these aspects would have to be considered to provide for good concrete construction, the answer is yes.

Q Okay. Now my question is: Did you know on this particular job that these particular factors were in one form or another inadequately considered prior to Lift 15?

BY WITNESS HERNANDEZ:

A I don't think that the evidence indicates that they were. We have one -- less than one percent of this surface that was -- had any evidence at all of that, and then there was the size of the voids that were determined were truly insignificant and would not have been addressed on any other job.

So, to answer that question, we were aware of them. Not we, the people that were doing this planning must have been aware of them.

Now, on Lift 15 they were not adequately

13-10

addressed, but they had been addressed previously on previous placements.

Q Have you previously been cited for insufficient vibration, concrete vibration, to your knowledge?

MR. HUDSON: Is that question limited to a reactor containment shell pour, or for the plant in general?

MR. GUTIERREZ: The whole job.

MR. HUDSON: I just wanted to make the record clear.

BY WITNESS MURPHY:

A There have been indications and evidence that concrete had not been properly consolidated in several instances, as we have documented several times this morning.

But, I think as Mr. Artuso pointed out previously, we cannot expect to come up using concrete with a perfect concrete unit.

BY MR. GUTIERREZ:

Q I think I understand your point, that in a job this size you are not going to be textbook perfect with every pour, but I think I asked you a very direct question,and that was: On this job, prior to Lift 15, to your knowledge were you cited by the NRC for improper concrete consolidation practices or vibrators, use of

L3-11

vibrators?

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, I believe we were, but I do not recall, cannot recall specifically the I&E Report. If it was 79-0 something I think if you would -- I don't even remember what our response was with respect to that citing, whether we agreed, or whether we did not agree.

I think there was -- If I recall from the record, our first reply to that was we may not have agreed with the citation, if that's correct.

Until I have that citation, and be able to review the enforcement record, and also our response, I could not give you a direct answer.

MR. HUDSON: Your Honor, I'd like to enter an objection to this line of questioning at this time. If Staff has an I&E Report in mind, why don't they just show it to the witness, say, yes, we were cited, or no, we weren't. We made a response. And get on with it.

There is no reason to play this cat-and-mouse game about whether or not these gentlemen happened to remember whether we were or not cited for a particular violation.

I think the Staff knows what the facts are, and they know what those I&E Reports are. They can just get them out and show them to the witness.

13-12

MR. GUTIERREZ: Your Honor, we are wasting time here.

First of all, to respond to Mr. Hudson, I don't think there is a cat-and-mouse game being played. I am asking the panel about particular practices, and when they first learned that there might be problems on this job relative to those practices, and I think I am getting sometimes direct answers. Sometimes, "Well, we don't know. It's always a problem."

These are the men who are in charge of the concrete work on the job. Now, if they don't know if they have been cited, it is hardly a cat-and-mouse game. I will be glad to give the two citations, 79-04 they were cited, and 79-15 they were cited, both for -- one for failure to follow concrete consolidation procedures. One is for lateral movement of concrete with vibrators.

I would think this would be something that would be within their immediate recall.

MR. SINKIN: Mr. Chairman, I agree completely that testing of the witness' recall of when they were cited by the NRC on a particular event is a very worthwhile endeavor.

JUDGE BECHHOEFER: I think the objection will be overruled, for the reasons stated by Mr. Gutierrez.

13-13

MR. GUTIERREZ: Was there a question pending? I thought Mr. Hernandez had answered the question.

MR. HUDSON: That is correct. My objection was to the line of questioning, not a particular question.

JUDGE BECHHOEFER: I see. The objection is overruled.

BY MR. GUTIERREZ:

Q Now, among these other factors you list on the top of Page 13 was equipment malfunctioning. And in detail you had said that on Lift 15 there were two pumps used.

On prior lifts, -- Well, let me ask the first question.

Were there prior pours of the magnitude of the Lift 15 pour?

BY WITNESS MURPHY:

A Yes.

Q And on those pours, to your knowledge, what was the nature of the pumping equipment used? The same as it was on this pour? You don't have to go into the details.

BY WITNESS MURPHY:

A To the best of my knowledge, yes.

Q And do you know the numbers of pumps that were used?

13-14

BY WITNESS MURPHY:

A. The same setup, to the best of my knowledge. Now, I am not familiar with every placement that was made down there, but I think this was the practice that had been followed.

