NUCLEAR REGULATORY COMMISSION

ORIGINAL

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	:	
	:	
LONG ISLAND LIGHTING COMPANY	:	DOCKET NO. 50-322-OL
	:	
(Shoreham Nuclear Power Station)	:	

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

LONG ISLAND LIGHTING COMPANY : Docket No. 50-322-OL

(Shoreham Nuclear Power Station)

Third Floor, B Building
Court of Claims
State of New York
Veterans Memorial Highway
Hauppauge, New York 11787

Thursday, September 16, 1982

The hearing in the above-entitled matter convened, pursuant to recess, at 9:00 a.m.

BEFORE:

LAWRENCE BRENNER, Chairman
Administrative Judge

JAMES CARPENTER, Member
Administrative Judge

PETER A. MORRIS, Member
Administrative Judge

APPEARANCES:

On behalf of the Applicant, LILCO:

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* * *

C O N T E N T S

E X H I B I T S

RECESSES:

MORNING - 10,339
NOON - 10,387
AFTERNOON - 10,434

P R O C E E D I N G S

(9:00 a.m.)

JUDGE BRENNER: Good morning. I wanted to mention one matter not related to quality assurance before we turn to the subject of quality assurance.

As we have informed you, we are working on the emergency planning discovery dispute. During a conference call the other week, we mentioned that we would go ahead and rule on the additional items which formerly were not placed before us by virtue of the traditional motion to compel or a response thereto. And the items I am thinking of were outlined in a letter from Suffolk County to LILCO, I believe, September 2nd or thereabouts. And there are 10 or 11 or 12 items.

So, we are going ahead and ruling on them. The parties had contemplated applying their view after we ruled on the first batch of what we might have said after the second batch, and the Board believed that it would save time for us to apply our own view as long as we were at it.

I infer from the fact that nobody has informed us otherwise, that there has been no further movement towards agreement on that last batch of items, either. Is that correct?

MR. LANPHER: Yes, sir.

JUDGE BRENNER: All right. So if the parties have no problem, we will rule on it. LILCO's response did not refer to those items, but that was understandable. And furthermore, since we have the items before us, the documents before us, we are in a better position than LILCO to assess how our general findings and legal principles apply particularly to those documents. LILCO is in the difficult position of having to guess from the county's description as to what might be in the document. So those items will be included in our ruling.

That is all we have. If there is nothing else unrelated to quality assurance, we can hear any preliminary quality assurance matters and then continue the cross examination.

MR. LANPHER: I am not sure -- I guess it is a preliminary quality assurance matter, but just pursuant to your request yesterday, Judge Brenner, I provided to LILCO a list of documents that we were intending to use in quality assurance examination, and also, a list of what I entitled subject areas relating to quality assurance in which we are going to be alleging a pattern of deficiencies or violations exists.

I also informed LILCO, because that list is fairly long and therefore, there is a problem in getting

ready, we would start on the matter of engineering and design calculations in terms of a subject area today.

If the Board would like, I can provide you the same handwritten list I provided to LILCO.

JUDGE BRENNER: It might be helpful. As you know, in this particular area it is very summary, your cross plan, and a more detailed, subject-by-subject progression, which sounds as if you have, would help us. We don't have to have it this moment if you don't have additional copies.

MR. LANPHER: I have one copy. One additional copy.

JUDGE BRENNER: Okay, I guess we would like it.

MR. ELLIS: Judge Brenner, it might be useful for me to add that Mr. Lanpher has, indeed, given us a list of documents and the topics. It might be useful to point out that the documents really are fairly voluminous and we have worked hard to prepare, and, of course, the documents go beyond just these documents. In other words, there may be other pertinent documents.

What we are really talking about is hundreds of pages, not specific ones, and when we get to -- if there are specfic findings for what I am sure Mr. Lanpher regards as good reasons of his own, he didn't want to identify to us specific findings that he wanted

us to be prepared for.

But I think we will do our best and hope that we will not have to delay unduly.

MR. LANPHER: I should add, Judge Brenner, that I also advised that in terms of calculations -- this was a list trying to foresee not just today, in terms of calculations -- that I would be concentrating on the Engineering Assurance Division audits; the first set of documents that are listed on the sheet that I just gave you.

JUDGE BRENNER: Okay. We will proceed and see how it goes. Very quickly, I hope we will be catching up so that these witnesses will not be put in the position of having notice of a day or so. I mentioned before, I don't know how things progressed to this point, the particular documents that are being focused on so very late, and we will see how it goes.

By now you, I hope, know what documents you are going to use throughout the entire cross examination over the next few weeks, or will very quickly know that, and very soon, hopefully, in the next few days or the beginning of next week or so, you can give them a definitive list so that the witnesses can be a week or so ahead, as opposed to this day-to-day approach.

MR. LANPHER: Judge Brenner, except for items

which were produced pursuant to subpoena, I think this is very close to a complete list. I would expect -- I mean, there are a lot of documents here, Mr. Ellis is correct. When we talk about engineering assurance audits, that is a lot of documents. And field quality control audits, that is a lot of documents. And I think, as I say, this is fairly close except for some of the materials that were produced by subpoena.

JUDGE BRENNER: All right, let's get into it. Mr. Ellis, I assume your witnesses know that the accurate answer may well be that they don't know because they don't remember because it has been sometime since they have read the document, or that detail in the document, and so on. And they don't have to speculate.

MR. ELLIS: Judge, yes, I think they do.

MR. LANPHER: Judge Brenner, to save time, it might also be helpful if I marked several things upfront for identification. Then we don't have to take the time afterwards. If I could ask our friend, Judge Morris, our next exhibit number so that we can get it straight.

JUDGE MORRIS: Forty-eight.

MR. LANPHER: I would like to have marked as Suffolk County Exhibit 48 for identification Shoreham Project Audit Number 0, an Engineering Assurance Audit dated December 31, 1969. That is the date of the

report, it should be noted. The audit was conducted at some different date, and probably over a number of dates.

JUDGE BRENNER: Actually, I think if you look at the second page, the date of the audit was January 5 through 9, 1970, if I have the right document.

MR. LANPHER: You have the right document. On the next page, the interoffice memo which I think sets up the schedule for the audit. At any rate, we would like this marked as the County's Exhibit 48 for identification.

We would like Shoreham Audit Number 00 marked as Suffolk County Exhibit 49 for identification, and on the second page of that it has a date of April 17 to 24, -- I apologize. Some pages are not entirely clear, but if you go to page 5, handwritten page 5, it has a date of July 1, 1970.

I would like marked as Suffolk County Exhibit 50 for identification Shoreham Project Audit 1. The second page has a date of September 14 through 18, 1970, and the third page has the date of September, 1970.

JUDGE BRENNER: Okay, those three documents are so marked.

(The documents referred to were marked Suffolk County Exhibit Nos. 48,

49 and 50, respectively,
for identification.)

MR. LANPHER: Finally, I would like to mark what I handed to the Board and parties yesterday, a large volume of Stone & Webster Engineering Assurance Audits. They are audits numbers -- well, the cover page which was prepared by my office as sort of an index has Audits 2 through 40. And it notes that some pages are missing, some pages need a better copy.

LILCO has supplied us yesterday with these materials. I would like to thank them very much for that. We have not had an opportunity to include them in the volumes that had been delivered. We are not going to be addressing those specific pages, but I will endeavor to get the copies made, and if I can borrow the Board's and the reporter's copies some evening, we will get them updated.

JUDGE BRENNER: Okay, yes, we would certainly appreciate it being done that way instead of our having to make the inserts.

MR. LANPHER: Anyway, this volume of audits, Audits 2 through 40, I would note that Audit 2 is dated March, 1971 and Audit 40 is dated June 4, 1982. I would like that to be marked as Suffolk County Exhibit 51 for identification.

JUDGE BRENNER: Yes, and this volume is, of course, the Engineering Assurance Audits, as contrasted from the other volume which is the Field Quality Control Audits.

(The document referred to was marked Suffolk County Exhibit No. 51 for identification.)

MR. LANPHER: If the Board would like, I can mark that volume for identification at this time, since I did pass it out yesterday. I was not intending to get into it right now, but I delivered it to all the parties and to the reporter.

JUDGE BRENNER: No, let's wait until you are closer in time to when you will use it. I just wanted to make sure I have the distinction right.

MR. LANPHER: Let me proceed with the witnesses, rather than me testify that those are all Engineering Assurance Audits.

Whereupon,

T. TRACY ARRINGTON,
FREDERICK B. BALDWIN,
ROBERT G. BURNS,
WILLIAM M. EIFERT,
T. FRANK GERECKE,

JOSEPH M. KELLY,
DONALD G. LONG,
WILLIAM J. MUSELER and
EDWARD J. YOUNGLING,

the witnesses on the stand at the time of recess, resumed the stand and, having been previously duly sworn, were examined and testified further as follows:

CROSS EXAMINATION -- Resumed

BY MR. LANPHER:

Q Mr. Eifert, have you had an opportunity to review Suffolk County Exhibits 48 through 51, which are Stone & Webster Engineering -- which I believe are Stone & Webster Engineering Assurance Audits Numbers 0 through 40?

A (WITNESS EIFERT) I didn't go through this package and look at each and every audit, but I believe these are all Engineering Assurance Division audits.

Q Thank you. And these are Stone & Webster Engineering Assurance audits?

A (WITNESS EIFERT) Stone & Webster Engineering Assurance.

MR. LANPHER: Judge Brenner, I would like to move these exhibits into evidence, and I will proceed with examination relating to them.

MR. ELLIS: Judge Brenner, we think it is

premature to introduce them into evidence, and we certainly would have an objection to introducing all of these, wholesale, into evidence at this time.

I think that what ought to be introduced into evidence is what there is examination on. I think it is objectionable to introduce a mass of documents like this into evidence and to have examination on only portions of it, and then to use portions of it later on for things such as findings.

JUDGE BRENNER: All right. Let's take the more traditional approach, then, and wait until after the examination and we will see what the situation is. There are many ways of taking care of it, depending on what has occurred. Perhaps something similar to our caveat with respect to the FSAR, or whatever.

MR. LANPHER: If I could be heard just one moment on that, Judge Brenner. I am mindful of what Mr. Ellis is saying. I am hopeful that, for instance, on the calculation, I am going to go through these audits, a number of them, and we have been through them ourselves and we think we have identified a large number of calculation areas. I am not sure that the Board wants me to ask questions on each of those calculation areas, each and every one of them. There are many.

In terms of our proof relating to what we

believe is a pattern of deficiencies, however, those areas relating to calculations we think are relevant and should be in evidence.

What I am proposing to do is after we get rolling, so to speak, I am going to note areas that I am not specifically examining on but which relate to calculations and which we think demonstrate our points. And if on redirect Mr. Ellis believes that they need explanation, that is fine. Otherwise, I am afraid that the examination will become just too voluminous, and it is what I tried to point out in my cross plan, that I would be taking efforts, hopefully, to shorten it rather than cover every single thing and ask questions on every single item in here.

JUDGE BRENNER: Well, his point was slightly different. Let's see what occurs. They are exhibits for identification, so in terms of being there for the record so that the reader of the record understands your questions and the answers without having to repeat verbatim everything in the exhibit, that purpose is achieved.

His other concern was that there may be parts that are not touched upon at all in the cross examination, and he doesn't want to find out for the first time in findings that you thought you saw

something in there which is reduced to responding to in findings, as distinguished from being able to pursue it on redirect.

I can make a judgment after I see the scope of cross examination. And, in fact, the two of you might be able to reach an accomodation after we see what has occurred on the cross examination.

MR. LANPHER: Fine. Why don't we see.

BY MR. LANPHER (Resuming):

Q Mr. Eifert, when Stone & Webster uses the term "design and engineering calculations", what is Stone & Webster referring to?

MR. ELLIS: Judge Brenner, I have an objection. I hate to object to the first question, but he uses -- I think he said "engineering and design" and he didn't give the witness the context in which they might be used. I mean, they are terms used every day and have everyday meanings, and if he has a particular context or a particular document in mind, it seems to me that he ought to call attention to it and find out what it means in that context.

JUDGE BRENNER: Usually, as you know, we let the witness supply that type of thing. But, Mr. Lanpher, he has a point in this case. Those are terms that we know are used in many different contexts. Did

you have a particular context in mind? I assume you did.

MR. LANPHER: Let me come at it a different way, Judge Brenner.

BY MR. LANPHER (Resuming):

Q Mr. Eifert, does Stone & Webster use procedures to control design calculations?

A (WITNESS EIFERT) Excuse me, I missed one of your words.

Q Does Stone & Webster have procedures or a procedure for the control of design calculations? A procedure that explains how it is done, how it is controlled?

A (WITNESS EIFERT) Yes, we do.

Q What procedure is that?

A (WITNESS EIFERT) The basic procedure in the Engineering Department is Engineering Assurance Procedure 5.3.

Q Now, does that procedure cover the preparation and control of manual and computerized calculations, sir?

A (WITNESS EIFERT) Yes, it does.

Q Does this procedure apply basically throughout Stone & Webster various disciplines? For instance, structural, mechanical, electrical?

A (WITNESS EIFERT) Yes, it does.

Q So the same basic -- I'm sorry, did you finish

your answer?

A (WITNESS EIFERT) Yes.

Q Is one of the aspects of the calculations which are controlled by Stone & Webster which the Engineering Assurance Division attempts to control the verification of calculations?

A (WITNESS EIFERT) What type of verification are you referring to?

Q Let's start with the accuracy of the calculations themselves.

A (WITNESS EIFERT) Okay, the design verification, then. Yes, the Engineering Assurance procedures describe the design verification process in terms of the design review that is performed, or the alternate calculations that might be performed as part of the verification. The procedures describe that this shall be accomplished, and assigns responsibilities and provides the mechanism for providing the documentation of that verification.

Q Does that verification process take more than one signature? In other words, is it the same person who does that review, or does it take two or more persons to provide that verification review?

A (WITNESS EIFERT) That would depend on the individual calculation. I would think that the normal

process would be that the verification review would be performed by one individual. I am sure we have had situations, although I can't recall the specifics, where a given analysis, the verification review, may have involved more than one individual.

Q Is another aspect of the control of calculations to insure that the input data utilized in the calculations are clearly defined, and the source of the data traceable?

A (WITNESS EIFERT) Yes, it is.

Q And is another aspect of control of design calculations that the records of calculations be available?

(Panel of witnesses conferring.)

JUDGE MORRIS: Available to whom, Mr. Lanpher?

MR. LANPHER: Judge Morris, available to whomever may need to utilize those calculations. I have in mind criterion 17 of Appendix B, Judge Morris.

(Panel of witnesses conferring.)

WITNESS EIFERT: In response to your question, the procedures do require that the calculations be available to the people who need to use the calculations in performing their work. This is one of the administrative controls that we include in our procedures. When you look at a documentation and

understand the extent of the documentation for a given analysis, there is a lot of documentation or may be a lot of documentation for a given analysis, the basic calculation, as well as supporting documentation, which we require traceability to that documentation.

In the design control process at Stone & Webster, the basic calculation is the document that is most readily needed for use in developing and documenting the design. The availability of the backup information, some of the source documents which in some cases are textbooks, for an example, availability in that term should be understood to be available to the extent that it is needed and timely retrieval of that would be necessary.

BY MR. LANPHER (Resuming):

Q By that you mean there needs to be a way of knowing where those data are located?

A (WITNESS EIFERT) What I mean is that we have to and have to, and have insisted at Stone & Webster, that we have documentation to a degree such that another engineer in that discipline could obtain that other information. Not necessarily that someone totally unknowledgeable, without an engineering background, could readily find that information.

Q With respect to traceability and the

verification of calculations, is it also one of the control features that the input data itself -- for instance, maybe the pressures which are used in a calculation of temperature, that kind of thing, -- that those input data themselves are correct?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Yes.

Q Is another aspect of the control of calculations to identify whether the calculations relate to QA Category 1 and safety-related, using Stone & Webster terminology, or whether they relate to QA Category 2 or 3?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) The practice at Stone & Webster for marking the quality assurance category on calculations as early in the project was that that was one of the administrative controls that we identified on calculations. Sometime in the mid-1970s -- and I am going to approximate because I don't remember the specifics -- in 1976 I believe, we deleted the requirement for specifically marking the calculations with quality assurance categories, primarily because it was an administrative control which was judged had no useful purpose in the control of calculations.

That requirement may have changed today,

whereby it is a requirement to mark the quality assurance. I am not sure. But I do believe the calcs are normally marked with the quality assurance category.

And I would like to explain that Stone & Webster's procedure that I referred to early, EAP 5.3, as it is applied to all calculations performed for the Shoreham Project by Stone & Webster is the same process, the same documentation requirements, the same administrative controls, the same review requirements for all calculations, regardless of what quality assurance category is applicable to the design for which the calculation is applicable.

By that I mean both the QA Category 1 calculations, as well as all calculations that we would perform for QA Category 2 and 3 designs.

Q Isn't an aspect of control of calculations, Mr. Eifert, assurance that they are distributed to the proper persons?

A (WITNESS EIFERT) Yes, it is.

Q And is another aspect of Stone & Webster's control of calculations to assure that a void or superseded calculations are properly marked?

A (WITNESS EIFERT) Yes, it is.

Q Is another aspect of control of calculations to assure that the computer programs are verified?

(Panel of witnesses conferring.)

I am talking about the computer programs which are used in calculations.

A (WITNESS EIFERT) Excuse me, did you use the word "computer programs verified"?

Q Yes.

A (WITNESS EIFERT) The Stone & Webster does require that we use -- the term we use is qualified computer program in performing calculations. That process is covered by a different engineering assurance procedure. That is addressed in Engineering Assurance Procedure 2.5. Excuse me, 5.25.

The program, the way it is administered is to provide qualified programs for use by projects in developing calculations.

Q Mr. Eifert, in the control of calculations, does Stone & Webster also require that certain calculations be checked for accuracy?

A (WITNESS EIFERT) We discussed earlier the design review and design verification process for calculations. Checking is a part of that process. And yes, we do require that for all calculations. And I emphasize again all calculations, including those related to the non-safety related aspects of the design.

Q Is part of control of calculations also

protection from fire, keeping them in a firebox, or at least one set in a firebox?

A (WITNESS EIFERT) Yes.

Q Mr. Eifert, when Stone & Webster seeks to control calculations in the manners that we have been talking about, is it acting pursuant to its attempts to comply with Appendix B to Part 50?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) I would like to answer that in a couple of parts. The first part is that Stone & Webster had mechanisms for controlling calculations prior to 10 CFR 50, Appendix B. So in that sense, we didn't establish controls for calculations because of Appendix B.

The second part of my response, I would like to point out that Appendix B does establish some requirements for establishing a design control program for, as an example, having a mechanism for reviewing the design. And those requirements are implemented in our procedures for preparation of calculations.

Now, many aspects of controlling calculations which we include in our procedures which are not directly relatable to Appendix B requirements. There are a lot of administrative controls that we apply to the process of preparing calculations from a management

control standpoint which are, simply stated, not directly tied to Appendix B requirements.

Q The calculations that we have been talking about, those are documented in writing, correct?

A (WITNESS EIFERT) Yes. With the addition of computer data for those calculations that are developed using computer analysis. The documentation is, in that case, printed by computer.

Q Do you consider such calculations to be design documents at Stone & Webster? I don't mean you personally.

A (WITNESS EIFERT) Yes, we do.

Q One last series of questions before we get to specific audits. In the Stone & Webster audits there are references to audit observations. What is an audit observation?

A (WITNESS EIFERT) An audit observation is a term that we use to identify in a report typically the areas that have been observed during the audit that are being reported to the project or responsible organization. If you look at the audits that have been presented, the term is used in many cases on the top of the form -- this is an audit observation form. Then the text on that form describes the conditions that were reported.

Q Is it fair to state that an audit observation is issued when there is some condition which does not comply with a Stone & Webster procedure or control mechanism, or otherwise may need to be improved?

A (WITNESS EIFERT) Yes. But in addition, some observations are conditions observed by the auditors during the audit that may not link directly to a procedural requirement.