Q. So to the best of your knowledge on other pours prior to Lift 13 there wasn't backup, either, for pumps. Is that accurate?

BY WITNESS MURPHY:

A. I would not have considered a backup equipment. As I testified previously, I did not consider it as backup. Somebody else made the judgment that it was.

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14-1

BY MR. GUTIERREZ:

Q To your knowledge, did equipment -- pumping equipment malfunction on other pours of the size of Lift 15?

BY WITNESS MURPHY:

A I have no prior knowledge.

Q Does anyone else on the panel?

BY WITNESS SINGLETON:

A We have had -- during the course of concrete placement on the site ... you know, equipment breakdowns on other shell lifts and stuff ... on other pours.

Q How about Lift 8? Do you recall if there was a significant equipment malfunction on that lift?

BY WITNESS SINGLETON:

A I'm sorry. I can't really recall that -- you know, an individual lift like that.

I am familiar with 15. But 8 I can't recall.

Q Is anyone on the panel familiar with any equipment malfunction that prolonged the pour time to the point that voiding would be a potential problem, in the same sense that I gather you think the prolonged pour might have contributed to voiding on Lift 15?

BY WITNESS HERNANDEZ:

A No, sir, not to my knowledge. I think I'd

14-2

like to -- I believe on Lift 15 there was a simultaneous breakdown of both pumps at the same time.

Q. Mr. Artuso, turning to Page 14, I know we went around this line a couple of times this morning -- not in reference to this particular page citation. Looking at Line 12 and following on Page 14, it's characterizing the voids on Unit I containment.

And it's saying what percentage of the area these voids represent.

And I guess my question is: As a professional engineer, if you were merely told a percentage of voiding in a containment building, would you be willing to render a professional judgment as to the significance of those voids on that fact alone; or would you require more information in order to exercise your professional judgment?

BY WITNESS ARTUSO:

A. I would need additional information, the most important of which is the distribution of those voids.

Q. Mr. Artuso, referring to Page 20, Question and Answer 30, you're asked whether voiding in containment is -- I'm sorry -- voiding in large concrete construction operations is common.

I think everyone here is in agreement with

your answer, that insignificant voids are common. Is that the gist of your answer to the question here.

BY WITNESS ARTUSO:

Yes. Insignificant voids are common.

Q Now, my first question is: Of the 105 voids in the two containment units, would you consider all of them to be insignificant or were some significant?

BY WITNESS ARTUSO:

A I would probably like to divide the definition of voids into insignificant, significant and critical.

Insignificant are the voids that are slight, surface, honeycomb without too much depth to it.

That you'll find everywhere.

Significant voids are larger areas of either honeycomb or voids.

Critical are ones that could adversely affect the function of the structure.

My conclusion was in examining the location of all the voids on this containment, the location, the depth, the appearance and considering that the stiffeners that are used on that liner, which, in fact, contributed to the voids conversely helped distribute the loading on

14-4

that membrane, in the event of a postulated accident.

So, in effect, what's causing it is also helping distribute the loading so that the unit operates as a whole.

The primary importance of any structure is that you should have a continuity of action throughout the system.

And that is what you get from no voids, or the transmission of the loading and stresses into the structure.

So my conclusion was that there would be no -- absolutely no adverse effect even if those voids, other than the Lift 15 -- even if those voids were left non-repaired, they would not even be able to be detected in both either an accident or, in addition, you have the SIT test -- the structural integrity test. You would probably not be able to see any effect during that test.

Q Now, I take it from that that of the 105 voids, you don't consider any of them -- even before repair, to have been critical?

BY WITNESS ARTUSO:

A Absolutely not.

Q Some of them were significant, but the vast majority were insignificant?

14
41-5

BY WITNESS ARTUSO:

A. The vast majority were insignificant. Some of them were significant in that it would be nicer if they were filled -- those spaces were filled with concrete.

Q. Now, I wanted to focus on your word "significant." You're using that "significant" to -- in relation to what? Structural --

BY WITNESS ARTUSO:

A. Significant in relation to -- this was the -- This is what you try to achieve. When you build the structure, you try to achieve a void-free structure.

If you don't get a void-free structure, it doesn't mean the structure is jeopardized. It means that you don't have what you had -- what you had tried to accomplish.

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BY WITNESS HERNANDEZ:

A Mr. Gutierrez, may I add something there? With respect to the repair of the voids, it was never the intention of HL&P engineering or Brown & Root engineering to leave the voids unrepaired.

From the onset of Lift 15 and all through the investigation of Lift 8, initially and at subsequent widening, the decision was made to repair the voids that were detected.

That was the position. It was not really desired to go back and provide academic questions as to what would happen if this void was not filled.

It was much easier to just bring the concrete back into complete conformance with the specification by filling the voids.

Q When you say "conformance with the specifications," there wasn't some kind of tolerance there in the specifications that provided for a certain amount of voiding?

BY WITNESS HERNANDEZ:

A No. I cannot give you an exact extraction from the specification on concrete. But it basically says that voiding is something that we do not want to have happen on the job.

Q Thank you.

Now, Mr. Artuso, again, I'm trying to understand what you mean by "significant," and I -- this is all in the context as Mr. Hernandez says that they are -- have been repaired.

But I'm trying to get a feel for the extent of the problem before it was repaired.

And you say significant -- Are you saying that they weren't significant because if left unrepaired, the building would be able to withstand exactly what, in your-- What were the types of things you considered?

BY WITNESS ARTUSO:

A "Significant" in my definition is the presence of a void that you would not expect to have. You would grant that that void should have been filled. That is a significant void.

The critical nature -- My definition for a critical void is one that had it not been repaired could have jeopardized the functioning ... the load-carrying capacity of that structure.

In my estimation, none of the voids in the containment, with the exception of Lift 15, would have resulted in that structure from performing as designed, because of the reasons I gave earlier.

Q Mr. Artuso, are you familiar with 10 CFR Part

15-3

50, Appendix J?

BY WITNESS ARTUSO:

A. No, not Appendix J.

Q. Just to refresh your memory or any member of the panel, it's "Primary Reactor Containment Leakage Testing for Water Cooled Power Reactors."

BY WITNESS HERNANDEZ:

A. Could you repeat that again, Mr. Gutierrez?

Q. "Primary Reactor Containment Leakage Testing for Water Cooled Power Reactors."

BY WITNESS HERNANDEZ:

A. Are you referring to the leak-rate test?

Q. Yes. I was going to preface any remark, Mr. Hernandez, before you explained to me that this is primarily a test to be completed when containment is actually finished, and it's kind of a pre-op test.

But what I had in mind to ask the panel was whether any analogous-type test was made on the existing structure to see what -- any kind of radiation leakage type problem ... how the voids would have impacted that consideration.

BY WITNESS HERNANDEZ:

A. Mr. Gutierrez, with respect to shielding on the design of the containment, we have gone back and repaired the voids.

15-4

Therefore, we have brought the containment back into conformance.

We are also, as required by the statutes, going to perform a leak rate test. By the statutes and in conformance with the statutes, we are also required to perform a structural integrity test.

We will take the containment up to 1.15 times its pressure -- its accident pressure, to test the integrity of the containment.

This will exceed any design basis accident that has to be postulated.

Therefore, we know that we will have a containment that can perform as the design intended. In addition to that, we are going to post-tension the containment.

We are going to actually make sure that this is the normal course of events. There are a number of operations that have to be done prior to the containment functioning under an operating license.

Q To summarize, Mr. Hernandez, basically you took a very logical approach, I guess, that rather than to perform an in-depth analysis -- what the effect the voids would have on the structural integrity, the radiation leakage problem ... rather than doing all those detailed analyses, you made the judgment to fix them all;

15-5

is that --

BY WITNESS HERNANDEZ:

A. Yes, sir. That was made early. That was made initially with the Lift 15 investigation.

I haven't added also that with the Lift 15, as contained in our final report to the NRC, we did perform a load test on the brackets -- on an individual bracket to demonstrate the adequacy of the grouting method and the performance of the bracket was excellent.

It was inside of our expectations with regard to its acceptance.

Q. One last factor that I think has been explained or outlined by the panel relative to voiding problems is the horizontal shear ties.

Prior to the corrections made as a result of the voids on Lift 15, could you outline -- whoever the applicable panel person is -- what was the nature of the problem relative to the horizontal shear ties?