Q That is why I qualified it. Not necessarily tied to a procedure, but to bring to the attention of Stone & Webster management and the people that are implementing the program that there is a condition which has been observed in the audit that requires attention.

(Panel of witnesses conferring.)

A (WITNESS EIFERT) I believe your characterization is correct. I would like to point out, though, -- and I think if you have gone through many of the observations I think you have observed -- that there are many audit observations that describe conditions that relate to conditions that were observed by the auditor that are being reported for specific correction of the identified discrepancies, based on the auditor's knowledge, having performed the audit; that they are isolated instances and there is no adverse condition identified.

We report those and insure that those are corrected, and in that sense, those types of findings would not be the important type of things that our management would need to get involved with at this specific level.

Q But management is made aware of all of the audit reports, correct? All the engineering audit reports?

A (WITNESS EIFERT) That is correct. Our audit reports are distributed both to the Vice President of Quality Assurance and to the Vice President and Director of Engineering, and other management.

Q I believe in your testimony you indicate that prior to 1977, you didn't use the term "audit observation"; you used the term "infraction notice." That is at page 118 of your testimony. Am I correct that an infraction notice is basically the same as an audit observation, but different terminology?

A (WITNESS EIFERT) Yes, that was just a terminology change.

Q Gentlemen, I would like to turn your attention to Suffolk County Exhibit 48, which is Engineering Assurance Audit Number 0. I would like to direct your attention to handwritten page 45 of that audit. And the top of that page is entitled "LILCO-Engineering Audit."

And under "conclusion of audit" I direct your attention to the first paragraph under the label "calculations."

JUDGE CARPENTER: Mr. Lanpher, may I have the page number again?

MR. LANPHER: Yes, it is handwritten page 45, and my estimate is about two-thirds of the way through this audit.

JUDGE CARPENTER: Thank you.

(Discussion off the record.)

JUDGE BRENNER: Back on the record.

MR. LANPHER: Judge Brenner, for the record, under a statement that says "Conclusions of audit" is the word "calculations." And the last sentence of that paragraph reads in full as follows: "These results predict that the average calculation in the LILCO Project is..." -- and it is all caps from here on, -- "...NOT FULLY OR ADEQUATELY REVIEWED 22 PERCENT OF THE TIME." The remainder of that sentence was underlined in the original.

BY MR. LANPHER: (Resuming)

Q Gentlemen, it is true, is it not, that in this audit the auditors determined that the review and endorsement of calculations -- let me strike that.

This audit is an audit of the Shoreham project, correct?

A (WITNESS EIFERT) Yes, it is.

Q And was this the first engineering assurance audit for Shoreham, to the best of your knowledge, Mr. Eifert?

A (WITNESS EIFERT) To the best of my knowledge, this was the first audit.

Q Thank you, sir.

It's true, is it not, that this audit conclusion indicates that the review and endorsement of calculations for the Shoreham project was unacceptable?

A (WITNESS EIFERT) If you would, I would like to take a minute and go through the entire report. I haven't looked at this report in a long time. I did not use this in preparing for today.

JUDGE BRENNER: Mr. Eifert, is this same thing going to be true with respect to the other three loose audits, that is Suffolk County Exhibit 49 and 50, that you have not gone through them recently?

WITNESS EIFERT: The problem here, sir, is

that these very early reports are in an unusual format. The later reports in the later part of the '70s are clearer and in more standard format with respect to what the concern was and what the basis for the concern was, and it will be much easier to talk to them. These first three reports are the first reports that were issued at the start of the program, and engineering assurance, and standard methods had not been yet established.

JUDGE BRENNER: When did you provide these to LILCO, Mr. Lanpher, this morning?

MR. LANPHER: I provided a copy to them this morning. I advised them yesterday at approximately 2:00 p.m., I think, sometime in that timeframe, that I would be utilizing these.

JUDGE BRENNER: Can you work around the sequence and ask questions about the others first and then come back to these three, or is it necessary to take a break now while they review it?

I would obviously prefer to proceed.

I guess we might as well let them look at all three intead of one by one.

MR. LANPHER: Well, I have a hard time answering your question, Judge Brenner, because my questioning is going to be very brief on these, and to document basically what the findings are in the audit.

JUDGE BRENNER: We have discussed this before. A witness, and I think you and I also are aware that the witnesses are understandably concerned about what else might be on other pages that in the witness' mind would shed light on the particular area you are focusing on.

MR. LANPHER: I was trying to establish an historical context starting from the first audit. So I feel that it would be very useful if they could review these first. I will give them the exact pages of the next two audits also that I am intending to direct questions to. I think it is about a paragraph or two in each.

JUDGE BRENNER: All right, why don't you do that now on the record, direct them to the particular portions, and we will take a quick break.

MR. ELLIS: That might be useful information for the others as well, which they reviewed in the book last night, because there's a lot of pages.

MR. LANPHER: I have to respond to that, I'm sorry. I told them yesterday that I was going to start on calculations and these audit reports. Where the word "calculations" appears is very clear.

Now, they appear in a lot of places, but I think I have been very explicit in telling them exactly

where I am going today, far more explicit than I have ever been in any other case that I have ever litigated, frankly.

JUDGE BRENNER: That may say more about the way you litigated other cases.

MR. LANPHER: I don't agree with that, Judge Brenner, but let me advise where else I will be going in these three audits.

JUDGE BRENNER: All right, just these three for now is all I'm asking, every place that says calculations in these three?

MR. LANPHER: I would direct their attention to two pages later on hand-numbered page 47 where corrective action is mentioned, they may want to review that. They may want to review it all, but calculation is mentioned there. And the page after page 49 and numbered 50, but it is cut off somewhat, it is the audit summary relating to calculations.

Turning your attention to Suffolk County Exhibit 49 for identification, hand-numbered page 7, it is entitled -- we probably have black out.

JUDGE BRENNER: No, we are okay because he used the margin there.

MR. LANPHER: On that page, the top paragraph is labeled "Calculations," and the witnesses my want

also to refer to three pages later where the calculation summary sheet is set forth. It is a table.

Turning to Suffolk County Exhibit 50 for identification, first will be on page numbered 5 -- it is not hand numbered. It looks like this is a stamped number. It's a memorandum, interoffice memorandum page. The bottom portion of that page, starting with the following: "Technical areas have been exempted." Is that blacked out?

JUDGE BRENNER: Yes.

MR. LANPHER: Well, I will advise them off the record what that states.

Page 7, two pages later, is that all blacked out on the Board's copies?

JUDGE MORRIS: Yes.

MR. LANPHER: That has calculations.

Let me make a suggestion, that these black-outs, I will go on to another audit, and at the break I will try to get these pages to them. It would just take too long otherwise.

JUDGE BRENNER: All right.

In terms of the record, if you can get clean pages for the copies that are in the official exhibit file, of course, that would be important. In terms of fixing up everybody's copy, including ours, it may or

may not be necessary depending on -- I will probably mark up my own anyway as we go along.

(Pause)

JUDGE BRENNER: Mr. Lanpher, in terms of the overall subject of the witnesses having sufficient notice as to what documents are coming up, I had some general comments earlier.

It may be good at the beginning of the day tomorrow if counsel, including yourself, can advise us as to how you have managed to accommodate that need on the part of LILCO's witnesses, and later, presumably, the Staff's witnesses, consistent with your ability and needs to plan your case so that we can have a picture as to how specifically everybody has been informed of what documents are going to come up throughout the rest of this quality assurance case, and I will have a better handle then for what is going on.

MR. LANPHER: I will be happy to do that. I would hope to be able to do it before tomorrow morning, before tomorrow, in fact.

JUDGE BRENNER: Right, but I mean tomorrow morning then tell us about the rest of the case. I want to have an idea, are you going back through these same audits again, only then picking a different subject in the audit? Are there going to be future volumes

numbered like this? Just you tell me tomorrow morning.

MR. LANPHER: I can answer those two questions right now for you.

JUDGE BRENNER: Okay.

MR. LANPHER: There wil not be future volumes beyond the two that I have given. I am intending to cover each subject area. I debated on that, whether to do everything, for instance, that is in audit 1, and I thought that would not be as productive as trying to take what I consider discrete areas. Calculation area is the one I am addressing today, and go through those areas, and I thought it would be easier hopefully for the witnesses to prepare if I was going to cover one basic subject area, recognizing that there is still a lot for them to prepare. I don't mean it is easy. And I will try to let you know by late today or certainly by tomorrow morning the order of the subject area that we intend to cover, and we will just see how many we get to each day.

JUDGE BRENNER: All right.

Maybe we ought to pursue this a little bit now then.

I have your handwritten document. Subject areas are on top. We have an identification of which engineering assurance audits will be looked at before

those subject areas in some sequence because we've got the volume we are provided. The same is true with respect to the field quality control audits. Some of these other document listings are broader.

MR. LANPHER: Let me explain them. I put this list together very quickly. The next one is quarterly reports previously noted.

Yesterday when we adjourned I provided Mr. Earley with a listing of about seven or ten quarterly reports. These are documents which are produced pursuant to subpoena, and I told him the precise ones. I think they started in late 1977 or early 1978. So I advised them of those ones.

The next document, the SALP reports for 1981-'82 --

MR. ELLIS: While you are on the quarterly reports, I think it would be useful for the Board to know there were eleven of those that I think you identified, and they in turn refer to voluminous documents. That is something I think is useful to know. They are not self-contained documents themselves. They are reports of a number, summaries of other audits.

JUDGE BRENNER: Have you told them which subject areas you are going to pursue within each of

those reports?

MR. LANPHER: No, I haven't.

JUDGE BRENNER: Can you do that in the near future, or is it all the subject areas.

MR. LANPHER: They will be the subject areas that are noted at the top of the page. I have not said the second quarterly report of 1979 I am going to use for this purpose.

JUDGE BRENNER: Well, that's what I mean. I think you should do that, not at this moment, obviously, but soon.

It doesn't seem like a difficult thing for you to do. You have to prepare your case, unless you are going to use every quarterly report you identify for every subject.

MR. LANPHER: No, I'm not going to do that.

JUDGE BRENNER: I think you should give them the breakdown, and I guess I have the same observation as to each of these, identify which document you are going to use for which subject.

Now, if it is a document for all subjects, obviously you can say that.

MR. LANPHER: Well, the quarterly reports make it very clear which subject they address when you look at the subject areas at the top of the page. I will

have to go through the surveillance reports re storage. I don't think I could be any more explicit. We have a series of those.

JUDGE BRENNER: You have identified particular surveillance reports for them?

MR. LANPHER: I think there are three classes of surveillance reports that were provided pursuant to subpoena that deal with surveillance reports regarding storage, and as I indicated at the top of the page, storage and handling is one of the subject areas.

JUDGE BRENNER: Okay.

How many surveillance reports are there that regard storage, roughly?

MR. LANPHER: These are one-page documents, probably 200, 300.

JUDGE BRENNER: And you are going to use all of those for your cross examination?

MR. LANPHER: I am going to be proposing a stipulation to LILCO on those. As I advised them earlier, before the hearing started, I'm not going to be getting into the details of each of those, but there are results relating to them, overall results, and I am working on a stipulation that hopefully I can propose to them.

JUDGE BRENNER: Okay.

So you are going to have further discussions to specify and/or possibly stipulate matters as to that, correct?

MR. LANPHER: Yes.

JUDGE BRENNER: What about the other listings of reports?

MR. LANPHER: The CAT inspection, that is in Mr. Hubbard's testimony. That's going to be in evidence.

JUDGE BRENNER: Go ahead.

MR. LANPHER: The 1982 I&E reports, subsequent to the filing of the contention, I guess, post-March, they contain violations, deviations or observations that relate to the above subject areas.

JUDGE BRENNER: Okay.

Are you going to use the CAT inspection for many of the subject areas?

MR. LANPHER: Several of them.

JUDGE BRENNER: All right. I want you to tell them which ones. It may be obvious to them, but I want to make sure that there is no ambiguity. I want the case to go as smoothly as possible, given the volume of documents, in terms of time. I don't want a witness to have to say he was not thinking of that portion of the document when you asked him about it, and if you have

given them the advance information, then I will know there is less reason for the witness to do that.

You are not going to get to some of these for a few days, presumably.

MR. LANPHER: I think that's right.

JUDGE BRENNER: So there will be time to do this.

I don't want to focus on your particular words here. I recognize you put this handwritten outline together in a hurry, but one listing is I&E reports referenced in contention, and then parens (not likely in detail).

Are you going to use all the I&E reports referenced in the contention? Can you enlighten them as to which portions you will focus on?

MR. LANPHER: I am going to focus on those portions that I believe relate to the subject areas above. These witnesses, in Attachment 10 to their testimony, have all the corrective action letters of LILCO relating to those I&E reports. I don't think it's any surprise. I feel as if I can go into any of those since they have addressed them.

JUDGE BRENNER: Yes, but you must have a plan of cross examination, knowing which ones you are going to go into, and you can identify it for them so that

they don't have to continue to worry about the entire volume. There is a difference between their overall familiarity and their ability to focus on it, to prepare for probing questions you are going to ask, unless you need the element of surprise -- and I don't think you do for this type of subject.

MR. LANPHER: Judge Brenner, I think that is a very hard thing to judge, when you need the element of surprise and when you do not.

If you order me to tell them, I certainly will. I think we are going beyond giving people a road map at this time.

JUDGE BRENNER: It is a matter of judgment, I guess, our judgment. When there is this large a volume of documents involved, in the name of effinciency, I don't want to have to stop every time so that the witness rereads a document that he might have read six months before or even as recently as two weeks before, but at the time he had to consider the entire document as opposed to the particular portions you are going to ask about. And I think it is reasonable. I don't want to unfairly burden you in your preparation for the case, but on the other hand, I don't want to unfairly burden the other side, either. I am interested in getting focused as quickly as possible, as you ask your

questions here. It is solely for that reason that I think it is fair for you to be more precise in your specifications of what you are going to ask. It won't totally bind you. If in the course of asking about a document or later preparation you see something else you want to ask about, I'm not going to forbid you from asking the question because you neglected to mention that portion, but hopefully that will come up very rarely, and we will have the benefit of most of your questioning, areas of questioning, being identified in the documents.

There are a lot of documents here. That is my sole point.

So I'm not sure I understand why it would be unfair for you to make a better attempt to be more specific.

MR. LANPHER: Well, whatever you order, Judge, I will do it. I don't want to argue with you.

The implication of your words is that I have not been specific, and I disagree with that. If you want me to be more specific, I will be.

I think I have been very specific in giving this list and telling them even precisely which subject area I was going to cover today, that I was going to cover the engineering assurance audits on the subject

matter of calculations.

I frankly don't see how I can be more specific. In going down the road, I was going to try to give similar road maps. I am sorry, but I am taken a little bit aback by the Board's implication that I have not been forthcoming on that.

Well, enough said.

JUDGE BRENNER: That's you inference. I did not phrase it in terms of how good you have done up until this point, and it doesn't serve any purpose to discuss that. There is more that can be done, and that is the point we are going to.

MR. LANPHER: Just tell me to do it and I will do it, sir.

JUDGE BRENNER: Okay. Do it along the lines that we have just discussed. I think you understand what I am saying, and I did not agree or disagree as to whether what you have done with Suffolk County Exhibits 48 through 51, in telling them to look at the calculations section -- in fact, I agree with you. That sounds fairly specific. The problem is they were told that yesterday afternoon. I understand that we have affected the order of things also, but I want all this disclosed to them once we get past the next day or two, sooner than just a few days before the cross

examination, and I think by next Monday is a fair day, absent your coming back and telling us that you had a particular problem getting to some of it.

MR. LANPHER: Very well.

JUDGE BRENNER: Thank you.

I think it will assist your cross also. You are entitled to your opinion on that. You will be able to follow up and pursue it. You will be able to set a much better rhythm for yourself.

Now that we have had all that discussion, maybe the witnesses have had time to look at the reports. I guess they can't read portions of it because it's blacked out.

MR. LANPHER: I think the witnesses had their own copies of these reports, or some of them. I'm not sure. I'm not sure that Mr. Ellis does, or Mr. Bordenick, or the Board.

JUDGE BRENNER: We can get by. The portion blacked out so far are not very extensive.

MR. LANPHER: Why don't I just read them in and let me get going. I will stop being frustrated.

JUDGE BRENNER: If the witnesses have finished reading the reports.

Are you ready, Mr. Eifert?

WITNESS EIFERT: Yes, I am.

JUDGE BRENNER: All right.

Don't read them in in the abstract, but just as you are probing a particular one.

BY MR. LANPHER: (Resuming)

Q I would like to go back to Suffolk County Exhibit 48 for identification, the handwritten page 45.

Mr. Eifert, it is true, is it not, that this audit report indicates that the review and endorsement of calculations at Stone and Webster was unacceptable at this point in time?

A (WITNESS EIFERT) This audit did identify that there were some calculations for which the documentation of the review and endorsement was not available to the auditors.

Q This report also indicates that the results of the checks that were made in this case indicate that on the average, that calculations for the LILCO project will not be fully or adequately reviewed 22 percent of the time, correct?

(Witnesses conferring.)

WITNESS EIFERT: Mr. Lanpher, the number, ask you indicated, is indicated in the report. It is not clear to me from looking at the documentation that we have been able to look at here if that number was based solely on problems with the documentation or the review

and endorsement. There may have been others.

BY MR. LANPHER: (Resuming)

Q Mr. Eifert, do you have any reason at this time to disagree with the conclusions of this audit relating to calculations?

A (WITNESS EIFERT) No, I do not. But I would like to point out that I have been able to go through some of the documentation there that indicates the results of the audit, and the results indicate documentation problems, and in no case were there any findings with respect to the adequacy of the analysis.

Q But was an independent -- it still is an independent requirement, regardless of the ultimate accuracy of calculations, it is a requirement by Stone and Webster that calculations be reviewed and endorsed, correct?

(Witnesses conferring.)

WITNESS EIFERT: Yes, it is.

With my knowledge of the types of findings that we have had over the years that related to the documentation of the review and approval, the findings have primarily been in the area of the documentation of the review and not in the lack of review.

I can give you an example you might come to later in going through, but at one point in time we had

a requirement that the reviewers hand-letter their names. Subsequent to that we changed the requirement that the review be documented by a signature, and we will find audit observations with respect to documentation of review because the individual didn't sign his name but he was continuing with the old practice of printing them. So a lot of these are documentation problems which are not indicative that there was a lack of review.

BY MR. LANPHER: (Resuming)

Q Would you say it is indicative of a discipline in following the procedural requirements of Stone and Webster?

A (WITNESS EIFERT) No. I would characterize this as inattention to the administrative controls that we applied to calculatoons. Typically, an engineer pays the majority of his effort and attention time to the technical accuracy of the work and the conclusions he is drawing from the calculations. The administrative controls are second in priority to those in a normal engineer's thought process, and that is what I would characterize this as.

Q Do you consider inattention to administrative controls acceptable?

A (WITNESS EIFERT) No.

Q Gentlemen, I would like to turn your attention to Suffolk County Exhibit 49 for identification.

(Pause)

Gentlemen, if you would turn your attention to handwritten page 7. I apologize that there are portions that I believe in your copy are not readable.

Is this one of the legible pages?

(Discussion off the record.)

BY MR. LANPHER: (Resuming)

Q Have you had an opportunity to review the top portion of that page under "Calculations," sir?

A (WITNESS EIFERT) Are you referring to page 7?

Q Yes.

A (WITNESS EIFERT) Yes, I have.

Q Is it not true that this audit report indicates again that there was inadequate review and sign-off of calculations?

(Witnesses conferring.)

MR. ELLIS: Judge, this is the second of the three. I think it would be helpful if they had an opportunity to review these whole ones on his list. He said he would use 2 through 40, also may use 0, 00 and 1, and we focused on the book rather than these.

JUDGE BRENNER: I know, but Mr. Eifert, maybe

you misunderstood me as I asked if you had had a chance to look through these reports.

Well, if you want to look at all the reports. I meant the three loose ones.

Have you not had an opportunity to do that?