BY WITNESS HERNANDEZ:

A. As I remember it, the basic problem with the horizontal shear ties is that the location of the shear ties would limit accessibility of the crew actually performing the vibrator -- providing the vibration of the concrete, the actual consolidation of the concrete.

I should add, periodically -- field

15-6

engineering -- construction periodically used the field request for engineering action to locate when they identified an exceptionally difficult pour ... to seek some type of relaxation on the location of the shear ties.

This was then evaluated by design engineering. And if it was something they could live with, they then provided that means to construction engineering.

However, subsequent to -- I believe Lift 15 investigation, and the Lift 8 investigation, it was decided that there was a better arrangement for the location of shear ties, that was one that design engineering could live with and still present the maximum amount of accessibility to the individual pour.

Q Mr. Singleton, did the positioning of the horizontal shear ties present any problem relative to the QC inspector's ability to make a pre-placement pour inspection?

BY WITNESS SINGLETON:

A It would limit us in some degree as to accessibility ... as getting down and doing the type of inspection that would have been desired.

Q Did you bring this accessibility problem to engineering's attention through any documentation?

15-7

BY WITNESS SINGLETON:

A. I'm not sure that we brought it to their attention by any form of documentation. But I know we brought it to their attention as far as during our inspection, accessibility to get in there and check the clean-up and everything.

We had to utilize the skinniest people we had to get down in there. That presented a problem to us at that point.

But as far as on a memo or letter ... you know, during our in-process type inspections and stuff, this was brought up to them.

Q. Could you put a time frame on when this accessibility problem first surfaced relative to QC inspectors?

BY WITNESS SINGLETON:

A. I'm sorry. No, sir, I couldn't really put a time frame on that.

Q. Well, you were a QC inspector. Could you wriggle in between the horizontal ties at all times?

BY WITNESS SINGLETON:

A. When I was a QC inspector in the field, I was a little bit thinner than what I was -- than what I am right now.

And, yes, I could get down there. My primary

15-8

responsibility was the Fuel Handling Building. If you're familiar with any type of design in the Fuel Handling Building, there are some very narrow areas that I had to get down in there to.

But, yes, I have gotten down in there. And one of the things I do now before I'll say "Yes, we can inspect this area," I will climb down into an area.

And if I can get into the area, then I know my inspectors can get down there to do the inspection.

Q Mr. Singleton, understanding when you were a QC inspector, you were basically not assigned to containment, as you progressed to the management ranks and you were in containment, at all times could you get down through the shear tie areas; and did it ever present a problem?

Did it ever present a problem in your ability to make the inspection, which I guess is the critical question?

BY WITNESS SINGLETON:

A It doesn't so much limit your ability to make an inspection, as does it limit that once you go down into that area, you can't see a good way. You have to make numerous entrances down into the pour.

15-9

Mostly -- a lot of the times you have to go down and then kind of back into it ... put your feet underneath of you and go backwards and crawl horizontal.

Nothing was really limited. Just some of it was a lot harder than other pours.

Once you got down in there, you were limited in your maneuverability. But you could get down in there and check it out.

Q Before I leave this area, I'm just trying to pinpoint a time frame when these problems -- or the accessibility problems were perceived.

BY WITNESS SINGLETON:

A I believe we've had basically the same shear tie design and configuration from Lift 1 all the way up.

Q All right, thank you.

On Page 24, Line 32, we're talking about the ability to locate the Cadwelds in place. Am I correct in saying that from a technical structural point of view -- by that, I hope I'm being clear -- namely, with respect to the integrity of the containment, it's your testimony that it's not necessary to know where every single Cadweld -- the exact location of every single Cadweld? Is that the gist of it?

15-10

BY WITNESS MURPHY:

A That is correct, assuming that the testing frequency has been proper, and that they have been inspected.

Q Because of the uniformity of Cadwelds, I assume?

BY WITNESS MURPHY:

A That's right. And the history of the item.

Q Now, Mr. Singleton, am I correct in saying that it was a Brown & Root requirement, nonetheless, to identify where each individual Cadweld was? That might have been overly restrictive; but that, nonetheless, was a requirement?

BY WITNESS SINGLETON:

A That was a requirement in procedure ... to identify the location of Cadwelds. It was quality control's interpretation of that -- It was our interpretation that we had to supply a unique location.

As an example: elevation, azimuth or radius.

Q Well, then, in answer to Question 40, when the answer is: "Location of Cadwelds is unnecessary," the technical explanation or structural explanation side, from a pure quality control point of view -- and following the procedures -- wouldn't you have to admit that it is

15-11

necessary?

BY WITNESS SINGLETON:

A. The only time a location of a Cadweld is necessary is if there is a test splice area and you have to go back and locate this splice on either side of that failed splice and test those areas.

Q. Well, let me ask you the question again, because I think you gave me a technical answer. And I was asking you from the viewpoint of yourself as a QC superintendent -- quality control -- if there is a specification or a requirement that Cadwelds be located exactly or uniquely in the structure -- isn't it necessary to do that?

BY WITNESS HERNANDEZ:

A. Mr. Gutierrez, I think the point was in Mr. Singleton's response was that it was determined that that was a QC interpretation of the requirement for location ... to provide a unique location of the Cadweld.

I think from an engineering standpoint, it would be sufficient to know where the Cadweld was placed in terms of the specific pou[illegible] or if it was located in this portion of the [illegible] th regard to consideration of the effects.

Q. I understand the engineering explanation, Mr.

15-12

Hernandez. What I'm trying to do is get strictly the quality control viewpoint.

If engineering tells quality control that they're interpreting their regulations wrong, or that they don't have to do it, I understand that's a process that runs its course.

But I'm trying to focus just on the role of a quality control supervisor in making a determination. Once the interpretation has been given to the reg that Cadwelds shall be uniquely located, isn't it necessary, Mr. Singleton?

BY WITNESS SINGLETON:

A. I believe it's necessary to locate the Cadwelds by way of concrete pour number or general location or wall number. It's debatable amongst ourselves -- amongst the QC people as to whether we have to go to a unique location, as far as elevation or azimuth.

But I believe that you would have to locate it in terms of pour number or area that it's in.

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16-1

JUDGE BECHHOEFER: Mr. Gutierrez, if I can just interrupt and ask the question in a slightly different way, because I've wanted the answer to that question, in any event.

If the QC personnel whom you were talking about who are responsible for interpreting a procedure interpreted it in a certain way, does it matter that engineering personnel think that that's not necessary?

I mean, what relevance is it that engineering personnel think it's not necessary as long as the QA/QC people interpret it in a certain way?

Don't you have to go get the interpretation changed before you decide that it's unnecessary?

WITNESS SINGLETON: What we normally do in that case, Judge Bechhoefer, if QC has an interpretation of a procedure and it differs from construction or engineering, then we elevate this up to our quality engineers who are responsible for the development of the quality procedures or the quality input or the inspection requirements of the procedures.

We elevate it up to them, and they in turn, as far as negotiate with engineers or construction as to what is the proper interpretation of that procedure, and we follow whatever direction that the quality engineers give us as to the interpretation of that

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procedure.

JUDGE BECHHOEFER: I assume that before any such procedure is referred upward you will follow it until it's changed, is that correct?

WITNESS SINGLETON: Yes, sir, we'll follow the extent of the procedure requirement until such time as action occurs that would cause that requirement or that procedure to be changed.

JUDGE BECHHOEFER: Thank you.

BY MR. GUTIERREZ:

Q In light of the -- I believe it's your testimony that at least with respect to the necessity of locating the precise Cadweld to its precise location within the containment, that was a subject of varying interpretation among the QC inspectors, is that your statement or your testimony?

BY WITNESS SINGLETON:

A When I arrived on the jobsite in December '76 the Cadweld had been underway for a certain period of time, and that was the interpretation that had been developed by the quality control personnel and the quality control supervision, as to what the definition of location was.

Q So there was no confusion when you came on, that was a requirement, and all the QC inspectors

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followed it?

BY WITNESS SINGLETON:

A That's correct.

Q Now, on Page 29, Question and Answer 49, I was a bit unclear this morning as to exactly what events, if any, what series of events in October 1978 gave rise to this Cadweld documentation task force.

BY WITNESS LONG:

A Mr. Gutierrez, if I may explain, as I testified earlier, I think in one of Mr. Jordan's questions yesterday, that one of my engineers had identified several problems dealing with the -- in his surveillance of the Cadwelding inspection books in the QA vault at the time.