WITNESS EIFERT: Yes, I am prepared to respond.

The infraction, I would like to point out in the case -- and I use the general term "infractions" -- this was called an audit conclusion -- it indicates that of the four disciplines audited, there was only one discipline which the auditors felt needed to -- was performing less than totally adequately. They recommended the corrective action you have referred to with respect to the evidence of checking. I believe it would have been preferable to that particular discipline. I think what typically was happening back in those days is that the audit progress was closely tracking the results of the prior audits, and what we see here is an improvement from the first audit which we spoke of to this one where the actions taken are correcting and preventing the condition reported from the earlier audit. That is on the basis that the concern here was primarily one discipline.

BY MR. LANPHER: (Resuming)

Q Mr. Eifert, which discipline are you referring to?

A (WITNESS EIFERT) As indicated on the third line of the first paragraph on page 7, that is the structural design discipline.

Q You are referring to the calculation audit summary?

A (WITNESS MUSELER) Mr. Lanpher, excuse me. I think we may have a page conflict here with what you are looking at and what we are looking at. So give us a moment, please.

JUDGE BRENNER: I was looking at, and I thought Mr. Lanpher was asking about handwritten page 7, those first two paragraphs under the subheading "Calculations."

Am I in the right place, Mr. Lanpher?

MR. LANPHER: That's what I thought he was refering to.

WITNESS EIFERT: I'm sorry, I was looking at Exhibit 50. The same information is on page 7 in Exhibit 50.

JUDGE BRENNER: Okay.

(Witnesses conferring.)

WITNESS EIFERT: Mr. Lanpher, to respond to your question with respect to what is audit 00, Exhibit

49, the paragraph on page 7 which summarizes the conclusions on this did indicate some calculations that where the documentation was lacking for the review and final of the calculation, the recommendation also indicates that the project was requested to go back and provide that documentation.

BY MR. LANPHER: (Resuming)

Q In fact, Mr. Eifert, the audit results indicated an unacceptable level of performance to the requirements of the review, is that correct?

A (WITNESS EIFERT) I would like to explain that this terminology you are referring to -- and I believe that it was only used in these early audits -- are referring to a conclusion that was drawn based on the number of infractions, based on the number of checks that were made. The number of checks went beyond checking for documentation of review and checking. It went on to the other administrative control aspects that I have referred to earlier.

The conclusion is based on an overall review of those and not specifically to a review and signoff by a second engineer.

Mr. Burns could possibly add some to that as he was involved in the early formation of the Engineering Assurance Division and was involved more in

this process than I was.

A (WITNESS BURNS) I think there are a number of factors here that are not readily apparent by reading the audit material, the first condition being the fact that many of these audits were conducted during the process of the calculations being performed and often the auditors arrived on the scene in the process, if you will, of calculations being performed, taking the work product that was available at the time, that in some cases led the auditor to -- obviously in the case where he might intercept a calculation between the originator and the checker, but additionally, as evidenced in the audits, while there might be some inattention to endorsement signatures which in fact are the signature or initials of the reviewer or checker, there might be some inattention there on their part, in certainly affixing those signatures or initials.

We would during the audit not give the individual any credit for intention or even the fact that the person might indicate that they in fact didn't complete the checking process but simply omitted or forgot to affix their initials. If the initials or signature were not in place, the infraction was determined to be appropriate and it was so noted during the audit.

These first three audits, of course, are at the onset of the program and for both the auditors and the project personnel, it was a rather new experience.

Q Mr. Burns, I assume those comments you just made were general comments. Do you have any reason to believe that they specifically applied to this specific audit?

A (WITNESS BURNS) They apply to all three audits. As a matter of fact, I participated in some of the audit findings, I believe, in possibly Audit 1. I have not looked at my name to see, but that was approximately 12 years ago, so I don't know where my name might appear on these.

But I participated in a number of the audit activities myself and was there for -- either present directly or present indirectly, and had reviewed and worked in the preparation of the reports themselves. They were -- I wouldn't say totally experimental, but they were certainly pilot audits. They were the beginning of the program. The Shoreham Project was one of the very first projects to be subjected to these kinds of engineering assurance measures.

We did not, during the process of these audits, determine any serious deficiencies in the calculations themselves. In other words, the output appeared to be acceptable, and we did often utilize, during the conduct of audits, technical assistance or engaged technical assistance from various divisional

experts, to look into the adequacy of the calculations.

Administratively, they did leave something to be desired, as is indicated in the reports.

Q I take it from earlier answers, however, that the results which were found in this audit, even with your caveats, were not acceptable in terms of control of the calculation process, from Stone & Webster's point of view.

MR. ELLIS: I object to the question so far as it refers to -- it characterizes a whole series of earlier answers.

MR. LANPHER: Let me rephrase the question.

BY MR. LANPHER (Resuming):

Q Would it be fair to state, however, that the results of this audit did document Stone & Webster's finding that the results -- did document Stone & Webster's findings or conclusions that as of that time, the control of the calculation process was not adequate, not acceptable?

A (WITNESS BURNS) Is that directed to either?

Q Yes.

(Panel of witnesses conferring.)

A (WITNESS EIFERT) The results of these audits, as reported here, indicate that there were discrepancies in the implementation, but in no way indicated that the

process was inadequate. These concerns were reported as audits because Stone & Webster considers tight control of calculations important. We have considered it important since the beginning of the Shoreham Project and before, and that is what is reflected here, and it does not reflect any kind of a lack of control of the process of preparing calculations.

Q Am I correct that it is your belief, then, that this is indicative of inadequate implementation of that process? At least, based on these findings.

A (WITNESS EIFERT) These, I believe, are all implementation omissions on the part of the people who prepared these calculations.

Q Mr. Eifert, if you could turn three pages further, or Mr. Burns, to the audit summary calculation sheet, there are three columns under the broad heading "infractions to review requirements." Can you define what were major infractions and what were minor infractions? How those terms were used by Stone & Webster.

A (WITNESS BURNS) Major and minor was a totally subjective judgment, and the auditor would try and determine by looking at the calculation whether or not he considered the matter to be one that required some immediate attention and would, therefore, classify it as

major or minor.

There was also some attempt at that time to weigh those two, to sort of give more weight to one than the other. It turned out later that it was so difficult many times to make that judgment that we ultimately went to the more generic term today of audit observation.

I might add that as indicated on the schedule of audits, there was such a tension or interest in this area at that time that the Discipline Division chief engineers were commonly involved in these audits. So it was a relatively strong response by project people to the audit results.

JUDGE BRENNER: Mr. Burns, what does the "effective" column mean? In some cases it is major or minor, but in other cases that is not true.

WITNESS BURNS: Judge Brenner, I had been asked earlier what the "effective" column meant, and as best I can remember -- and this is really going back some -- the "effective" meant documents that were affected by that; by the number of times it was repeated within documents. As I remember, it related to that. In some cases, that number is larger than the major or the number --. In other words, you will see sometimes it is a combination.

I think if you look at the fourth column down,

you will see a 3, a 4 and a 5, indicating, of course, that you can't add them and you obviously can't subtract them.

JUDGE MORRIS: Excuse me, Mr. Burns. If you take half of column 2 and add it to column 1, do you get column 3?

WITNESS BURNS: Yes, it could be that. At the time we were using that number, and I am really not sure what we used it for.

JUDGE BRENNER: I think that is the answer.

WITNESS BURNS: It does look like it, yes.

JUDGE BRENNER: That is the weight, I imagine, because the summary on page 7 uses the 17 1/2 number for infractions.

WITNESS BURNS: We made minor half of a major. The "effective" score, I presume that was used in some of these other calculations. And I am sure that it was.

JUDGE BRENNER: There's another question I wanted to ask you. One of your general comments was that sometimes, the auditor would get the calculations sooner than the normal process by which they would have been checked. And that is the reason that there was no indication that somebody checked the calculations.

I guess (a) I don't understand how that

occurs. Isn't there a location from which the auditor gets these calculations, such that they would not have been put in that end location until after having gone through the checking process? Let me ask that one first, then I will ask my next one.

WITNESS BURNS: Okay. In this particular time period, physically, we were located in about, I believe, seven buildings scattered around Boston. The audit activity or the audit group was in a location physically remote from the project.

We operated on sort of a scheduled basis, in the sense that we would give the project a schedule of when we were going to arrive. But that schedule was adjusted by personal contact with the people that we would ultimately audit.

Often, in the early days of auditing, the people generally would find themselves to be not available, and in those cases we would arrive in any event and conduct the audit. We operated on a little bit more of an informal, flying squad basis than we do today.

JUDGE BRENNER: Is there a response to an audit finding, such as the two paragraphs under "calculations" on page 7, somewhere in the records where it would be indicated that hey, you found "effective" 17

1/2 infractions, but six of them do not fit because you took our calculations before we completed our process?

WITNESS BURNS: No, there would not be that in evidence. That would have been done in a face-to-face meeting with the people who were subjected to the audit.

JUDGE CARPENTER: Mr. Lanpher, if I might, looking at that same page 10, it shows, for example, under "structural" there was one calculation and there were nine checks. Is there anywhere in this document where I can find what the nature of each of those nine checks is?

WITNESS BURNS: No, I don't believe you would find it in this document.

(Panel of witnesses conferring.)

WITNESS EIFERT: Sir, that information would typically be on a checklist that the auditor reviews while conducting the audit. In reporting the audits, we do not include that individual checklist as a typical practice.

If you would like, we can check the backup file here and see if we can establish that to give you an answer as to specifically, the items that were checked in that audit, if you can give us a moment.

JUDGE CARPENTER: For the different categories, is the nature of each the same, or is it

specifically different for structural, mechanical, hydraulic, et cetera?

WITNESS BURNS: There would be an audit plan for each of the calculations. The plan itself was generally a generic plan and it would have certain listed attributes, and we can read off some of the attributes here, if you are sort of interested in what they are.

JUDGE CARPENTER: Well, it is a table of those attributes, and I can't understand the table without knowing what the attributes are.

WITNESS BURNS: We will give you the attributes.

MR. LANPHER: Judge Carpenter, if I could interrupt one second, if you go back to Audit 0, the last four pages of that audit have what is entitled an "Infraction Report", which describes the specific calculations and the specific infractions. I don't know if that is the kind of detail or data that you were looking for.

JUDGE CARPENTER: Well, that is helpful, Mr. Lanpher. That does show the kind of thing. I was just looking for the generic things, a score sheet, or something. But I don't know what is being scored.

MR. LANPHER: I just wanted to bring your

attention, Judge Carpenter, to that.

JUDGE CARPENTER: I see the results of that scoring are spelled out, but what the two or three were for each case --. I was curious to see what the nature of the audit is in terms of what the auditor scored for.

WITNESS EIFERT: Sir, if I may, I have the checklist that was used in that audit in front of me now and I can identify quickly --

JUDGE CARPENTER: Perhaps after the break if you could give me a copy, that would be helpful.

BY MR. LANPHER (Resuming):

Q Can you identify which audit this is for?

A (WITNESS EIFERT) We are still looking at Exhibit 49, Audit 00. And if I may, in looking at this checklist, for structural calculations it does indicate that with respect to the responsibility for initialing initials by the checkers, it does indicate that the problem was that the initials had only been indicated on the calc summary pages, which would have contained the conclusions of the calculations. In those days, the requirement was, I believe, or the practice was at least to initial every page, and that is what has been omitted here.

So this does indicate that there was a review. It was an administrative problem, as I believed

it to be.

JUDGE BRENNER: Maybe we diverted you. We want to get a feel for what is being looked at, and I thought you were going to give us the attributes which would typically make up the checks.

WITNESS EIFERT: I am sorry, I misunderstood. I thought I was supposed to give you a copy.

JUDGE BRENNER: We confused you.

WITNESS EIFERT: There are nine attributes. The first one is calculations listed in the master index. The second one, standard format on standard Stone & Webster calculation forms. Third, calculation filed in job book. Fourth is, check indicated by initials. Five, result summarized and easy to find. Six, engineering judgment identified. Seven, engineering approach easy to identify. Eight, equation and codes identified. And nine, data and factors identified.

The results of this particular audit on structural indicate that the problems are with listing the calculation on the master index, use of the standard Stone & Webster format and the checking initials being only on the calculation summary rather than throughout the calculation. All of the attributes with respect to the technical aspects -- identification of codes,

engineering judgments and so forth are identified here as satisfactory.

JUDGE CARPENTER: When you say identified here, what are you looking at?

WITNESS EIFERT: I am looking at what would be the audit checklist that the auditor used while looking at the calculations. It identifies these nine items, and he is required to fill out the results of his looking at the calculations as being satisfactory or unsatisfactory with respect to the procedural requirements and any remarks. This is one of the many pieces of paper that we have as backup documentation to all of the audits that we will be discussing here. And many pages of audit checklists that are used by the auditors.

WITNESS BALDWIN: Sir, I believe that is in direct reference to the question that you had earlier, to the table on the structural item. That is the backup attribute checklist for that table.

JUDGE CARPENTER: I was simply trying to have the record be clear as to what piece of paper he was reading from. I don't have that piece of paper.

WITNESS BALDWIN: It is not part of the package that you have.

JUDGE BRENNER: We understand it. Which one

was the minor one, the one where they didn't initial every page?

(Panel of witnesses conferring.)

JUDGE BRENNER: Does the checklist indicate that?

WITNESS EIFERT: No, the checklist does not indicate that.

JUDGE BRENNER: Since the number of calculation column -- and I am back on the table in Suffolk County Exhibit 49 for identification now -- in all cases is not simply multiplied by nine to get the number of checks, does that mean the auditor was free to choose not to audit every attribute for every calculation?

(Panel of witnesses conferring.)

WITNESS BURNS: Yes, Judge. In every case, he did not necessarily hit every attribute. Normally, if he for some reason omitted an attribute, he would make a remark, although there certainly was every attempt to pick up every attribute. I can't really remember too many circumstances in here, without going back and looking at detailed sheets, why there would be an omission. But if there was an omission, it was a conscious one by the auditor. There could be occasions when that might happen.

JUDGE BRENNER: Okay. Let's take a break until 11:00.

(A short recess was taken.)

JUDGE BRENNER: Back on the record.

MR. LANPHER: Judge Brenner, just so it is noted, during the break LILCO provided us and the Board with the checklist which was referred to before. And I just have one question.

BY MR. LANPHER (Resuming):

Q Mr. Eifert, going back to the calculation audit summary sheet that we were talking about before the major, minor and effective columns, or maybe Mr. Burns, with respect to the structural calculation, the auditor who was indicated on the checklist to be Mr. Shaw, would he have been the one who filled out this calculation audit summary or provided the data for it?

A (WITNESS BURNS) Yes. Mr. Shaw would have completed the audit checklist.

Q Mr. Shaw, in his subjective judgment, concluded that two of the three structural unsatisfatories were major infractions, correct?

(Panel of witnesses conferring.)

A (WITNESS BURNS) Mr. Shaw would, in completing the audit summary sheet, indicate the major/minor category. However, before he would get to that point, he would have on his team, so to speak, Mr. Klehm, who happened to be the equipment specialist who is the most senior structural technical man in Stone & Webster at

the time. He would consult with Mr. Klehm so that Mr. Klehm would lend him the technical expertise, and then when he came back with that audit checklist, he would sit with the person who headed up the audit activity at that time and he would review the findings with him, tell him what he saw and they would then come to a conclusion.

He would propose a conclusion. His supervisor, who is the Chief Engineer of Engineering Assurance at the time would then either approve or disapprove certainly that conclusion.

Q Then the conclusion of that process, which included more than just Mr. Shaw but also, consultation with some of his colleagues, was that two of the three structural calculation infractions were major?

(Panel of witnesses conferring.)

A (WITNESS BURNS) They would be classified at that point into one of the two categories, major or minor. However, the categories themselves were not rigidly defined, and they themselves would have no reflection on the ultimate safety of the design that was related to the calculation. They were not akin to major/minor/critical in the sense of somewhat affecting safety in any way.

They would simply be considered at that time

to be of the infractions or items or omissions, however we term them, found at that time to be the more serious of the group and the ones that they obviously wanted the persons that would respond to the audit to pay attention to. Some kind of a priority, I am certain, for their attention.

Q Back at this time, I understand you changed your practice later, but was there a procedure to guide this judgment between major and minor category? Or was it totally just without guidance?

(Panel of witnesses conferring.)

A (WITNESS BURNS) There were no written procedures as such. It would be dependent on the combined experience of the auditor and certainly, the auditors involved here were extremely experienced people and had strong experience in the defense industry before they get into this business. Combined with obviously, the judgment of the technical people that were involved in the audit. So it was a subjective judgment.

(Panel of witnesses conferring.)

As a point of clarification, however, there were certain procedures and instructions available to describe the overall conduct of the audit itself.

Q I was focusing only on the classification categories, and my understanding is that there were no

written procedures as to that.

A (WITNESS EIFERT) That was the context in which the question was answered. The procedures typically identified the responsibility, who is responsible for making decisions in the audit process, but do not in this particular case specifically have criteria. It was the experience, as Mr. Burns answered the question.

MR. LANPHER: Judge Brenner, unless the Board wanted to, I wasn't going to put this checklist into evidence.

JUDGE BRENNER: No, we don't have any independent need to do that.

MR. ELLIS: On that, was it legible? Was the copy we furnished the Board -- the one that I have is not entirely legible. If it isn't legible, we will furnish legible ones.

JUDGE BRENNER: It is fine. Whatever we wanted from this checklist was given to us orally by the witness. That is why independently, we didn't even ask for a copy of it. So we are okay.

BY MR. LANPHER (Resuming):

Q Gentlemen, I would like to turn your attention to Suffolk County Exhibit 50 for identification, which is Engineering Assurance Audit No. 1. I would like you to turn to page 7, numbered page 7 I believe on your

copy. On the Board's copy there is one sentence that is partially or entirely illegible. I think it is the second sentence at the top of that page. When you are there, I will read that sentence.

(Pause.)

I will read the first two sentences. "LILCO Project calculations were determined to be unacceptable with respect to Stone & Webster's standards. Of four calculation categories audited, only one (structural design) was found to be below acceptable standards."

Mr. Eifert, is the rest of yours legible, sir?

A (WITNESS EIFERT) Yes, it is.

Q Would you agree that this audit dated from September 1970 documents a continuation of unacceptable controls for calculations by Stone & Webster for the LILCO Project?

A (WITNESS EIFERT) No. I would better characterize this as indication that there has been improvement in the level of control of calculations for the Shoreham Project.

Q Does this audit indicate that while there may be improvement, the level of calculation problems is still unacceptable by Stone & Webster's standards?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, to characterize

this audit, I would like to indicate that, again, these findings are indicating that attention is needed to the administrative control aspects of the calculation preparations; no instances of inadequacies in the design were reported by these, and it reflects very early in the project Stone & Webster's strict requirements for documentation and control of the calculation process.

And in the context of some of the specific administrative requirements, there were items identified which, by our own practice and our own management policies, we wanted and saw a need for more explicit documentation in these calculations. And that is what we are seeing in these audits.

The term "unacceptable" as used in the audit is referring to those types of things and not in any way to the design of the Shoreham plant.

Q Well, Mr. Eifert, the administrative aspect of control of calculations is important, is it not, to insuring the overall design adequacy of the facility?

A (WITNESS EIFERT) Not all of the administrative requirements have any direct bearing on the design adequacy, and I can characterize that with examples. We will see in some problems -- I think there were problems in the original audit that we discussed here today with respect to calc index and what is on the index. That

index issues not only as an index in the traditional sense for accountability purposes, but Stone & Webster over the years has used that same document as a management control tool to identify who has been assigned to prepare a calculation and when he was given that assignment, who had been assigned to perform the review and when that was done, the file location for the calculation.

Many of these administrative controls do not bear directly on the adequacy of the design or the adequacy of the analysis. We, in our program, have vigorously evaluated projects implementation of all of the requirements that Stone & Webster places on calculations. These administrative controls, as well as the controls that bear directly on the adequacy such as the review process itself of the calculation.