In his review of these documents, FSQ's, field inspection books, Cadwelding test records, prompted the review that is referred to here by CDTF, Cadwelding Documentation Task Force review.

Q Thank you, Mr. Long.

On the next page Mr. Murphy says that from a safety significance point of view there is no significance to the fact that a few final inspections of Cadwelds weren't made.

Mr. Murphy, that's because of the uniformity of the Cadwelds, et cetera, that I think we have already --

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BY WITNESS MURPHY:

A. It was based on the history of the item.

Q. Right. Now, Mr. Singleton, I'd like to turn to you and again ask, from a strictly QA/QC point of view, do you attach any significance to the fact that a few inspections weren't made?

BY WITNESS SINGLETON:

A. No, sir, I don't, and that's based on some information provided in Mr. Murphy's testimony as far as the -- of the 36,300 Cadwelds made at that time, between April of '76 and April of '79, there was only about one percent of these Cadwelds that were rejected due to visual inspection, and it's based on the level of confidence that has been demonstrated during the time we've been shooting Cadwelds.

Q. Is that the quality control inspector's function to make that judgment?

BY WITNESS SINGLETON:

A. The quality control inspector's function is to follow the requirements of the procedure.

Q. I can only ask, in light of that answer, how can you say there is no significance from a purely QA/QC viewpoint to the fact that a few inspections weren't made?

/ / /

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BY WITNESS SINGLETON:

A. You base -- I believe that was based on my own personal judgment or feeling. That's my own personal belief in it. That does not represent policy of Brown & Root or policy of quality control, based on the information that I have available to me and what I have seen in the Cadwelds out there, I have that level of confidence. That's not a technical judgment or anything.

Q. Well, it's your personal feeling that for QA/QC in the construction of nuclear power plants that close enough is good enough?

BY WITNESS SINGLETON:

A. That's not my personal feelings. My personal feelings is that I have to follow the requirements of the procedure.

BY WITNESS HERNANDEZ:

A. Mr. Gutierrez, if I might add, if we state that we will -- our position is, with HL&P, if we say that we are going to do something, then by God we're supposed to do it. That's the specific intent. If we over-specify, then we'll have to meet that level of performance until such time as we evaluate the over-specification and determine that it's not applicable from a design engineering standpoint or from some other reasonable standpoint.

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Q Well, Mr. Hernandez, in light of that, and that's the position I've understood all along, would you care to comment on Mr. Singleton's position as the QC superintendent?

BY WITNESS HERNANDEZ:

A I believe Mr. Singleton is speaking from his personal judgment with regard to knowing basically the performance of the Cadwelds.

If any decision is to be made as to the significance of not documenting Cadwelds in terms of location, that would be a design engineering standpoint.

That would have to be taken up by design engineering to evaluate the circumstances.

Q So then you feel it's wrong for the QA/QC inspector to make that judgment. I understand you to be saying that it should be documented and let engineering or design make that judgment that it seems Mr. Singleton is willing to make.

BY WITNESS HERNANDEZ:

A No. My position is not with respect to Mr. Singleton. My position is with regard to the project as a whole. If we specify that we will -- we are going to perform against a certain condition, then we are held accountable for performing against that specific requirement. That is a project position. I can't say it

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any other way, other than that's HL&P's position with regard to the requirements of the project.

BY WITNESS SINGLETON:

A Would you allow me to clarify that a little bit, please?

Q Sure.

BY WITNESS SINGLETON:

A Either you have misinterpreted what I said or I misinterpreted what you thought.

As far as the position of a civil quality control superintendent, we're going to follow what the requirements are of the procedure.

If it tells us to inspect a Cadweld while standing on our head, that's what we're going to do.

Now, if design feels that's over-inspection, well, that's up to them to change, but as it our position we're going to follow the requirements of the procedure until such action occurs that changes those.

But my viewpoint was strictly my own personal viewpoint. We're going to follow the requirements of the procedure.

Q Skipping over to Page 40, with respect to the function of the waterproofing membrane, I believe it's the panel's testimony that the waterproofing membrane is the guard that prevents water seepage into

16-8

the containment, is that --

BY WITNESS SINGLETON:

A. For watertightness impermeability, yes, sir. It provides for watertightness impermeability.

Q. I'm sorry. I've been corrected. It's not containment, it's the other structures like fuel handling building, and such, is that right?