Q Let me see if I understand your point a little better. If there were an instance where you determined that an item had not been checked, would that be an administrative control problem or would that be a substantive or a more substantive problem?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) I am sorry, Mr. Lanpher, could you rephrase that question?

Q I am tryin to get a sense, Mr. Eifert, for

your delineation between administrative control problems as opposed to problems that could affect the substantive adequacy of the design. Would it be fair to state that that is the delineation you were trying to make before?

A (WITNESS EIFERT) Yes, it was.

Q By way of an example, if there were an instance where a calculation was required to be checked, reviewed, and it wasn't, which category of problem would you put that in?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) As a general response to your question, review and approval is considered a very important process in calculations, and we rigorously assure that all calculations receive that.

When you look at the results of audits you have to look at the individual situation to detemine whether you would put a concern with review and approval as reported in an audit into the administrative category or into a category of more importance.

The example I think that we have used this morning where we had a concern with review and approval but it was -- the problem being that the review and approval was documented on the calculation summary which contains the conclusions of the calculation and the indication, therefore, that the individual who reviewed

the calculation in essence said "administratively failed to indicate his initials or signature on the subsequent pages of the calculation" -- I would characterize that as an administrative problem.

The example I used earlier with respect to signature or initials in lieu of -- or the prior program requirement that allowed for printed name, I would call that an administrative concern, although it deals with review and approval.

We have seen other audit observations, and we will find some if we take further examples where we found in a multi-page calculation there was one page of the entire, say, 60 or 70 pages in the calculation, one page where the reviewer failed to put his name on that particular page. The reviewer failed to sign a specific page. Those I characterize in that basis as administrative control problems. Inadvertant in that particular case would probably be the situation and not substantive in any way to the analysis or the conclusions of the analysis.

Q Mr. Eifert, my original question, however, was if you determined that, in fact, the check or review had not taken place as opposed to someone doing the review and forgetting to sign it, all right? -- now, if the review has not taken place, is that a substantive

problem, not administrative?

A (WITNESS EIFERT) Again, we would have to know the specific circumstances around it. If it was a situation where a calculation had been prepared and sent to file and would not have been reviewed or expected to be reviewed, I would characterize that as a situation that we need to pay close attention to.

If it was a situation that Mr. Burns described earlier in his testimony where the audit -- the calculations that were audited were selected from in-process calculations and it was reasonable to expect that they would have gotten the review, I would not have given that the same importance.

Q Mr. Eifert, with respect to Suffolk County Exhibit 50 for identification, the sentence that was difficult to read, -- let me read it again because I want to ask a question about it. It says, "As for calculation categories audited, one, structural design, was found to be below acceptable standards." Now, if you would turn to page 10, three pages farther, the calculation audit summary sheet -- I apologize, it is not easy to read.

This does not appear to reach the same conclusion as the text. In fact, it appears here that three of the four areas were not acceptable by Stone &

Webster's standards. And I am looking at the nuclear calculations where there were three major infractions and the acceptable number for Stone & Webster was two. Structural calculations, there were five major infractions; acceptable, the number was two. Mechanical, there were three major infractions, and the acceptable number was two.

From this, would you conclude that the text of the audit conclusions was incorrect?

(Panel of witnesses conferring.)

A (WITNESS BURNS) No. The conclusion you are drawing is, I think, incorrect in this case because the report itself, the body of the report, judges acceptability to Stone & Webster standards and particularly avoids any connotation of the acceptability of the individual calculation.

And secondarily, these numbers are contained on this table. The accept number by S&W standards is an arbitrary number determined by, at that time, one of two methods. Either by running a calculation or by using a set of tables to determine that number, based on the size of the actual sample of product looked at. So that accept number, when it says "accept number by S&W standards", that number is just a number arrived at by that means and does not necessarily overrule the

judgment that is brought into play and arrived at at the conclusions portion of the audit. In fact, it may be different in some cases, and is.

A (WITNESS EIFERT) Mr. Lanpher, I might add that very quickly, as we go through additional audits, we will identify that this technique was discontinued in the program because it was felt that it was not providing us a meaningful way to judge the performance.

A more meaningful evaluation is provided directly by the auditor who has performed the audit, who has talked to the people performing the work, who has actually looked at the work and weighs all of the information that he has, specific, hard data as well as such things as attitude of the people doing the work, to come up with his specific conclusion with respect to the acceptability of the work being performed.

Q Mr. Burns, you referred to those numbers in the S&W acceptability column as arbitrary numbers. Turning your attention to the fourth page of this exhibit, Exhibit 50 for identification, -- and hopefully there is nothing blacked out -- it is number 3 at the top righthand corner. It is entitled "standard for audit performance." Are you familiar with that standard?

A (WITNESS BURNS) I am familiar with that statement.

Q It indicates there, does it not, that at that time, Stone & Webster had an acceptable quality level of 97 1/2 percent for its review of the items which were contained in this audit?

(Panel of witnesses conferring.)

A (WITNESS BURNS) The statement of standard for performance indicates -- and I can quote, "The standard can be stated as an acceptable quality level of 97 1/2 percent." However, an EQL or an acceptable quality level is certainly not an absolute value. And in fact, it is not an absolute value. It means certainly in quality assurance terms that on the average over a long span of time, you would have every expectation of achieving that level of performance.

But certainly, again, when I say arbitrary, it may be arbitrary as misunderstood here. Those kinds of performance level indicators were subsequently eliminated from the program as being not a very good measure, really, of performance. That performance was much better and much more adequately determined by the combined judgment efforts of the technical and quality people as they were performing these audits. And this practice I believe ended after about the third audit here, and you will not see this again.

A (WITNESS MUSELER) Mr. Lanpher, let me make a

comment about that because while I am not in the quality assurance department, I am somewhat familiar with these audits because they affect the Stone & Webster Engineering Department.

As the paragraph on page 3 states, if Stone & Webster's position was that if a slip from the standard in the types of things that we have been discussing here, which are primarily administrative controls, was not higher than 2 1/2 percent, then Stone & Webster's policy was that there was acceptable to allow administrative details to not require extensive corrective action. And Mr. Burns can correct me if I am paraphrasing Stone & Webster's corporate position incorrectly.

What is not stated here but what is the practice in the engineering of the plant is that the technical adequacy of the design has to be 100 percent adequate, and I think both Mr. Eifert and Mr. Burns have stated that they have not observed in these audits any instances of technical inadequacies in the calculations. And that they have on their staff technical personnel who are capable of making that evaluation.

So I wanted to make it clear that neither the Lighting Company and, I am sure, neither Stone & Webster

nor General Electric, from the standpoint of the technical adequacy of the plant, is saying that an acceptable level of technical adequacy is 97 1/2 percent, and 2 1/2 percent of the plant can be inadequate, from a design standpoint and from a safety standpoint. That is patently not the case.

I believe the designs are checked and rechecked so that there are no technical deficiencies in the final design product.

MR. LANPHER: Judge Brenner, I am not going to follow up further on this aspect at this time. That is covered elsewhere in my cross plan. I am going to stay with the area that I was pursuing.

JUDGE CARPENTER: Mr. Lanpher, I would like to ask one question.

MR. LANPHER: Certainly.

JUDGE CARPENTER: Looking at Suffolk County Exhibit 50, it states, "Seventeen calculations were audited." Is this a sample of the calculations that had been carried out since the last audit?

(Panel of witnesses conferring.)

WITNESS BURNS: At the particular time that these audits would have been conducted -- no, it is not an ironclad guarantee that those 17 would be what was remaining since the previous audit. I would say that

yes, it would be normally the level of activity at that time usually resulted in us taking a look at what was available. And that 17 would be about what was available. So it would be a fairly extensive coverage of the project activity.

JUDGE CARPENTER: So I am using sampling in the sense of being deliberately only a fraction of the total. I think you just stated that it was closer. The attempt was really to get 100 percent coverage?

WITNESS BURNS: During that phase of the project it was very common to take 100 percent of the available calculations. Because of the level of effort it was easy to do and we normally, at that time, would not resort to sampling unless there was a large population available to get into. We would take what was available and do them all.

JUDGE CARPENTER: But during the course of time, you did have to go to a sampling strategy?

(Panel of witnesses conferring.)

WITNESS BURNS: Yes, Judge Carpenter. Today -- well, even in that period if there were extensive numbers of calculations available we would select a group, a representative group to examine and as the project developed and considerably larger populations of calculations were available, we would then take some

portion and examine those rather than examine 100 percent. The desirable effort was not necessarily to do 100 percent in the long run.

JUDGE CARPENTER: Thank you.

WITNESS EIFERT: If I might just clarify for the record, the audit process is in addition to the full control process of preparing and documenting calculations and reviewing all calculations. So the less than 100 percent review in the audit process in no way indicates that there wasn't total and 100 percent control of calculations through the project.

BY MR. LANPHER (Resuming):

Q Mr. Eifert, to follow up on Judge Carpenter, it is true that the purpose of the audit process is really to insure that those other procedures, the design review, checking, et cetera which are 100 percent procedures are, in fact, being implement? Is that correct?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, the purpose of the audit is twofold, not singular, as you have indicated. It is a process that insures that the design control process -- in this case, practices for preparation and documentation of calculations -- are being implemented.

And the purpose of auditing is also to insure that we have defined procedures which can effectively be implemented and are effective in producing the result of a quality product. So we are doing both aspects in auditing.

Q And when you mentioned that you audited less than 100 percent later in the process, especially when there are many calculations, the purpose of that auditing is so that you may make a judgment as to the adequacy -- I am talking about calculations -- the adequacy of calculations for the entire project, or for the entire discipline being looked at. Is that correct?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Auditing gives us a way of looking at the implementation of our program to insure that as we have discussed, it has been implemented and that it is an effective program. In that sense, it gives us, then, a basis for -- an additional basis for the overall confidence that we have performed a complete and adequate design.

That is what we have achieved with our auditing on Shoreham. It is not to say that auditing is the only basis for our confidence that we have achieved quality in the design for the Shoreham plant.

JUDGE MORRIS: Excuse me, Mr. Lanpher. Mr.

Eifert, I thought that Mr. Lanpher was trying to address the problem of the relevance of a sample, rather than doing 100 percent audit. And I guess I was expecting you to answer that you assured yourself that your sample did represent the entire population.

WITNESS EIFERT: If that was his question, in response to your comments, the sampling -- we do use a sample approach in auditing today. The auditor selects that sample based on his knowledge of the process, his knowledge of the specific organization -- for example, the discipline that is doing the work -- and has confidence that it is a representative sample of the entire process within that organizational unit. Yes.

JUDGE MORRIS: I think it may be premature to ask now how you assure yourself of that, but I think we might come back to it at some time.

BY MR. LANPHER (Resuming):

Q Gentlemen, I would like now to turn to Exhibit 51 for identification. I will call it Attachment 4 to that exhibit, which is Engineering Assurance Audit 4. So that it is clear in the record, this audit is dated February 26, 1973. And the audit occurred during late January 1973, and I would like to direct your attention to the first page of that audit, gentlemen.

I also note that it appears, Mr. Burns, that

you are involved in this audit. Your name is in the upper righthand corner of that first page.

Now, this audit indicates that calculations were not checked and dated; at least, that the audit determined that. Is that correct?

(Panel of witnesses conferring.)

MR. ELLIS: Mr. Lanpher, I am not sure I heard that question fully. Would you repeat it, please?

JUDGE BRENNER: Mr. Lanpher, go off the record and tell them what you asked off the record so that when you come back on, we can just go with the answer while they are conferring.

(Discussion off the record.)

WITNESS BURNS: Yes, the conclusion section here -- and this would be page 1 -- indicates under "observations", "Calculation" -- Item C, "Calculation is not checked and dated."

BY MR. LANPHER (Resuming):

Q Does that complete your answer, Mr. Burns?

A (WITNESS BURNS) No. I would like to take a look at the specific record and determine further on what basis that judgment was made. It appears that it is a single document and checking and dating could mean a number of things. It could mean certainly that no check was made. It would also mean that a check,

initials or signatures or dates were missing on some subsequent pages, or even supplementary pages. The summary is just that; a summary, so we should probably take a look at that and we will get back and provide certainly more information on that.

Q Mr. Burns, a further question. Further down on that page, it indicates that for nuclear and electrical project calculations performed during a two-year period, 1969 through 71, that in some instances no references were given for sources of input data. This violates your calculation control requirements, correct?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) No, Mr. Lanpher. The requirement that was in effect in the program at that time was that we have traceability to the input data. What this is indicating is that the calc prepared did not specifically identify the source document in the calculation. It does indicate that there wasn't traceability.

And as an example of something that we have seen over the years, engineers who were very familiar with analysis in their discipline and very familiar with the engineering texts that are available and appropriate for that discipline, used those as the source document

for equations using their calculations, and are so familiar with them that they failed to reference them in the analysis. This is how I would characterize this type of analysis.

Clearly, anyone in that discipline at that point in time would have traceability, would be able to find that reference source.

Q Is the purpose of your control procedures, however, to have the calculation make the specific reference so that it is immediately apparent how the calculations were derived? In that sense, immediately apparent where the source of data was, or what it was?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) I think I can best answer your question by characterizing the kind of explanation that we give in training presentations when we give training to people preparing calculations. That is, that the documentation has to be sufficient such that another individual at some later date in the same discipline can reasonably use that document.

We have imposed over the years very stringent requirements that have become more stringent with respect to the specific detailed traceability to source information. To give you an example, our earlier procedures indicate that we had to have traceability,

and we have always had traceability. Later, we indicated more specifically that they should identify the document in the calculation, even though it could be possible for an engineer experienced in that discipline -- and it would be reasonable to expect that another engineer experienced in that discipline -- could find the information.

Today, in one of our disciplines where they have imposed an input documentation requirement such that they not only want their people to document or reference the source document but also identify the specific page in that source document from which they have taken that information.

So I think I have tried to characterize the context of the concern that the company has with respect to input traceability. Our basic policy is that we have traceability, okay, and we have had traceability.

The implementing procedures provide specific detail with respect to how to meet that requirement. We have increased over the years and become stricter in what we accept, primarily from the standpoint to make the documentation more readily usable from a design standpoint, and also, to insure that Stone & Webster provides LILCO with very usable documentation to facilitate the operation of this plant. And that is

what we will see as we discuss many of the observations where input source documentation is identified as a concern, is identified as a concern from the point of making sure that we provide the detail and more detail, strict adherence to positive traceability for usability of the documentation, and not in any way questioning the technical adequacy of the anlysis or the conclusions of the analysis being questioned.

Q Mr. Eifert, the fact that the references were not given for these calculations did, however, violate Stone & Webster's internal procedures in existence at that time, did it not?

A (WITNESS EIFERT) Yes. My point was to characterize -- to keep the violation, if you will, as you have termed it, in context. There was discrepancy in the documentation, and I am just trying to keep it in its appropriate context.

(Counsel for Suffolk County conferring.)

Q Mr. Eifert, in a number of instances you have stated that it is your belief that, for instance, this lack of reference, did not impinge in any way upon the accuracy of the calculation itself. In every instance where an audit is performed, are the calculations actually checked? Do you understand my question?

A (WITNESS EIFERT) I don't think I understand

your question. Checked by whom?

Q Let me ask it again. When engineering assurance performs an audit in the calculation area, does engineering assurance always insure the substantive accuracy of that calculation? In other words, does it check the calculation itself?

A (WITNESS EIFERT) The audit process that we implement at Stone & Webster includes, in some cases, looking at the specific analysis that was performed and the conclusions drawn, but not in all cases. The basis for our statement with respect to effect on results is just in my specific experience where we have identified concerns with calculations in this timeframe, and the results of those did not identify any inadequacies in the conclusions of those calculations as a result of what the auditor observed or the actions taken by the project during the follow-up activities of the audit.

Mr. Burns has the specific experience in this timeframe of the early seventies.

A (WITNESS BURNS) There would have really been two audit actions taken on checking. Number one, the auditor would look to see that the calculation had evidence of checking, and then, in a number of cases, there would be a technical specialist present who would actually look at some portions of the calculations.

Obviously, not 100 percent because of the time involved, but would look at some of them and run down through the calculation to see that also, from a technical viewpoint, it exhibited the proper handling.

That check, of course, is not a check we take credit for, because that is just an over-check. That is looking at the calculation after it has been completed, both by the originator and the ultimate checking by the responsible party. That would also be done.

Q Is that done in every case?

A (WITNESS BURNS) No, it would not be done in every case.

Q In fact, the checklist which you provided after the break, or your counsel provided after the break which, I guess, related to Exhibit 49, when I look at the line attributes checked for the structural calculation in that audit, none of those, to my knowledge, indicate an actual check of the calculations, even in part. Is that correct?

(Panel of witnesses conferring.)

A (WITNESS BURNS) The audit checklist in question does not have that as certainly an attribute, and, of course, the auditor himself would not be the person charged with checking that. In this particular audit, it would not have been the auditor but would have

been the division specialist.

It is not the primary function of the audit activity at that point to perform an overcheck. However, it has been our practice, and I believe it continues to be our practice, to do such things. It is not necessary that those overchecks be noted on the checklist.

However, they certainly do serve the purpose of giving added assurance and added management interest certainly at the technical level in the adequacy of all of our calculations. And in the even that an item would be found, certainly correction would be undertaken. So it is not a rigid audit item, and therefore, is not listed appropriately on the checklist, but it is certainly a practice that we have undertaken and have continued to undertake.

A (WITNESS EIFERT) Mr. Lanpher, if I could add, and this might be an important distinction at least in concept with respect to some people's understanding or belief of understanding of quality assurance programs. At Stone & Webster we in engineering assurance employe engineers as our auditors. In this particular case, Mr. Shaw is a graduate engineer, okay? And that is our practice for auditing. Not to say that all of our auditors are degreed, but the vast majority of our

auditors are degreed, especially those who are auditing this type of work.

Mr. Shaw, in doing this, because he is a graduate engineer by education, by training and experience, he would, when asking questions with respect to the documentation of the engineering judgment, it would be natural for him to question whether it was a proper judgment, okay? When looking to see if the engineering approach would be identified, it would be natural for him to identify that.

Knowing that that is the approach that was taken and that is the type of people we had doing this audit, it is our basis for our statements with respect to had we observed any inadequacies from a technical approach in these calculations or conclusions, we would have recorded those. And we have not identified those or reported these in these audits.

Q Gentlemen, turning your attention again to Engineering Assurance Audit 4, page 2 of 3 related to corrective action, toward the top of the page, first of all, this corrective action relates to the calculation observations set forth in the previous page, is that correct?

(Witnesses conferring.)

A (WITNESS EIFERT) Yes, Mr. Lanpher, that reference on the top of page 2 to the action taken to correct and prevent future occurrences is the action that relates to the observation with respect to calculations.

Q Mr. Eifert, why would the corrective action only go to future occurrences? Why would the auditor not recommend that other calculations of the same kind during that time period, especially 1969 through '71, which are noted at the bottom of page 1, be looked at again to see if there are similar deficiencies as to those?

A (WITNESS EIFERT) In fact, Mr. Lanpher, it did. If you look at the first sentence of the recommended action, the recommendation was to correct deficiencies, and the follow-up activities in the audit process would have verified that that happened.

In the paragraph that you are referring to, I

can understand where there would be some confusion. The corrective action required to prevent future occurrence, we have discussed a clear distinction I think earlier in these hearings on quality assurance between corrective and preventive action. Many times the use of the term "corrective action" includes both what we think of as necessary to correct identified occurrences as well as the action to prevent, as appropriate. It is commonly used in the industry that way as well. We have used it various ways in the Engineering Assurance Audit Program, as we will see as we go through here, at the top of the pages where we identify where the deficiencies were corrected.

The paragraph that you referred to is where we are identifying that in this particular case, even before the audit was completed, the project took necessary action to prevent recurrence of it.

So before the report was even issued, the project should take positive steps to prevent recurrence of these conditions.

Q Mr. Eifert, I understood that recommendation to correct the specific deficiencies that were identified on page 1. I assume the audit looked at particular calculations, saw problems, and this corrective action as to past deficiencies said go

correct those that you found, correct?

Is that right?

(Witnesses conferring.)