BY WITNESS SINGLETON:

A. That is correct, with respect to the purpose of the waterproofing membrane, was to provide an added degree of assurance for watertightness impermeability.

Q. Does it also serve the function of preventing water from interacting with the concrete? Is there a distinction there that I just drew that you're seeing?

I got from your testimony that what you were saying is it's a waterproofing or a watertightening structure to prevent water from actually going into the building, but it seems also that it retards against the water interacting with the surface of -- the concrete surface of the structure.

BY WITNESS HERNANDEZ:

A. Sir, with respect to that, the provisions of ACI-31[illegible], which is the code of record that we are required to perform against for structures outside of the containment, the only requirement is that we provide

16-9

three inches of cover for the reinforcing steel.

However, we have chosen, as an owner's prerogative, to include the requirement for waterproofing membrane for all structures below Elevation 28.

Q Well, do you know whether this feature is on almost all nuclear plants?

Maybe that's a question for Mr. Artuso.

BY WITNESS ARTUSO:

A Most nuclear power plants have waterproof membranes. However, many of them do not rely on a waterproof membrane from keeping the water from interacting with the concrete.

The only purpose for concern about that would be corrosion of the reinforcing steel. There is sufficient cover on a nuclear power plant construction that it is not necessary to have a durable structure without it.

The same thing would apply maybe even to the tendon gallery. You may not want water in the tendon gallery from a nuisance standpoint, but it would not be destructive, provided a proper surveillance is maintained.

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17-1

BY MR. GUTIERREZ:

Q Now, I'm coming to --

MR. GUTIERREZ: Mr. Chairman, I am led to believe you wanted to break at 3:00. Is that still your intent?

JUDGE BECHHOEFER: I just think it is appropriate to ask Mr. Fisher one question.

(Laughter.)

WITNESS FISHER: Thank you, Mr. Gutierrez. I appreciate that.

MR. GUTIERREZ: I didn't want him to feel he came all the way from Houston for ....

BY MR. GUTIERREZ:

Q Mr. Fisher, I wonder, in thinking about the congested rebar, and this is a question that was raised in my mind -- I don't know if it was raised in yours as an engineer -- from and engineering point of view rebar is put in concrete for purpose of strengthening concrete; is that true?

BY WITNESS FISHER:

A Yes. That is basically correct.

Q Is it possible that rebar can be so congested and, therefore, create problems with voiding in such as to weaken the overall structure?

L7-2

BY WITNESS FISHER:

A Well, I suppose that's possible, if you agree to the situation where concrete cannot enter between the rebar; part of the utilization of the rebar depends upon its interaction with the concrete that embeds it.

In an extreme situation you could have such congestion that it would be impossible to have concrete around the rebar at all.

Q So from an engineering point of view the optimal strength would be a certain amount of rebar, coupled with the concrete; true?

BY WITNESS FISHER:

A That's true, and, also, much can be done with the arrangement of the rebar to accomplish accessibility for concrete, and also to get the added strength that you are seeking.

For example, the designer can bundle rebars together, and provide the steel in that manner and still by bundling bars together provide more space between bundles, if you understand what I mean.

Q Let me ask you, and this is for any panel member that feels he can answer this, when the voids in Lift 15 were discovered and corrective action was taken, it seems all along that what has been assumed is with certain construction procedures, possibly inappropriate

L7-3

or inadequate vibration that caused the voids, was there any analysis done, engineering analysis, or was there any questioning that the design, itself, might have called for rebar which is too congested to be adequately poured around?

BY WITNESS FISHER:

A The nature of the problem in that area creates a difficult design situation. You have a very high load, a very large load -- that is, the brackets for the polar crane, supported off the inside of a shell, so you have a very large concentrated load with some attendant pending moment introduced into a shell structure. There is almost no way to avoid a concentration of rebar, and a congestion of embedment achorage, just to fulfill the design requiremen

We could consider the possibility of spacing brackets closer together and using more. However, you still have almost an equivalent load occurring on each bracket at the point in time when you have the crane parked right at that bracket.

So your design load would be essentially the same.

Q In light of the experiences relative to around the brackets in Lift 15 on Unit 1 have you changed the design at all for Unit 2?