A (WITNESS BURNS) It would appear that the one or two conditions have occurred here. Number one, there is certainly a high potential that the audit sample in fact was 100 percent of what was available. As made in the comment on the recent nuclear and electrical project calculations, it looks and it was in fact a case where the auditor in that instance went back into previously prepared calculations from a different time period. In that instance, of course, the reinspection in the sense of a re-examination of all previous work for an infraction woud not be appropriate. And the second condition would be that the auditor judged the occurrences or some of the occurrences that he ran into here as either isolated or limited occurrence and not something that would justify a re-examination of all previous product.

It is not common practice, and certainly I don't think advisable, for anybody to presume that every time we run into an infraction or a deficiency of a minor nature that we will stop at that particular point in time and go back and re-examine all previous work because the whole quality assurance process is basd on

looking at ongoing work and taking action as appropriate. There are some instances, obviously, where people do go back, but we certainly don't see that in every instance, and it certainly would not indicate in the write-up here that it was judged to be appropriate either through the large majority of, if not the total of procedures audited and the nature of the findings themselves. It was -- the judgment was made at that time, and I am sure -- I know I can state unequivocally that I sat with the auditors, as we always did prior to issue of any such report, and determined whether or not there was justification for re-entry or re-examination of prior work.

In those cases where we felt it was justified, we certainly recommended that to the project, and I can't recollect on any single occasion where the project refused to comply with such a request.

It was not the case here because it was obviously not in our judgment required.

Q Mr. Burns, would you turn to attachment to this audit? It is the next to the last page of the audit.

You stated earlier that it may have been an instance where all the previous calculations were looked at, or basically a 100 percent sample was looked at.

Doesn't this indicate that they only looked at foir calculations, or audited four?

(Witnesses conferring.)

A (WITNESS BURNS) Yes, that's correct.

Q So this would not be an instance where the audit itself had covered the entire population of calculations, correct?

(Witnesses conferring.)

I mean, this is 1973, well into the project, I assume.

A (WITNESS BURNS) They could have easily covered the population of calculations that were available to them, yes.

The presumption that four is a small number in one division at one time I think is just that, it is a presumption. I don't know what the Electrical Division, off the top of my head, had available for us at that particular period, January 24 to 29 in 1973, but that would not be unusual to go onto a project. We audited these projects very frequently, and it was not unusual to go onto a project that was on a quarterly audit schedule and find very little new work available. In some cases it was -- it could be a struggle to gather together the sample that you wanted, and we often, just to make sure the project was doubly kept aware of all

the requirements and continued to be subject to audit, we might go back and look at some unaudited areas from the past.

A (WITNESS MUSELER) Mr. Lanpher, I think I can shed a little light on this.

It is general knowledge that for a period in the early '70s, the project was reduced to a caretaker status in engineering, and while I cannot say exactly what the level of activity was when it started back up, it started back up I believe in 1972 and would have been gearing up during this time period. So the staffing was certainly coming back up at that time, but the actual work activities and the level of detail in terms of calculations that would have been done right then -- I am sure calculations were being performed in all the disciplines, but I just offer that to try to put in perspective where the engineering effort was. It had been shut down because of the delay in the initial licensing process and was in the process of building back up during this particular period.

Q Mr. Museler, or maybe Mr. Eifert, to put your comment in context, when did engineering start, Stone and Webster engineering activity start on the project? When did they gear down?

(Witnesses conferring.)

A (WITNESS MUSELER) The engineering began with the engineering support through the licensing process in the latter part of the mid-'60s, '68, '69, '70, and I am not sure of the exact hiatus when it was shut down. It was shut down for a period between a year and a year and a half, to my recollection. I believe 1971, but I am not really sure of that. That is really all I can say with any -- and that is not even very confident, but that was the period, sometime after 1970 the project was shut down, and it had been slowed down prior to that, and then when it appeared likely that the construction permit would be issued sometime in 1973, the engineering effort was begun in advance of that in order to get engineering in front of the field.

Q Gentlemen, I would like you to now turn your attention to Engineering Assurance Audit No. 5.

JUDGE MORRIS: Excuse me, Mr. Lanpher. Maybe there is something I missed, but is there a separate document called an infraction notice?

WITNESS EIFERT: Yes, there is. I am not sure if we were using that in this timeframe.

JUDGE MORRIS: Well, I note reference in this audit to infraction notices and the action to be taken is to be taken in response to those notices. I am wondering, what is the origin of those infraction

notices?

WITNESS EIFERT: Those infraction notices are prepared by the auditor. I believe that there are some audits here that contain some infraction notices. If you give me a second, I think I can find them.

JUDGE MORRIS: I am not so much interested in that. I am wondering if an infraction notice would be issued for each one of these deficiencies that is listed in the audit.

WITNESS BURNS: It would be issued for each one of the documents that had a finding against it to the responsible engineer, an individual one for each document.

JUDGE MORRIS: And they would be issued at the time of issuance of the audit report or before?

WITNESS BURNS: They would be issued before the audit report and would be summarized in the audit report itself.

JUDGE MORRIS: And the followup on that would be done by the engineering assurance people or the auditors?

WITNESS BURNS: Yes, sir.

JUDGE MORRIS: Thank you.

BY MR. LANPHER: (Resuming)

Q Gentlemen, I would like to turn your attention

to Engineering Assurance Audit 5, which is attached to the County Exhibit 51 for identification.

I turn your attention to the first page, the bottom half, and it continues over to the top on page 2.

Is it not true that this audit notes basically the same deficiencies as the previous audit we were just talking about, at least insofar as regards the preparers and checkers did not sign the data calculation sheets, and that the sources of input data were not identified or referenced?

(Witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, this audit that we are referring to now, Project Audit No. 5, is making reference again to not specifically the calculations or current calculations that would have been audited here, but of calculations that had been prepared in earlier years with respect to the detailed requirements for documentation.

It is not clear from looking at the record specifically which discipline calculations we are addressing here, but what I believe this reflects is that we were in the audits auditing the various disciplines' calculations and ensuring that all of the documentation for calculation that was prepared in the very early days of this project were up to the current

requirements as of 1973.

I think it is important to understand that since early auditing on the Shoreham, auditing performed by Engineering Assurance, we audit by engineering discipline, so we audit the Electrical Group, we audit the Power Group -- in the early days that was two groups, the Nuclear and Mechanical -- and so forth. We look at those as an organization and require, generally require the corrective and preventive action within that discipline as an organization responsible for the work.

So this I suspect, although I can't tell from these records, but this would be a different discipline from the audits that we have been discussing earlier.

Q Mr. Eifert, these are the same kinds of deficiencies related to that earlier 1969 or 1971 period, same kind of deficiencies as had been noted in the immediately previous Engineering Assurance Audit Report, correct?

(Witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, these are apparently the same kinds of deficiencies. The specifics, with respect to what the specific discrepancies are may not be precisely the same, but in general they are similar. These are the administrative, again, source document and specific documentation of the

checkers, the preparers and checkers. They do relate to the earlier audit.

But again, for emphasis, this was probably a different discipline, organizationally different, and our program for auditing calculation has been to look at each discipline as a functional organization and look at the process as performed by that discipline when evaluating performance and ensuring corrective and preventive action.

So it is not as much a repeat of the problem as we have seen earlier, but continued follow-up on the part of engineering assurance auditors in another area, and continued application of our program for ensuring strict adherence to all procedures.

Q Gentlemen, I would like to now turn your attention to Audit No. 7, dated, I believe, October 1973, specifically -- well, first I would like to turn your attention to what is called the statistical summary of audit findings attached to that audit. On the right hand side of that document it says "Compliance," and then it has three categories: satisfactory, marginally satisfactory and nonconforming.

What does nonconforming mean?

(Witnesses conferring.)

Q Mr. Eifert, I want you to understand my

question. I didn't mean in this audit specifically. I am just trying to get it in context because this kind of statistical form is used in a number, just so it is clear in the record.

I don't know if that helps your answer or not.

A (WITNESS EIFERT) I think it does, Mr. Lanpher. I think what we are seeing here -- and I don't recall the specifics. I was not involved directly in the audit program at this point in time, but what we are seeing here is the initial efforts to categorize the findings, weight them, if you will, by judgment of the auditors with respect to actions necessary by the organization t hat we audited.

There are really three categories here that we are using in this timeframe: satisfactory, marginally satisfactory, and nonconforming.

Later we use a similar breakdown of three where we have written into the report clearly that the first category is where work was acceptable. The second category, we specifically asked the project to correct the deficiencies identified. And the third category, we specifically asked them to, in addition to correcting the specifics, to determine if preventive measures or additional corrective action is necessary.

So I think in this kind of report we are seeing the first of that. The term is to compare the types of findings, the auditor had sufficient knowledge of the conditions reported in the items reported here as marginally satisfactory, that the specific conditions could be corrected. The items under nonconforming were judged to, either based on the knowledge of the auditor to be more important, needing somewhat more attention, or possibly they were put into the nonconforming category here because the auditor, in conducting the audit, did not have sufficient time to go in and judge the full scope of the audit, and we would want the project to take additional action to determine extent.

Q So would it be fair to state in comparing this to your later categories that where marginally satisfactory is noted, that roughly is equivalent with take corrective action; where nonconforming is noted, that is roughly the same as instances where later you directed there be preventive action?

A (WITNESS EIFERT) I believe that is the case, yes.

Q I would like to turn your attention now to the same audit, page 2. Under the pipe stress analysis, it is indicated that there are inconsistencies and omissions in the identification of equipment, and

further, that data on the worksheet do not agree with data on the MSK.

First of all, can you define MSK?

(Witnesses conferring.)

A (WITNESS EIFERT) And MSK is a mechanical sketch that would somehow be used here in the process.

Q Thank you.

With respect to those two deficiencies, the inconsistencies and omissions in identification of equipment, we will take that one first.

Do you consider that to be what you earlier described as an administrative problem?

(Witnesses conferring.)

A (WITNESS MUSELER) Mr. Lanpher, I can clarify that to some extent because I am somewhat familiar with that process. The identification of the equipment that is being referenced there would be the sketch. Since this is a stress analysis area that we are speaking of, the sketch is a sketch of the piping system that is being stressed, and that sketch would include the geometry of the piping and the components that are pipe-mounted. That would include valves, pumps, things of that nature. Pipe supporters, hangers would be in that category. So the omission in the identification of the equipment would be something like the pump that was

shown on there might not be labeled in an up to date manner, or it might not be labeled. It might just be pump, and it might not show Pump 001, or it might not have its full identification number on it.

So the purpose of those sketches is to identify those parameters that are necessary for the stress analyst to do his work. So I would be concerned if the pump were not shown on there. I would not be concerned if it did not have it proper number. That was not the installation diagram. It is not the drawing that is used for, frankly, anything else. It is used for the stress analyst to do his work, to have all the parts of the piping system that he is going to stress on one drawing.

Q Turning your attention, gentlemen, to the next one, data on worksheet -- and this is again with reference to pipe stress analysis -- it does not agree with data on the mechanical sketch.

Is that an administrative problem or is that, to use the term, substantive problem, the two categories we were talking about earlier?

(Witnesses conferring.)

A (WITNESS MUSELER) We are not familiar with the detailed use of the worksheet, so we can't answer that question.

Q Now, gentlemen, it is indicated under nuclear calculations that the sources of input data are not properly identified, and under the mechanical analysis calculations, that sources of input data are not identified.

Would you agree that this is the same kind of problem which has been identified on earlier audit reports, in other words, input data related?

(Witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, this reference to input data is a very broad category. In looking at the calculations that are prepared for a nuclear plant, there are literally thousands of calculations in many different disciplines. The input data used for the disciplines are different, different data. So to characterize these as the same finding would probably be inappropriate.

Again, I would like to emphasize again that Stone and Webster's program for preparation and the documentation of calculations demands a high degree of traceability for usability purposes of these calculations, and again, this is what we are seeing here, that Stone and Webster has over the years insisted on providing that traceability, insisted and even increasd the degree to which we have had to have

traceability over the years, and in no way reflects on the design as drawn from the conclusion of those calculations.

Q Mr. Eifert, but these audit conclusions do indicate that with respect to traceability, there were audit findings that Procedure 5.3 had not been followed or had not been complied with. Isn't that correct?

A (WITNESS EIFERT) This audit indicates that the specific identification of source input data was not in all ways clearly documented in the calculations, but it does not indicate that we do not have traceability to the design data.

As I indicated earlier, our basic policy is to have calculations that are well documented and traceable to input data, and we have provided that. This is another example of the degree and the implementing detail requirements imposed by Stone and Webster management to ensure usability of these calculations.

Q Mr. Eifert, the purpose of this audit and all your audits, in fact, is to determine the compliance of the various disciplines looked at to the Engineering Assurance Program for Quality Assurance, correct?

I was paraphrasing from the first page of this audit report.

(Witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, the purpose of engineering assurance audits, in this context, as you are using it here is to evaluate the project's performance with respect to implementation of the Quality Assurance Program. We audit the various activities and ensure and demand strict adherence to our program requirements.

Q And at least with respect to the items noted on page 2, related to calculations, there had not been strict adherence to the requirements of that program, correct?

A (WITNESS EIFERT) No, I don't agree with that at all. The Quality Assurance Program at Stone and Webster includes the activities of the engineers who perform the work as well as the assurance activities such as the auditing activity and the audit product as we see it here, and those combined have ensured strict adherence to our program requirements, without question.

Q Well, what does an infraction notice mean then?

(Witnesses conferring.)

A (WITNESS BALDWIN) I would like to answer that. It is a departure from a requirement.

Q So to the extent that certain requirements --

and I believe these all relate to EAP 5.3, certain requirements were found not to be met, does that not indicate that there was not strict -- well, that's too many negatives. Let me start over.

These findings in this audit report that we are talking about document departures from the requirements of Procedure 5.3, correct?

A (WITNESS BALDWIN) They document a few, that's correct, but what we have seen and heard here this morning, if I could characterize it, is a program, a program that meets the requirements, procedures that meet the requirements. What we have seen is a lot of activity specifically in design control. What you have heard and seen is an audit program that is working and functioning. It is supposed to capture those things.

I personally look upon these few things as minor in nature and not significant.

Q What requirements were you referring to in your previous answer, Mr. Baldwin, a program that meets requirements, procedures?

A (WITNESS BALDWIN) The requirements of Stone and Webster's Quality Assurance Program, which is identified in the section for design and control, which is further backed up by many procedures, specifically in this case, engineering assurance procedures.

I think we have to bear in mind that what we are seeing is a picture here of an auditing effort, one that is functioning, one that is capturing the things that it is supposed to capture. That's what the procedures require. That's what the program requires. And that's what the regulations require.

As far as I'm concerned, the things that we have been talking about, as Mr. Eifert has mentioned several times, by and large, if not totally, are administrative, but the program captured them. They are not related directly to the design of the safety.

Q Is the audit program also designed to correct infractions that are noted to prevent their recurrence?

A (WITNESS BALDWIN) To correct them, yes. To prevent their recurrence, yes.

MR. LANPHER: Judge Brenner, this is a convenient time to take a break.

JUDGE BRENNER: All right. We will take an hour and be back at 1:35.

(Whereupon, at 12:35 o'clock p.m., the hearing in the above-entitled matter was recessed, to reconvene at 1:35 o'clock p.m. this same day.)

AFTERNOON SESSION

(1:35 p.m.)

MR. ELLIS: Judge Brenner, Mr. Youngling has a matter that I hope will be of some interest to the Board.

WITNESS YOUNGLING: We have a girl, Catherine Irene, 7 pounds, 9 ounces. And I might report that mother and daughter are meeting all appropriate quality standards. That's Mr. Muller's daughter.

JUDGE BRENNER: Well, congratulations to the Muller family and we're glad to hear that everything is fine.

Whereupon,

T. TRACY ARRINGTON,
FREDERICK B. BALDWIN,
ROBERT G. BURNS,
WILLIAM M. EIFERT,
T. FRANK GERECKE,
JOSEPH M. KELLY,
DONALD G. LONG,
WILLIAM J. MUSELER and
EDWARD J. YOUNGLING,

the witnesses on the stand at the time of recess, resumed the stand and, having been previously duly sworn, were examined and testified further as follows:

CROSS-EXAMINATION -- RESUMED

BY MR. LANPHER:

Q Mr. Eifert, I would like to go to engineering assurance audit 9, dated May 1, 1974, and particularly page 2 of that audit. Have you had an opportunity to review that audit, Mr. Eifert?

A (WITNESS EIFERT) One more minute, please.

(Pause.)

A (WITNESS EIFERT) Yes, I am. Thank you, sir.

Q Mr. Eifert, this audit indicates, does it not, that there were failures to meet the requirements of EAP 5.3 with respect to preparers' and checkers' signatures and dates, correct?

A (WITNESS EIFERT) You recall this morning, Mr. Lanpher, I gave as an example the procedural change where we required that preparers begin signing the calculations, and that's a change from the prior procedure requirement, where the requirement was that the name be printed and initialed.

This is one of the audits that I was using in that illustration. This audit, 1974, would be the first audit after implementing that procedural change. These are indicative of situations where the preparers and reviewers were not meeting the new procedural requirement, but the calculations had been reviewed and

the documentation was in accordance with the prior procedural requirement.

Q Had the preparers and checkers been advised of the new requirement, sir, prior to this audit date or prior to the time that the audit was performed?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) This is an audit that was conducted in 1974, Mr. Lanpher, and I do not personally know what specific communications would have occurred between the supervisors of the individuals preparing these calculations and the individuals themselves. I would have expected that the individuals would have been advised of the procedural change requirement and that this was an example of lack of attention to this administrative detail of the change in Stone & Webster's standard practice.

A (WITNESS BALDWIN) Mr. Lanpher, could I add something, please?

Q Yes.

A (WITNESS BALDWIN) On this audit number 9, if you turn to page 1 you will also see under 2.A, conclusions, that "The subjects listed below are satisfactory since no deviations from the application EAP's requirements were observed." And I point out pipe stress calculations.

In addition, I would like to also add that within less than a month of this audit number 9, in reference to the building service calculations, the structural steel calculations, and the engineering safeguard calculations, a formal corrective action audit was performed, as required by our program and procedures, and all of these three areas were found satisfactory.

Could I still have some more time?

Q I won't stop you, sir.

A (WITNESS BALDWIN) Thank you. Can I go back to January 16th, to the 18th, project audit number 8? And I would like to read from that audit report. Under 2.A, "Subjects listed below were found satisfactory. Where assigned parties were listed, infraction notices were listed and corrective action is required." "Project mechanical calculations and pipe support calculations" indicated as being found satisfactory.

JUDGE BRENNER: Mr. Baldwin, I'm sorry, I couldn't find that. Where in audit number 8?

MR. LANPHER: Judge Brenner, I think this is one of the pages where I noticed on the front cover that the page in what I had provided to the Board was not complete. It's the first page of that. The right-hand side I think is off on our copy and your copy.

JUDGE BRENNER: Yes, I see it now.

BY MR. LANPHER: (Resuming)

Q Mr. Baldwin or Mr. Eifert, I have to try to clarify one thing. I'm afraid there are too many pieces of paper and something got out of place in two consecutive audits. In audit 9 there is no attachment 2. If you look at the last page of audit number 10, if you could refer to the materials I supplied so we can get the record straight, attachment 2 there, dated May 1, 1974, I think that attachment should in fact be with audit 9.

If you could confirm that.

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Yes, that's correct, Mr. Lanpher. Attachment 2 that is filed here with project audit 10 does go with project audit 9.

JUDGE BRENNER: Mr. Lanpher, in coordination with the reporter why don't you see if you can move it back to where it goes for the three official exhibit copies.

MR. LANPHER: I certainly will. I did not discover this until we really just started again, or else I would have done it beforehand.

JUDGE BRENNER: Sure. I understand.

MR. LANPHER: The same thing happened on the

next audit.

BY MR. LANPHER: (Resuming)

Q Gentlemen, we just took out attachment 2 from audit 10 and moved it up to audit 9. If you would look at audit 11 as bound, there are two attachment 2's. I think the first attachment 2, with the date July 17, 1974, and the attachment 1 that is just behind that should both go with audit number 10.

For the record, audit 10 is dated July 17, 1974. Is that correct, Mr. Eifert?

A (WITNESS EIFERT) That's correct.

MR. LANPHER: Judge Brenner, we will fix that in the official copies.

(Pause.)

WITNESS BALDWIN: Mr. Lanpher, since we're going back and forth with some of these attachments, could we go back to program audit number 7, which we discussed just prior to lunch break?

JUDGE BRENNER: Wait a minute. I don't want to get too carried away. We are going back and forth for mechanical purposes. If you are going back into substantive areas, I would like to bring it back more to questions and answers.

WITNESS BALDWIN: Yes, sir.

JUDGE BRENNER: You have an opportunity to

talk to your counsel and he can handle a lot of your problems on redirect, also, unless you want to correct a previous answer or something of that nature.

WITNESS MUSELER: Judge Brenner, I don't think we want to correct a previous answer, but the previous two audit areas in the area of calculations, the thrust of that examination was in terms of failure to meet specified requirements set down by Stone & Webster. I believe it is material that in audit number 7, which was I believe the next to the last one that was discussed, there is I think a very significant part of that audit that was not covered.

JUDGE BRENNER: Okay. Now you are in the area of redirect, I believe. There is a fine line, and Mr. Lanpher is entitled to pursue his cross and you are entitled to have a full opportunity to answer his questions, which we will certainly give you. If there are other things that you think he should have asked to fill out the record, that is what your counsel is supposed to do on redirect.

So let's go back to your questions.

(Pause.)

BY MR. LANPHER: (Resuming)

Q Gentlemen, I'd like to turn your attention to engineering assurance audit number 10, with a reminder

that, at least for the Board and those of you using Exhibit 51 as marked, the attachment to audit 10 is in audit 11.

I direct your attention to the bottom of page 1, initially related to calculations. It continues over to page 2. Do you have that available, Mr. Eifert?

A (WITNESS EIFERT) Yes, I do.

Q Is it true, sir, that in this audit the need for preventative action was determined with respect to pipe stress calculations, electrical calculations, and vessel calculations?

A (WITNESS EIFERT) Yes, it is.

Q And the need for preventative action included, again, the signatures of preparers and checkers, the same problem that we were discussing before; is that correct?

A (WITNESS EIFERT) Yes, Mr. Lanpher. This finding, now referring to page 2 where we summarize the findings, the finding with respect to the signatures of the preparers and checkers, again reflects the situation where the new requirement for signature versus the old requirement for a printed name was not being met.

I'd like to take a moment and just look at the other problems with this audit. The page numbering problem in this context is typically a situation where

all the pages in the calculation are not numbered, a typical problem that occurs in a lengthy analysis when a page is added and the preparer omits going back and adding the page.

The indexing problems typically have been situations where the control aspects of identifying the assignment for preparation, the assignment for review, have not been incorporated.

And fire file problems that we have typically found, for example, relate to such things as not getting calculations to a fire file in a timely manner.

So these other items I characterize as administrative, in addition to the review and approval process. I would like to also point out that this is an example where we have audited thoroughly and are looking for strict adherence to our procedural requirements, that we have asked for preventive action in these disciplines; and also, it demonstrates here that we audit again by discipline, which is a key to understanding how our corrective and preventive action works.

If we follow in the time after this -- and I did quickly look at this during the lunch break -- the follow-up audits for pipe stress in audit number 13, which was conducted in 1975, indicates that the pipe

stress calculation area was satisfactory. And for clarification, this is pipe stress engineering as the activity. We also see references to pipe stress design, which organizationally is a different organization.

In 1976, the next time electrical calculations were audited, the electrical calculations were found to be satisfactory.

In 1975, the next audit of vessel calculations, the calculations there were found to be satisfactory. That may indicate, may demonstrate the effectiveness of the preventive action that was instituted as a result of this audit.

Q Mr. Eifert, you indicated that the next time electrical calculations were audited was in 1976; is that correct?

A (WITNESS EIFERT) That is correct.

Q Is that an abnormally long period to go between auditing?

A (WITNESS EIFERT) It was audited in January 1976. There was an audit scheduled for 1975, which would have been approximately 12 months after this one. The record shows that there was insufficient activity in the electrical division in that period of time to warrant an audit. So that's why the audit wasn't conducted, and it was conducted in the very early part

of 1976.

JUDGE BRENNER: Excuse me, Mr. Lanpher.

I want to see if I understand your emphasis on the separate disciplines. Are you saying we should regard these as recurrent problems because when they recur they occur in different disciplines, and we should only look at it as a recurrent problem if it shows up again in the same group?

WITNESS EIFERT: Yes, sir, that is what I am indicating. The discipline is organized on a project under a lead engineer, who reports to the project engineer and who has dual responsibility for reporting to the staff division chief.

The way the audit program has been structured over the years is to audit by discipline. The division chief is technically responsible for the work in that discipline. So we look at that activity.

Organizationally, we have a group that you can look at to see if they are effectively implementing the program, as well as by the type of work, the type of calculations, even in some cases the format of calculations as standardized within Stone & Webster or unique to a discipline.

I can make reference back to, there was a problem in audit 9 with the indexing of design

calculations in the structural area. The design calculation in the structural area is a series of calculations for a building, as an example, with all the subcalculations in that book indexed. And that is typically what we have.

The situation here was that they were maintaining a list of all the master books, okay, which would have been a rather short list for the various buildings. That technique is unique to the discipline. So we audit by discipline to organizationally look at their effectiveness and to have a method to look at similar work for effectiveness.

So in that sense I believe that the trend look is unique to disciplines and not that we have had similar disciplines -- similar problems across disciplines. When we request preventive actions with the discipline approach, we typically request that only for that discipline, and request it again, if necessary, in the other discipline when we audit it.

It would be in our judgment unreasonable, in all cases at least, to request that our pipe stress engineers take corrective action for problems that our electrical engineers were encountering with their calculations. So that's the way we structure the program.

JUDGE BRENNER: Why is that unreasonable if the same problems have cropped up in a number of different disciplines and the problems are not unique to a particular discipline, if they appear to be the type of things that occur in the keeping of calculations in general? Isn't that a rather narrow view of preventive action, to just focus it back within the particular discipline, as distinguished from communicating it on a broader basis throughout the Stone & Webster organization?

WITNESS EIFERT: When I indicated unreasonable, I was indicating -- my intent was that at the time we identify a problem in one discipline, without having audited the other discipline's work, not having any evidence that they do or do not have the same problem, I feel it would be unreasonable to go and ask them to relook at their work for that problem, primarily because the supervision of the work is different.

JUDGE BRENNER: Well, I don't want to be that abstract. How about with respect to these audit findings with respect to the calculations that are recurring in the ones that we have looked at so far today? Do you think it would have been unreasonable for the preventive action to have been more broadly based, so that back in 1970 or '71 or '72 all organizations

that are charged with producing and keeping and updating calculations were made aware that these problems had cropped up on other audits in a particular discipline?

I'm trying to get some insight into what Stone & Webster considers appropriate preventive action as applied to particular things as we proceed in this hearing, and that's why I'm asking these questions.

WITNESS MUSELER: Judge Brenner, I am sure there are many differences in specifics, depending on the audit findings. But in this area, the area of calculations, and in one of the audit reports that we covered earlier one of the corrective -- one of the recommendations for corrective action which was carried out appears on page 2 of 3, on audit number 4, where the corrective action required to prevent future occurrence involved the issuance of an addendum to the project general instructions. And they reference section 4.5, calculations, dated January 25th, 1973.

That is a general directive to the entire project, meaning all discipline engineers on the Shoreham project. So while there may be instances, as Mr. Eifert indicates, when it is not appropriate, I think in a number of these areas where the particular concern did cross discipline lines, it was addressed as a project-wide concern and not just as a discipline

concern, even though only one discipline might have been audited and followed up on.

WITNESS BALDWIN: Could I add something to that? In addition to that specific Mr. Museler is pointing out, I think it is correct to say if some of the preventative actions for auditing both in engineering assurance or quality assurance would indicate that modifications or enhancements or improvements to procedures are indicated, then that would take place.

And in a case like that, those standards, either the division or corporate or department standards or, in a case such as this, a project standard, would be in effect for everybody, everyone that is working with the quality assurance program, whether it be engineering assurance or procurement or construction.

JUDGE BRENNER: Okay. So that I understand your answers, Mr. Museler and Mr. Baldwin, there may be audit observations for which it is appropriate to look at the trend across organizational lines, as distinguished from what I had inferred Mr. Eifert's thrust was earlier.

WITNESS MUSELER: Yes, sir, that's correct. There may be instances, and I believe that project general instruction indicates such an instance in one of

the ones that was reviewed here.

BY MR. LANPHER: (Resuming)

Q Gentlemen, I am going to direct my attention now to engineering assurance number 11, audit number 11. Turning first to the bottom of the first page, it indicates that there were deviations from requirements with respect to concrete design calculations, also radiation protection calculations; is that correct, sir?

A (WITNESS EIFERT) Yes, it is.

Q What would be the basis for the determination which is indicated on this page, that the deviations are not indicative of trends, but rather were random in nature?

A (WITNESS EIFERT) The basis for that decision is the information which the auditor was able to gather during the conduct of the audit. In these specific cases, the conduct of the audit would have been such that the auditor would have had sufficient time to pursue any identified concerns to the degree necessary in his judgment to convince himself that there wasn't any -- to convince himself that the extent of the condition was limited to those instances which he had specifically observed.

He has judged them to be isolated to those

specific cases and therefore is asking only that the specific deviations be corrected in the audit.

Q This would be based on the auditor's judgment -- I think you used that term -- or would it be based on some sort of a statistical analysis?

A (WITNESS EIFERT) It is not based on a statistical analysis. It is based on the auditor's knowledge of the process involved, knowledge of the organization, his discussions with the people involved. As an example, during an audit on, say, calculations, the auditor could very easily establish that one individual had misinterpreted a requirement, and in sampling work of other individuals identify that they had not misinterpreted the requirement. In looking at their work he confirms that, in which case the action would be simply to correct that one individual's work. He would have identified the extent of that problem.

Q Mr. Eifert or anyone else on the panel, are you personally familiar or did you know, based upon your review of materials, what the nature of the concrete calculation problems were which were identified in this audit?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) I don't know what the specifics are for this audit.

Q Would the same answer apply to the radiation protection calculations which were noted just below that, sir? I am referring to page 1 of that audit.

A (WITNESS EIFERT) Yes. In preparing for this one, I didn't get a chance to look at everything, but the things I did look at, I would not have spent much time looking at something that we reported clearly as not a condition of concern. So it would be the same for all of these.

Q Mr. Eifert, in preparing audits or audit reports, does Stone & Webster have a procedure or requirement that the nature of the problems which are identified or infractions which are identified need to be spelled out? And by spelling out I mean some details provided so that a reviewer of the audits or a reader of the audits will understand what the problem is.

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, the engineering assurance procedure that addresses auditing would describe the content of report and indicate that engineering assurance would be reporting the findings in this manner. And being in the engineering assurance procedure, therefore, the project engineer, as well as all of Stone & Webster management, understands the context of the report.

In addition to that, the specific discrepancies are documented on infraction notices which are provided to the project.

Q As a follow-up on Judge Morris' question earlier this morning, the infraction notices have additional details?

A (WITNESS EIFERT) The infraction notice would identify the specific concerns, as well as contain a response, in this case indicating a response from the project, indicating that the conditions had been corrected.

Q Mr. Eifert, if you could turn to the last page of this audit, the statistical summary of audit findings. I am a bit confused by an earlier answer where you stated that whether a trend is indicated is based on judgment, not on any statistical analysis. This table is called a statistical summary. Would it be better to maybe call this just a summary of the findings? There is no statistical significance to be attached to this, is there?

(Panel of witnesses conferring.)

A (WITNESS BURNS) The term "statistical summary" is used here. I believe it's accurate. However, the statistical summary, as you can see, is simply the count, the numerical count of the documents

audited, the number of checks made, and the determination of areas where there were findings made, either satisfactory, corrective action required, or preventive action required.

So it does serve as a statistical summary. But it is not, certainly, in any way to be taken as some kind of a rigorous analysis, because it's not that.

A (WITNESS BALDWIN) A simple computation could be used, though, on some of those. For the concrete, radiation and nuclear, you find that you were in the 90 percentile bracket, i.e., that which you looked at is 90 percent good. If one was to compare -- excuse me. Let me confer.

(Panel of witnesses conferring.)

A (WITNESS BALDWIN) To add to the end of my last statement, I was misled by those two columns. I would like to make a couple of remarks, though.

In going back to page 1, again in the conclusion section under 2.A, the subjects listed below were satisfactory since there weren't any deviations from the EAP observes, and I note document control, nuclear calculations and electrical specifications. I also note, I recall in reading the information that it was approximately a month later that these calculation areas, once again a corrective action audit was

performed and once again these areas were found satisfactory.

Q Mr. Baldwin, do you know, either personally or based on your further reading, what the nature of the calculation problems were with respect to concrete or radiation protection?

A (WITNESS BALDWIN) No, I don't.

Q Turning again to attachment 2, Mr. Baldwin, Mr. Eifert or whomever, what are the criteria for when something is labeled "corrective action required" as opposed to "satisfactory"?

(Panel of witnesses conferring.)

MR. ELLIS: Mr. Lanpher, you mean other than the document speaking for itself, at the bottom of the page?

MR. LANPHER: Do you want to coach them some more?

JUDGE BRENNER: Hold it. There's a question out. Let the witnesses answer.

WITNESS EIFERT: I'm sorry, there's some confusion on the question. I believe your question was, what is the criterion for determining if corrective action is required?

BY MR. LANPHER: (Resuming)

Q Versus labeling something as satisfactory.

A (WITNESS EIFERT) At this stage of the audit process, it was simply that. "Satisfactory" was used when there were no items identified by the auditors that were different from the procedure or requirements. "Corrective action" was used specifically in this audit to correct all instances of implementation that differed from the requirements.

Q So one or more deviations would justify going to the corrective action column; is that correct?

A (WITNESS EIFERT) In referring to audit 11, that was the criteria. I don't want to say that that was a hard and fast rule that has always been used. For example, if an auditor was auditing a calc today and found a page number error, one page number, and the individual corrected it during the audit and the auditor found no other instances of that, that would be not reported as -- formally reported as an item for corrective action.

The auditor would note that in his audit checklist and that would be reported as an area that was found satisfactory, the way we implement the program today.

Q Mr. Eifert or maybe Mr. Burns, I would ask along these lines to you, Mr. Burns: Is there any statistical significance between the corrective action

column, preventive action column, along the lines of the earlier audits, where 97-1/2 percent acceptable quality level was referenced? Are there any statistical guidelines with respect to corrective action and/or preventive action?

(Panel of witnesses conferring.)

A (WITNESS BURNS) No, there is no relationship between those statistical judgments made in the earlier audits and the practice exhibited in these reports we are looking at right now, and certainly current practice. As a matter of fact, that practice, as you might note by looking at the record, at least by the records themselves, was very shortly discontinued as being a practice that did not yield what we considered the very best results for the program.

A (WITNESS MUSELER) Mr. Lanpher --

Q Mr. Museler, I'll give you a chance.

If I could just follow up on that one answer, I want to make sure you didn't misunderstand me, Mr. Burns. I did not mean a direct relationship between that earlier 97-1/2 percent acceptable quality level. I meant, was there anything comparable at this point in time, which was in late 1974?

A (WITNESS BURNS) No, there was not. The decision at this period of time was to make the judgment

based upon the auditor's experience, his observed findings, and the conditions as he saw them during the audit, and after consultation with his supervision and the other affected parties he would come to a decision and the decision would be documented within the audit findings.

Q Mr. Museler, I'm sorry to cut you off.

A (WITNESS MUSELER) Thank you, Mr. Lanpher.

I would just like to note that that criteria you note was used only briefly earlier on, and I believe it was 97-1/2, just as a number. It was utilized to indicate satisfactory.

Subsequent to that, while not on a statistical basis, items that were judged to be unsatisfactory, as indicated in some of the audits that we have been going through, were indicated as areas of concern that required corrective action, even the overall sample showed a 98 percent satisfactory level of calculations. That is indicated in one of the audits that we have covered.

So I guess what I am trying to say is that the switch from an early statistical approach to the judgmental approach that Stone & Webster utilizes today was not done and did not result in, let's say, a lower level of just numerical bean-counting in terms of what

is acceptable or not. The complexity and the diversity of what is in these calculations and all the different attributes that have to be checked I think is a more proper way to do it.

But even with the bean-counting, the overall level of compliance is, at least in one particular case -- and I can't state what it was in every case, but at least in one particular case where the findings were such that they required corrective action. Still, the overall population at that point was 98 percent correct evaluation.

Q Mr. Museler, you've got me curious now. What is this one particular case that you are referring to?

A (WITNESS MUSELER) It is Audit No. 7, the second to the last page, and the overall --

Q Could you wait just a second while I get there?

A (WITNESS MUSELER) If you have that page, there is a series of boxes which is a kind of a graphical way to report the results of the audit. This is on an overall basis, and Mr. Burns can, I am sure, comment, if it is needed, as to how this is arrived at.

I am referring to the top line under "Calculations," which was the subject, ands again, in this audit it was one of the things we went over and discussed at some length, the audit findings in the area of calculations requiring corrective action. The results in the center box state the level of review given calculations since the last major audit has been review. Audit results indicate that 98 percent of LILCO project calculations have been thoroughly reviewed in accordance with Stone and Webster requirements, and the recommended corrective action in this particular case was to correct the reported infractions. I guess in this case no preventative action is called for.

A (WITNESS BURNS) This summary chart, at that

time it was commonly in usage for a period of time. It was an attempt to start to move away from what was in the early days a strong statistical approach and move into more of a combined approach. As you can see, we have these goods and accepts which gives the people who are reviewing the findings some idea of the subjective judgment of how their work is being viewed, and additionally, it has a figure here being somewhat different in the way it was arrived at.

The 98 percent figure and so forth used in these particular blocks was the result of a direct average computation based on total attributes applied versus the total attributes applied and found to be somewhat unsatisfactory, in some way unsatisfactory. So it wa an attribute count calculation which is again somewhat different than the earlier calculation.

JUDGE BRENNER: Excuse me.

Mr. Museler, when you get to the second box in that middle column -- and I'll let you worry about it later, but staying with the box that you read, does that mean to you the same as what you previously stated, that is, that 98 percent of the attributes were in compliance? It seems to be speaking more about the quality of the audit rather than the findings of the audit.

WITNESS MUSELER: I believe, if I understand Mr. Burns' explanation, which is what I believed it to be, it is, for instance, from the attribute sheets that were discussed this morning, the total audit would have had X number of attribute sheets with nine attributes per sheet, so that total number of checks of calculations -- in other words, that's the total population of pass-fail points is indicated by that number, and of that number, 2 percent failed the test and 98 percent passed the test. That is my understanding of what that box means, sir.

JUDGE BRENNER: I am just reading the language. It says 98 percent of LILCO project calculations have been thoroughly reviewed in accordance with Stone and Webster requirements. The language is there as written. I don't know if that means the same thing.

WITNESS EIFERT: Sir, that is in reference to the engineering review of the calculations and not in the review of calculations that is performed in an audit. That's what those words mean.

JUDGE BRENNER: Your explanation doesn't help me. I'm sure it's my fault, but I don't understand the distinction you have just drawn.

I don't want to pursue it to the Nth detail

now, but if it is important to anyone, I'm not sure the language that is written matches up with the explanation. I will leave it at that for now.

MR. LANPHER: Judge Brenner, could I follow up with a question with a slightly different angle?

BY MR. LANPHER: (Resuming)

Q Some of the questions earlier, Mr. Eifert, had to do with whether people had, after calculations had initially been prepared, there was a requirement for someone then within the engineering department to review or verify those calculations, correct?

A (WITNESS EIFERT) That is correct.

Q Now, is this a statistic relating to how well that review process within engineering had been performed?