17-4

BY WITNESS HERNANDEZ:

A. Mr. Gutierrez, I don't believe that -- We may have made minor changes to enhance the accessibility, but I believe the basic configuration of the bracket remains the same as on Unit 1.

I might add that when we identified Lift 15 we had only poured 20 or the 24 brackets. We did make a successful pour for the other four remaining brackets y taking into account greater accessiblity, greater visibility, attendant actions made with respect to a number of other features that we have currently gone into in past testimony.

Q. Are you changing anything relative to the type of concrete that you will pour into that lift for Unit 2 -- I'm sorry, the mix?

BY WITNESS MURPHY:

A. There have been provisions put in the new procedures that they can request the use of grout in congested areas.

This has not been forbidden before, but it is specifically called out and flagged, if you will, so that if construction feels there are problems in an area, around penetrations or in areas of hign concentrated rebar they can request the use of grout.

A design engineer will evaluate the situation,

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and give them permission to do so, or not if he cannot.

Q Other than what you've cited in your direct testimony and elaborated on today, are you doing anything else different relative to prepour planning for the lift pours on Unit 2 than you did on Unit 1 pours?

And I don't mean that as a trick question. We've gone through extensive testimony as to what differences you've already done, but I'm just thinking relative, particularly, to prepour activity, planning, anything you can think of?

BY WITNESS HERNANDEZ:

A Mr. Gutierrez, I believe that could best be handled in the concrete restart program which will address the specific pours that were made in Unit 2. However, you know, we have gone over the major features.

Q Mr. Fisher, on page 47, answer 88 --

JUDGE BECHHOEFER: Could you break off?

MR. GUTIERREZ: If I could just get this answer from Mr. Fisher, I think that would be fine.

JUDGE BECHHOEFER: Okay.

BY MR. GUTIERREZ:

Q The only question I had on answer 88, Mr. Fisher, was with respect to your rebar containment, internal structures, were your specifications more stringent than in ACI-318?

BY WITNESS FISHER:

A. I'm presuming you mean the design specifications or the design criteria, and basically the American Concrete Institute code that was used in the internals was 318.

MR. GUTIERREZ: Thank you.

JUDGE BECHHOEFER: Okay. With that we will adjourn until Monday night, July 20.

MR. AXELRAD: Mr. Chairman, can we assume that on Monday night after the oral argument, the only evidence, the only panel that will be needed is the continuation of this panel?

JUDGE BECHHOEFER: That's right.

MR. AXELRAD: We do not have to bring another panel besides this one panel?

JUDGE BECHHOEFER: That's correct. No.

MR. JORDAN: Your Honor, I am reminded of one thing, when you mentioned the oral argument, which had slipped my mind, and that is that I discussed with Mr. Reis the possibility that we might be able to work out something that would be satisfactory to CEU that we wouldn't have to then make the motion to strike any documents. I assume if we reached that point and made that decision that we wouldn't make the motion, then we wouldn't need to do the briefing, correct?

JUDGE BECHHOEFER: Well, that decision may or

L7-7

may not satisfy the Board, in terms of what's in the record. That's my only problem with that.

MR. JORDAN: The answer therefore is --?

MR. AXELRAD: Mr. Chairman, I believe from the viewpoint of the Applicants the matter should be briefed. It might well be that the Applicants would want to move to strike some I&E reports.

MR. JORDAN: Oh, okay.

JUDGE BECHHOEFER: I think the briefing is desirable. Whether we end up certifying whatever answer we get may depend upon what the answer is.

With that, we will be adjourned until Monday night, July 20th.

(Whereupon, at 3:05 o'clock p.m., the hearing in the above referenced matter was adjourned, to reconvene at 7:00 o'clock p.m. on Monday, July 20, 1981, in Houston, Texas, South Texas College of Law, 1300 San Jacinto Street.)

This is to certify that the attached proceedings before the

NUCLEAR REGULATORY COMMISSION

in the matter of: HOUSTON LIGHTING & POWER COMPANY
SOUTH TEXAS NUCLEAR PROJECT UNITS 1&2

DATE of proceedings: 26 June 1981

DOCKET Number: 50-498 OL; 50-499 OL

PLACE of proceedings: San Antonio, Texas

were held as hereir appears, and that this is the original transcript thereof for the file of the Commission.

LaGailda Barnes
Official Reporter (Typed)

LaGailda Barnes
Official Reporter (Signature)