A (WITNESS EIFERT) Yes, it is.

Q Or verification?

A (WITNESS EIFERT) Yes, it is.

Q What was the sample size that was used to derive this percentage?

(Witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, still looking at Audit No. 7 on the statistical summary of the audit findings, the number of documents audited is indicated, and the total number of calculations audited in this

audit is 22.

Q The 22 calculations audited, how many attributes -- I thought before you were talking about how attributes were what this percentage went to. Am I incorrect?

(Witnesses conferring.)

A (WITNESS EIFERT) The number of attributes checked is also here, and I will add it up.

(Pause)

MR. LANPHER: Judge Brenner, maybe it would be better if they did this at their leisure, and I could come back to it.

JUDGE BRENNER: I guess I don't fully understand what is being done. I thought we were going to just add up those first five numbers in the total number of checks column, but maybe I'm wrong.

MR. LANPHER: I thought that also, but he is using a different document, I think.

JUDGE BRENNER: And that is something, counting on my figures, over 185 checks, somewhere between 185 and 190.

WITNESS EIFERT: Bob came up with 183. I am not using any other document. I am still looking at the audit. I was trying to further understand what that 98 percent indicated on the attachment meant. I am trying

to understand why you are asking these questions. I don't see any useful data that we can give you here.

JUDGE BRENNER: Okay.

I will give you some free witness advice, and I guess you get what you pay for. You are going to continue to be confused throughout the course of this if you worry abot where he is going five questions from now or what the relationship the questioner sees between his first question and second question, and sometimes that's why we get more longwinded answers than is necessary to answer the question. Just answer it question by question.

Of course, you are free to supply any explanations, but it should be in the context of that question. Let him worry about where he is going in terms of his findings.

MR. LANPHER: Judge Brenner, I am just going to see if I can get this over the break, and then we can pursue it another time, all right?

BY MR. LANPHER: (Resuming)

Q Gentlemen, I would like to turn your attention to Engineering Assurance Audit No. 14, and that is dated August 12, 1975, and I would like to go to page 2 of it, please.

Mr. Eifert, have you had an opportunity to

review that page?

A (WITNESS EIFERT) No. I would like some time to read that, please.

(Pause)

JUDGE BRENNER: Mr. Lanpher, while he is reading that, I realize we have discussed this whole area of giving people further information where feasible.

Is it possible if you haven't already done so to give a sequence of the audits in Exhibit 51 that you are going to go through for purposes of the subject of calculations?

MR. LANPHER: Yes. I'm going to go right through.

JUDGE BRENNER: Okay, each and every one of them in numerical sequence?

MR. LANPHER: I'm going to go in numerical sequence, yes. I am hoping, as I said earlier, to be able to -- I have not covered some. I have skipped some items in some of these which I will point out at the end in the event that Mr. Ellis wants to pursue redirect on them, and I am hoping that there will be more of those as we go along that I am not going to cover.

JUDGE BRENNER: Okay. But potentially, depending on the answers, we might cover all of them,

and approximately in sequence.

MR. LANPHER: I am going to try to go through in sequence. I think I have to.

JUDGE BRENNER: You have skipped one already, I believe, unless I am losing track.

MR. LANPHER: I am not going to go back to those that I have not covered except possibly, depending on the Board's rulings about findings, you know, what we cite in findings. There are some that I have skipped that I decided just to try to be efficient not to mention right now, but I would want them in evidence and to be citable.

JUDGE BRENNER: And parties are going to talk about that in the first instance.

MR. LANPHER: If you would like as I go along, I can even identify them right now. I thought it was quicker just to skip them for now.

JUDGE BRENNER: I think that's right. It's quicker to skip them for right now.

MR. LANPHER: Very good.

WITNESS EIFERT: I have read that page.

BY MR. LANPHER: (Resuming)

Q Okay.

Turning your attention first to Item 1 on that page, the hydrothermal calculations in the environmental

area, it is true, is it not, that with respect to sources of input values, there is a requirement -- let me start over.

It's true, is it not, that they identify the sources of input values in all the calculations audited were not identified as required by the procedure EAP 5.3?

A (WITNESS EIFERT) No, the audit is identifying that some input sources are not identified.

Q Thank you.

Some input values were not identified, and the auditor in addition identified this as a recurring problem, correct?

A (WITNESS EIFERT) In this context, recurring would mean that the auditor identified it in more than one calculation, I believe.

Q I am reading the sentence at the top of the page, and let me just read it: "The following activities," and this item we are discussing is one, "exhibited some recurring deviations from applicable EAP requirements on all or most of the documents audited, indicating trends requiring preventive action."

So in terms of recurring, you do not believe the auditor was referring to previous findings of failure to identify input values?

(Witnesses conferring.)

A (WITNESS EIFERT) Yes, that's what I mean. I do not believe the auditor was referring to prior audit observations. He is referring to the condition that he observed during this audit. Recurring in this case means that he observed it in more than the calculations such that he could not identify it as an isolated case.

Q Now, Mr. Eifert, would you agree that in previous audits that we have reviewed, the failure to identify input values in calculations has been identified as a problem before?

(Witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, we have in other audits discussed the documentation and traceability of the input data and the strict requirements that Stone and Webster imposes to assure that we have ready traceability. In all those instances we have not discussed problems with the lack of identification of input. The data is in the analysis, and it is used. The traceability that we have been discussing -- and I don't recall in any of the prior audits that we discussed today having identified it as a problem with environmental calculations.

Q So it would be fair to state that this problem, while you recall it has come up before, came up

in different disciplines, correct?

A (WITNESS EIFERT) I believe that's true, and I also point out that in this audit where we did audit vessel calculations and pipe stress calculations, it was not identified as a problem for those disciplines.

Q Going toward the middle of the page, the environmental -- the meteorological calculations --

JUDGE MORRIS: Excuse me a moment, Mr. Lanpher. I am still having a semantic problem with C-1A, sources of some input values in all calculations audited. Does that mean there were some sources of some input values in each of the calculations or in all of the audits, in all the calculations audited were there some sources?

WITNESS EIFERT: I believe, sir, that the interpretation is that in each calculation audited there were some sources of input that were not identified.

JUDGE MORRIS: Thank you.

WITNESS EIFERT: One other point I would like to make about this audit is that environmental discipline, the way it is organized at Stone and Webster is an off-project group which does not come under the direct responsibility of the project engineer. In an overall scope of work, percentage of work that is performed, it is a small percentage. The work is

performed by specialists who do this work for all projects, and that is another, just an indication of why we have organized the audit by discipline and why we have chosen to effect preventive action by discipline.

BY MR. LANPHER: (Resuming)

Q Mr. Eifert, the environmental discipline is subject to the same Engineering Assurance Procedure 15.3, correct?

A (WITNESS EIFERT) Yes, it is.

Q Going now to the center of the page, under Point C-12, meteorological calculations, it indicates that the computer runs, referring to the computer program runs, have not been summarized as required in EAP 5.3, "nor is there any evidence that the data has been reviewed as required by Paragraph 2.2."

I assume that is Paragraph 2.2 of that same procedure. Is that correct?

A (WITNESS EIFERT) I believe that is correct.

Q And it is a requirement under that procedure, is it not, that there be evidence in the calculation that the computer data have been reviewed, just like other calculation data needs to be reviewed, correct?

(Witnesses conferring.)

A (WITNESS BURNS) The omission here that the auditor is summarizing, that is something I have run

into myself with environmental people. A good deal of their calculations, it turns out, are computer program type of work and the procedure requires that attached to the run itself be a summary, and the summary identifies the normal things that are required in a manual calculation. It is related to the computer program and the people that are responsible for the calculation.

There is no place in the computer run for the people that are handling the calculation to sign, and it turns out that I have seen this, and normally the corrective action is pretty straightforward. The calculation itself is not in doubt. Certainly the computer program itself is not in doubt. But the identity of the people would be in doubt if left uncorrected, and corrective action is to add a cover sheet. That is what Paragraph 3.2 requires that they do.

Q Mr. Burns, are you basing that on some other knowledge? I don't see that in this. Is that from some other review you have done?

A (WITNESS BURNS) Yes.

Q Is that speculation about what you think the problem is?

A (WITNESS BURNS) No, I have seen this type of thing occur, not very frequently, certainly, but it is

the kind of thing occur when people become involved in calculations which require somewhat more documentation than they might have been traditionally used to, and certainly the people in these areas are subject to all the same rules, and at Stone and Webster, are subject to all the same audit considerations, and yet bringing people into these disciplines, probably you have to pay a little bit more attention to that kind of thing.

Q Mr. Burns, I think you said from other types of situations you are familiar with you reached the conclusion that that was what this problem was.

You do not know that based on any specific review of this problem, correct?

A (WITNESS BURNS) No, I was not on this particular one, that's correct.

Q I understand that, Mr. Burns, but in addition, you have not reviewed the underlying details of this audit to determine that that precisely is what the nature of the problem was, or have you?

A (WITNESS BURNS) I have reviewed the material right here presented and am familiar with the EAP 5.3 and am familiar with use of the summary sheet. The summary sheet is a very straightforward document. They have the opportunity or the need to look at the EAP and look at the summary sheet format. Then it will become

very apparent to you on inspection of the summary sheet what exactly that finding means. The finding is not maybe as obscure or as undetailed as it might appear by this statement. In fact, it is quite clear, I think, as to what it means.

Q Mr. Burns, I guess I am focusing on the second half of that last sentence, the "nor" part, "nor is there any evidence that the data has been reviewed as required by Paragraph 2.2."

Is it your testimony that those data would have been on the summary sheet, part of the same summary sheet problem.

I guess I interpreted it as two different problems.

A (WITNESS BURNS) I'm not suggesting the review is there. I am suggesting that in fact without the summary sheet there was noplace for the review to be documented.

Q And you do not know whether the review had in fact taken place?

A (WITNESS BURNS) There would be no way of knowing just by reading this. You would have to have the summary sheet and then look at the details of that.

Q Gentlemen turning your attention to Item 3 on that same page of the audit, 3B specifically states that

the calculations have not been checked, and this is referring to environmental, well, aquatic ecology calculations. That would be a substantive kind of problem, is that correct, Mr. Eifert, the lack of checking of calculations?

(Witnesses conferring.)

Q Mr. Eifert, maybe the question was confusing. It was within the context of our discussions this morning. Some problems you classified as administrative and some as more serious. I called them substantive.

Is this an administrative problem, or is this something more serious?

A (WITNESS EIFERT) We consider it important that we check calculations, review calculations.

Q So this is in the other category, not an administrative problem?

A (WITNESS EIFERT) Review and approval can be other than an administrative problem. From looking at this report, I don't know what the specifics are. I indicated some examples this morning of review and approval concerns that would be administrative, the reviewer not signing each page and the other examples I used. I would have to take some time and go into the documentation that reported this and or follow-up documentation and the corrective action documentation to

determine whether or not this is an instance of something that is more than an administrative problem.

Q Gentlemen, I would like to turn your attention now to Engineering Assurance Audit 16 and page 2 of that, and the date of this audit is January 22, 1976.

If you could direct your attention to that part of the page under title "Engineering Mechanics' Calculations."

A (WITNESS BALDWIN) What audit are we on?

Q Sixteen.

MR. ELLIS: Which page?

MR. LANPHER: Page 2.

MR. ELLIS: You are skipping page 1?

JUDGE BRENNER: Mr. Ellis, I'm happy any time a page is skipped.

(General laughter.)

MR. LANPHER: I skipped a whole audit. I could go back.

MR. ELLIS: I just didn't want him skipping the good ones here.

(General laughter.)

WITNESS BALDWIN: Mr. Lanpher, could I go back to the last audit?

MR. LANPHER: You had better ask him.

JUDGE BRENNER: No. Let's get a question

first.

WITNESS BALDWIN: Would you ask me a question on the last audit?

(General laughter.)

MR. LANPHER: Judge Brenner, it's not even Friday.

JUDGE BRENNER: I'm not going to say anything. Let's move on.

BY MR. LANPHER: (Resuming)

Q Gentlemen, have you had an opportunity to review that portion of page 2 of Audit 16?

A (WITNESS MUSELER) No, we need a minute, Mr. Lanpher.

(Pause)

A (WITNESS EIFERT) Yes, Mr. Lanpher.

Q I'm correct, am I not, that this audit revealed that numerous calculations occurring in 1973 and 1974 have not been checked and filed in the job books.

A (WITNESS EIFERT) That is correct, Mr. Lanpher. The auditor in this particular audit would have been reviewing the work of the group, the Engineering and Mechanical Group, to take his audit sample. Normally the auditor starts by going to the project files, identifying completed work, and taking

the sample for the audit. In this particular case he also audited, identified, rather, that there was work in progress that had been in progress for a considerable timew that had not been completed and filed in the project job book file. The audit does not indicate that this work or the conclusions from these calculations had been used. Had that been the case, I would expect that the auditor would have reported that there were unchecked calculations and that had been in preparation for excess amount of time, and the results were being used. This is a case where we are making an observation that is primarily with respect to the scheduling of work, that they are not completing the preparation of cycle and reviewing the calculations and getting them into the job books.

Q Is this based on review of some other material, Mr. Eifert, and can you glean that information from this audit?

A (WITNESS EIFERT) I am taking that information from this audit. In fact, the process of preparation, review and control provides for, after completion of the review, the copy goes to the project file. So in this situation the process had not been completed. They had not completed the calcs and gotten them into the file.

Q So there were some calculations that were two

or three years old, approximately, that had not yet been checked and put into the file?

A (WITNESS EIFERT) That is apparently the case. The Mechanical Group of the Engineering and Mechanics Division typically prepares calculations that involve vendor documentation and use of information specific to equipment being provided. The situation probably here is that they initiated these calculations on a conceptual basis based on assumed vendor data and were holding the calculations pending receipt of the data to finalize the calculations.

A (WITNESS BALDWIN) Mr. Lanpher, I just wanted to add that since we jumped or moved to page 2, I wanted to draw attention to the satisfactory areas under 2A once again, since either no deficiencies were observed or those which were observed did not indicate significant noncompliance to applicable procedures in the engineering safeguard calculations, the pipe stress analysis calculations, the pipe stress calcs design division, electrical calcs, aquatic ecology calcs and meteorology calculations. Similarly, back in Project Audit 15 you will find under 2A again a similar situation with steel design calculations, radiation protection calculations, and process engineering calculations.

Q Mr. Baldwin, going back to what you referred to in Audit 16, it states that they were not significant noncompliances, those items that you mentioned.

Am I to infer from that, then, that the noncompliances that were discussed in detail on page 2 of that audit are significant noncompliances?

A (WITNESS BALDWIN) Not from a safety standpoint.

Q In terms of compliance with Appendix B to Part 50, do you consider those to be significant noncompliances?

A (WITNESS BALDWIN) No.

Q What are the criteria for significant and nonsignificant noncompliances?

(Witnesses conferring.)

A (WITNESS BALDWIN) Would you rephrase your last question, please, Mr. Lanpher?

Recalling back, maybe I can offer --

Q Let me ask the question again, please.

What criteria govern Stone and Webster's determination whether to classify something as a significant noncompliance versus one that is not a significant noncompliance?

(Witnesses conferring.)

A (WITNESS BALDWIN) In Stone and Webster we

don't use those gradations or classify them, but if I can put them in my own words, I would not consider it not significant in the context that it is adverse to quality.

Does that help?

JUDGE BRENNER: Mr. Baldwin, the audit report uses those terms, so I don't know how to square that with your comment that Stone and Webster doesn't use those terms.

(Witnesses conferring.)

JUDGE BRENNER: In addition to Paragraph 2A on page 1 that Mr. Lanpher referred you to earlier, the last paragraph on page 2 uses the term also.

(Pause)

JUDGE BRENNER: We are getting close to the time for a break. I can break it now if you need more time to consider this.

WITNESS BALDWIN: I would appreciate that.

JUDGE BRENNER: Okay. Let's break for 15 minutes, come back at 3:25.

(A brief recess was taken.)

(3:20 p.m.)

JUDGE BRENNER: All right, we can continue.

As I mentioned off the record in response to a question, we will run until about 5:00 o'clock today.

MR. LANPHER: Judge Brenner, I think we had a pending inquiry to Mr. Baldwin, to your question.

JUDGE BRENNER: It was a follow-up to yours. Do you recall the question, Mr. Baldwin?

WITNESS BALDWIN: I believe so, sir. The question of significance and specifically the significance of the second page of audit number 16, I believe, 2.B.2. I would like to rephrase or add to what I said earlier before the break.

In my definition and I believe that of my associates in this context, it is based on the auditor's judgment, the significance of these kinds of items. It may or may not be in what I would consider absolute terms. We discussed at some length this morning that major and minor, and I think in that connection it's very similar.

It is a judgmental thing by the auditor. It's based on his experience, his qualifications, how much he delves into the situation, how much he is aware of, his perceptions, his feelings, the attitudes that he may be confronted with.

And to summarize or finalize that point, it is my position that it is a judgmental factor, that he weighs each situation as he sees it, taking many, many things into account. I hope that's helpful.

BY MR. LANPHER: (Resuming)

Q Looking at the first page of audit 16, sir, there are some in that list of 22 disciplines which were audited which, while they were termed to be satisfactory -- let me strike that and start over.

Let's go to attachment 2. Maybe this is where my confusion arises. The statistical summary of audit findings. I believe this is the first report where we have a new format. The data sections are still basically the same, but now, instead of three columns relating to results, we have two. The preventive action column has been deleted, correct?

A (WITNESS BALDWIN) Correct.

Q Why was this change made?

A (WITNESS BALDWIN) I would like to refer that to Mr. Eifert. He was more involved than I, I'm sure.

(Panel of witnesses conferring.)

A (WITNESS EIFERT) In approximately this time frame, the definitions of the terms in the program were changed and the term "corrective" -- the terms "corrective action" and "preventive action" were

combined into the singular term "corrective action," with the definition basically changing to "corrective action" being those actions that you take to correct the conditions identified, as well as, if appropriate, those actions that you take to prevent recurrence of the items.

It was a program change in approximately this time frame, as I recall.

Q Now, as I recall our earlier discussion on this, under the old table where we had the three columns, and for instance audit 14 for the three columns, for an item to be marked "satisfactory" that meant no deficiencies were observed, correct? No deficiencies at all?

A (WITNESS EIFERT) Yes. When we discussed that earlier, that was how I answered that question and that is the statement that was made in the first part of the report for audit 14.

Q When I look at a satisfactory column in audit 16, however, just because an item is marked satisfactory does not mean that there may not be some deficiencies; is that correct?

A (WITNESS EIFERT) It would mean that there were no deficiencies in the work at the time that the audit report was issued, on the basis that anything that

was identified that was determined to be minor in nature and corrected in the audit was fixed, so noted by the auditor on his notes and documentation with respect to his conduct of the audit, and there was no basis for him to believe that there was any need for any further action.

Q So the criterion would be, if something is labeled satisfactory there are no deficiencies or the deficiencies can be corrected before the time that the report is made?

A (WITNESS EIFERT) No, that would not be the case. The nature of the deficiency would be considered, as well as the extent. Your answer suggested that anything that could be fixed before the audit was completed is not recorded, and that would not be the case.

The auditors would still be making the judgment on which or if any conditions exist which require further evaluation or additional attention by the project to prevent recurrence. Even if the project could correct and identify deficiencies prior to the completion of the audit, if the auditor judged, in the context that we have been using "significant" here, that additional attention was needed, it would become a condition that is reported.

(Pause.)

A Mr. Lanpher, if I could help possibly with some of the really trivial examples of things that would fall into this category --

Q Which category?

A (WITNESS EIFERT) Where an item would be reported here as satisfactory. What I'd like to do is give you some examples or a couple of examples of the type of things that would have been corrected at the time on the audit, and the activity would still fall into that category.

The implementation of the program today, for example, is, although we still require page numbering of calculations, if we identify isolated cases where there was a problem with the page numbering of a calculation and the auditor judged that it was so isolated and the people corrected that at the time, that would not be cause to require preventive action.

Q I followed you right up to the last, when you started using "preventive action" again, which I thought was no more.

A (WITNESS EIFERT) We would not in that situation -- we would report it, provided that they had corrected the condition, as a satisfactory item. Now, at this point in the process, with this change in the

audit program, the items that are now going into section B of this report 16 are either items that the auditor has investigated to an extent that he now recognizes or believes that preventive measures are required or areas that he has performed sufficient investigation to identify the item as a condition which the project should look at further to determine the extent and the need for any action to prevent recurrence.

Q Would I be right in concluding that the new corrective action required column on audit 16 is essentially equivalent to the old preventive action column? I'm referring back to audit 14.

(Panel of witnesses conferring.)

A (WITNESS ELFERT) It would be better to characterize the new one column as including both the old corrective action and preventive action, because we would still -- there still is the possibility that under corrective action we would report items in this way where only the cited conditions would require correction, those that were not corrected during the audit.

Q Gentlemen, I would next like you to turn your attention to audit 17. And for the Board's information, in audit 17, page 2 of that audit, part of the right-hand side is cut off. And Mr. Earley kindly made

available the correct page. We did have it copied and I will insert it in the record copies.

I'd like to turn you attention to that page 2, please.

(Witness reviewing document.)

Q Have you had an opportunity to review that page, Mr. Eifert?

A (WITNESS EIFERT) One minute, please.

(Pause.)

Q Mr. Eifert, if you just review the top of the page, that's all I'm going to direct your attention to. I should have said that before.

A (WITNESS EIFERT) Yes.

Q With respect to the engineering mechanics calculations, it is indicated that only 2 of 19 issued calculations could be located in the project area. Under your procedures and requirements, is there a requirement to have all these calculations at the job site or the project area?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, the structural mechanic group is another example of an off-project staff group that performs analysis for Shoreham projects as well as other projects. There is a procedural requirement that not only that group, the off-project

staff group, maintain files of their calculations, but they transmit periodically updates of those and maintain a duplicate set on the project itself. So this is not a situation where the transmittal of that data -- excuse me.

It's a situation where the project file was not in one place on the project.

Q Would it be fair to state that this is more of a document control problem as opposed to really a calculation problem?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, the procedural requirements for control of calculations and calculations files are contained in the procedures that control the processing, the preparation and review of calculations. This is an implementation problem with that specific procedure as contained in E'P 5.3.

Q Gentlemen, turning your attention to audit 18 --

A (WITNESS EIFERT) Excuse me, Mr. Lanpher. Two questions. First, I didn't hear your next page; and I believe this is the first observation that we have seen that deals with the off-project calculation filing. And again, in this calculation -- in this audit and in other audits we found many calculation, disciplines prepared

calculations satisfactorily for fulfilling the requirements of the EAP.

Q Thank you.

MR. LANPHER: With respect to audit 18, Judge Brenner, I need to do a housekeeping matter first on this one, if I may.

BY MR. LANPHER: (Resuming)

Q Gentlemen, if you would take the last -- looking at the exhibit which was prepared, if you would look at the last four pages. There is a distribution sheet and then before that there are pages 2, 3 and 4. Would you confirm to me that those four pages in fact should be part of audit 19?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, pages -- Mr. Lanpher, in my copy I have a page 2 of 2, which has audit scheduling data on it. Do you have that?

Q Go to the page right after that, sir, and you should have something labeled page 2, job number 11,600.50.

A (WITNESS EIFERT) Right. That page 2, page 3 and page 4, are part of audit 19. And I believe the distribution list also goes with audit 19.

Q Thank you, sir.

A (WITNESS EIFERT) This other page that I

referred to, is that in your copy as well? That seems to be misplaced. That is also a page out of audit 19. It's page 2 of attachment 1 of audit 19.

Q Looking at what I believe is properly audit 18, if you could look at page 3, the last portion of that page, "vessel calculations (design)".

JUDGE BRENNER: Mr. Lanpher, give me one moment.

MR. LANPHER: Certainly.

(Pause.)

(Discussion off the record.)

JUDGE BRENNER: Okay, let's go back on.

BY MR. LANPHER: (Resuming)

Q Mr. Eifert, I direct your attention to the bottom of page 3 of audit 18. This indicates that the nozzle reinforcement calculations do not evaluate the effect of the loads imposed by the piping; is that correct?

A (WITNESS EIFERT) It indicates, yes, that the existing nozzle reinforcement calcs do not evaluate the effect of the loads.

Q Would it be fair to characterize this problem as one of the calculation simply not being sufficient to cover what was necessary?

A (WITNESS EIFERT) I would characterize this as

during the audit the auditor looked at the calculations and identified his concern in this area. We would have to look further at the follow-up documentation with respect to this to determine what the condition indeed reflected.

For example, if the evaluations were contained in other calculations, or if indeed the method of considering such loads were appropriately -- a judgment evaluation which was not a detailed evaluation of the calculation. The recommended action there is for the engineering mechanics division to evaluate their methods in assessing the loads imposed by piping.

A (WITNESS MUSELER) Mr. Lanpher, I have some knowledge of this particular item, and the audit observation was essentially a question, the question being, the calculations for reinforcement of the nozzles were there, however the audit correctly noted that the loads imposed by the specific piping were not included in that, in those calculations. And the auditor correctly asked if that was an adequate method of treating this particular calculation.

As it turned out, there were various code rules and standards that apply to this particular type of calculation. Reinforcement calculations are a sort of a subclass, and the various loads that are included

in that calculation -- the calculation includes certain loads specifically and other loads not specifically, but based on the total stress that the nozzle is undergoing.

In this particular case, the response to this audit observation was that the engineer who was responsible for it did evaluate all of the code-required items for nozzle reinforcement in the calculation. In this particular calculation, the inclusion of the piping loads as a specific load, as opposed to either an allowance for a load or an allowable stress level, the inclusion of that in this particular calculation is stated in the code as being judgmental on the part of the engineer depending on the level of the loads on this particular nozzle.

So in other words, the requirements call for specifically line by line including certain loads and others not specifically, but through what I will call the conservatism of the calculational technique. So it was optional whether the piping be included as a particular line item in this calculation. And as it turned out, the nozzles in question did not require the piping to be included as a specific line item. They didn't fall into the criteria where they had to be specifically included.

So the auditor correctly asked the question, but the answer was that in this particular case the piping did not have to be included as a specific identified load.

Q Gentlemen, turning to audit 19, the bottom of page 1 related to "facilities calculation (design division)". It indicates that while there had been some rework of a design, that a number of the calculations have not been updated to support the designs on the current drawing. Is that correct?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, the audit is discussing the situation with respect to follow-up from a prior audit with respect to updating calculations to agree with design changes. And in that sense it indicates that there are at this date -- there is at this date some additional corrective action that has yet to be completed to assure that all the calculations are up to date to support the design as shown on the current drawing.

It does not indicate that the designs are not in any way supported by calculations. It indicates there were some changes and the calculations need to be brought up to date.

Q Isn't it usually the case that calculations

are performed before the drawings which presumably support -- are supported by those calculations are prepared?

A (WITNESS EIFERT) The situation here is that the calculations were prepared before the drawings were prepared. The situation involves some changes to those drawings. It does not indicate the source of those changes, but they were probably field changes. The situation would be that the proposed change was evaluated and approved based on the judgment of the engineers involved, fully recognizing that they had to complete the process by going back to the calculations and reflecting that information in the calculations.

A (WITNESS MUSELER) Mr. Lanpher, I can add to that that that is exactly the situation. I'm not sure in these particular drawings, but that is a very frequent situation in the erection of the plant, in that building services or the duct work and the HVAC -- heating, ventilating, air conditioning equipment -- domestic water-type systems, and the detailed installation of many of these components, which is installed in many cases on structural steel -- when the final installation, final equipment arrives, and the as-built condition of the equipment is fit into the original design, the steel may have to be changed,

usually not very significantly.

But whenever it is changed, it would change the initial design of the steel. That would have to be backed up by a calculation. But the majority of the time, this is a matter of the engineer's judgment, moving a gusset a couple of inches or moving a beam a foot. While it does have to be verified, it's not going to change the adequacy of that structure.

So in this particular case that's the type of thing where the calculations would actually follow the change in the design document.

A (WITNESS EIFERT) I would also point out that this observation is not an indication of a recurrence of the problem. This audit observation reflects that the judgment in this case of the auditor is that the follow-up with respect to this work, although progressing, was not progressing at a pace in their judgment to which it should have progressed.

And this I would characterize as an observation with respect to the scheduling and timing of work, as distinguished from the quality of the work involved.

Q Gentlemen, let me turn your attention to page 3 of the same audit which, in some of the books, are with the previous audit. It is the page entitled 2.B.6, Engineering Mechanics Division-Mechanical Section. It is one of those pages, Mr. Eifert, that you assisted us before in moving up from the previous audit.

(Discussion off the record.)

Q Mr. Eifert, this discussion concerns calculations from the 1970 to 73 time period, correct, which relate to the fuel pool?

A (WITNESS EIFERT) Some of the calculations addressed here refer to the timeframe, yes.

Q And the audit revealed that some of those calculations were based on data which were conceptual at that time, but which had not been verified since the original preparation, correct?

A (WITNESS EIFERT) That is correct.

Q And the audit also determined that some calculations which should have been done have, in fact, not been done, correct?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) With respect to the second item, with respect to the calculation for the spent fuel liner, this wording of the finding is typical when a calculation could not be located to show to the

auditor. The typical situation here is that the calculation had been prepared and is later located as part of the audit follow-up. But the audit does indicate that it was not available to the auditors. Yes.

JUDGE BRENNER: Excuse me, that is the language you would use, "when it was not available to the auditor", that a calculation has not been done?

WITNESS EIFERT: In my experience within the audit group, we have used that language. The situation involves communication between the auditors and the groups, and if we cannot locate the specific calculation and they do not produce it for us, we assume, therefore, that it has not been done and report it in that fashion.

JUDGE BRENNER: Well, I will give you the observation that that language sounds to me like a definitive ascertainment that the calculation has not been done, as distinguished from language that says the calculation is not available and, therefore, may not have been done and will not assume to have been done until found, or something much more conditional.

WITNESS EIFERT: That is why we worded it that way. We aren't going to assume that there is a calculation until they can produce it for us.

JUDGE BRENNER: All right. So when we see language like that we would have to go to the follow-up,

or you would have to show us the follow-up, through your counsel, more accurately in order to determine whether the calculation was done or not.

WITNESS EIFERT: That is correct.

JUDGE BRENNER: So far as we know now, that calculation has not been done, based on reading this audit on this record.

WITNESS EIFERT: Yes.

MR. ELLIS: Judge Brenner, I think this is an appropriate time for me to make this comment. If we are going to go finding by finding through this, then I think it is important for us to know the findings. In many instances, these witnesses have personal knowledge and are familiar with them and have been able to answer. If we are going to go finding by finding through all of this, then I think we should be familiar with the findings that they want to go through and that they want to pick out, so that we can answer these.

I don't think it is relevant to the contention which talks about patterns of breakdowns, but if that is what the Board wishes, then I think we ought to have that opportunity to do that. It is a monumental job.

JUDGE BRENNER: Well, he has told you what he is going to use these audit reports for, at least, and I think we have discussed plenty now what else he is going

to tell you. As cross examination proceeds, you will see what it is all about, and you can determine at the end what you want to come back on with redirect.

I know it is a big job. There are a lot of documents here. I am not going to make him tell you now what finding he is going to use every question for.

MR. ELLIS: Does the Board want to know this answer? I mean, I may make an independent judgment about whether I think it is relevant to any finding. I don't want to leave out anything that you are interested in.

JUDGE BRENNER: I have established, I think, the point I wanted to establish, and it was trying to understand Mr. Eifert's view of the language that would typically be used by an auditor. And I recorded my view as to how I would have expected somewhat different language to have been used, if it stood for what Mr. Eifert said it stood for.

What you want to do with that is your business and will depend, I suggest, on what the rest of the cross examination reveals with respect to seeing this language again in other audit reports or whatever. It may become pertinent in terms of categorizing whether an audit observation is more significant -- to belabor an overused word -- or less significant.

MR. ELLIS: When I made my remarks just a minute ago and used the word "findings" I meant audit findings; not findings -- when I said finding by finding, I meant if we are going to go through this audit observation by audit observation. I don't mean for him to tell me his findings.

JUDGE BRENNER: Okay, I misunderstood that portion of your comment. We will find out as we go through the cross what particular questions he is going to ask, but if he has already identified the subsection --

MR. ELLIS: Yes, sir, he leaves out some calculations and does other calculations, and if he is interested in particular audit calculations, we can do some research and give the the Board and give Mr. Lanpher more complete answers.

WITNESS MUSELER: Mr. Lanpher, --

JUDGE BRENNER: Wait a minute. We will just proceed the way we are proceeding. And hopefully, where there are particular patterns he wants to show, we will see it. He has to have some building blocks in. I can't say come in here and ask four questions as to your ulitmate patterns. That is all I have to say on this point.

WITNESS MUSELER: Judge Brenner, I believe

this remark is more correctly addressed to your remark on the interpretation of what the English language says about a calculation not being done. I believe we can confirm that in the parlance of engineering assurance auditors, that the calculation not being done does not really mean that the calculation was not done, but in fact means as Mr. Eifert characterized it, it was not available to the auditors.

We have been able to confirm that the particular calculation in question was, in fact, in existence early in the same year that the audit was conducted, and that the particular -- the reason it wasn't available is that it was somehow in transit between two of the engineering disciplines involved. And they returned the subject calculation to the mechanical section which is where the auditor looked for it. But the calculation had, in fact, been done and I think that is the simple point.

I share the same problem with engineering assurance audit definitions that you do, I'm afraid. I was quite concerned about that when I saw it. But the calculation was, in fact, done. I think that is the most important thing.

JUDGE BRENNER: I don't want to get too hung up on this one finding right now because we are looking

for patterns. But since you told me what you told me, how do you know that?

WITNESS MUSELER: Because we have been able to refer to the Stone & Webster project's response to the engineering audit observation.

JUDGE BRENNER: One reason I raised the question is that when we were looking at other audit reports, different language was used, and maybe you are easier on the environmental guys, I don't know, but in that case, the language was that the calculation was not readily available or not yet available. So apparently, -- you see, I have seen the other language used for the same proposition in the Stone & Webster audit report, and that is why I asked the question.

Let's go back to Mr. Lanpher.

BY MR. LANPHER (Resuming):

Q Gentlemen, the same page of that audit, just under the paragraph 3, the paragraph starting, "Two recent calculations..." It goes on to say that the analysis of asymmetric pressure was difficult to follow, and the source of base data was not identified. And revised results have not been transmitted to affected groups.

Now, with respect to the source of basic data, is this an example of where the calculations were not

readily traceable, the source of the data for the calculation?

A (WITNESS EIFERT) That is what is indicated in the paragraph that you referred to. Again, as clarification of the requirements that Stone & Webster has on providing traceability, I would like to characterize a couple of examples to give you a better feel for what we have been saying.

When doing an analysis, for example, for a pipe support calculation, one of the primary inputs to that analysis is the load from the pipe stress analysis. All the engineers know that the pipe stress analysis for that pipe run is the source of that input; yet, if the pipe support engineers are not specifically identifying the pipe stress analysis number for that particular pipe stress run, we consider that a less than totally adequately documentation of that pipe support calculation.

There are many, many examples like that that I could give where there is traceability to the source document through a general knowledge of the process and the source of that kind of input. This is, again, an example of a strict requirement in Stone & Webster's program that, again, we use primarily to insure the usability of this documentation.

We do not consider this in any way a condition that through our audits, we have been able to attribute any problems in design or conclusions of analysis. This is an administrative control that we consider is important, and that we follow up on, rigorously follow up on through the audit program. It is a standard that I believe is probably higher than any other industry with respect to the degree of documentation in calculations. We rigorously apply it and rigorously follow up to see that we are meeting that for our own management control and document usability purposes. It does not reflect on the quality of the work itself.

Q This does reflect, however, the fact that your own standards were not being met in this instance by your Engineering Mechanics Division, correct?

A (WITNESS EIFERT) In one specific analysis, yes.

Q This is not the first time in these audit reports that the lack of input data has been noted, correct?

A (WITNESS EIFERT) I do not recall any audit observation that identified the lack of input data. The input data is identified, the analysis is performed, reviewed, conclusions drawn and the design completed. We are talking traceability: references to specific documents and, in some cases, we will probably see later

in audit observations where we wrote up an audit observation on the basis that they hadn't referenced a specific page number in the calculation.

As you stated, this is not an indication of lack of input data.

Q This is not the first indication, however, of traceability problems which do not meet your standards, correct? Or your procedural requirements?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, we have discussed many times today the question of specific identification of input data. I have tried to characterize that situation, the procedure requirement, examples of it, so that everyone including the Board can understand what we are talking about.

This is a Stone & Webster requirement that we consider is important, okay? It is not significant to the analysis, to the adequacy of the design. It is an administrative control requirement that we feel is important to insure that the document is usable in the future.

JUDGE BRENNER: Mr. Eifert, I don't think you answered the question, and I say that not to identify that question is a super-important question necessarily, and not to pick on you individually, but this is going

to be a very long subject, as it is. And I think that I am starting to see a tendency of repetition in the answers, some of which may be necessary given the questions, but I suggest not all of which is necessary. And some questions, not all questions, but a lot more questions than you have taken advanatage of -- and I am speaking of all the witnesses -- can be answered yes or no, and then with the explanation, so that at least we know where you are heading.

And even if it can't be a definitive yes or no, the explanation can be, I think, somewhat more directed to the question. It is certainly not easy being up there as a witness, and it is made more difficult by our broad subject and even more difficult by a large panel because you want to consult and so on. But your answer did repeat, as you indicated, a point that you made several times today. I don't think you answered Mr. Lanpher's question as to whether this is an example of a traceability problem which has recurred. And I think you can answer that question, and then supply whatever explanation you want to make.

I don't know whether you answered that yes or no. You may think you did, but I have not heard it. And let me add one more thing. We go through the transcript and we look to try to get the witness's view

as accurately as we can from the point of what the witness meant. And if we have to thumb through two or three pages for every answer, your view may be there but it may start to become obscure. So give the most important information upfront in answering the question, and then whatever explanation you need.

(Panel of witnesses conferring.)

JUDGE BRENNER: Do you want to repeat your question, Mr. Lanpher, because my paraphrase --

MR. LANPHER: Judge Brenner, your paraphrase was just fine.

JUDGE BRENNER: Mr. Eifert, do you need the question again?

WITNESS EIFERT: I would like the question again.

JUDGE BRENNER: You ask it; it is your question.

BY MR. LANPHER (Resuming):

Q Mr. Eifert, would you agree that this is an example of a traceability problem similar to other problems that have been identified earlier in the calculation area?

A (WITNESS EIFERT) I do not characterize this as a traceability problem; it is an identification of the source document. In that context, it is similar to

other problems that we have discussed.

Q Thank you. Judge Carpenter?

JUDGE CARPENTER: I wonder if you could help me a little bit. I am not familiar with what a reviewer would do in the context of these items that you are talking about right now. But usually, when I review something I would first look at what the parent data are and be sure that I am starting out with the same items and am comfortable with those items.

Could you help me a little bit as to how a reviewer could have been comfortable that he could identify the sources of the data, as the first step in the review?

WITNESS EIFERT: Yes, sir, I think I can clarify that. These situations are situations where an experienced engineer prepares a calculation based on his understanding of the design process. He knows where to go and get the information that he needs for his analysis.

The review is conducted by another engineer who is similarly familiar with the design process and similarly, knows where that information is, uses much of that information very often in his work on the project.

The example I used of a pipe support analysis where the input document is the pipe stress summary for

that portion of the system, the reviewer would, without hesitation, go directly to that particular analysis and find and be able to have confidence that the proper input data was used.

Following through with that particular example because I suppose you could ask the question then why do we require such strict documentation if that is the case, when it becomes time to revise or change those calculations at a later date, either during construction or later during operation of the plant, the files of the input data -- in this case, the stress summaries -- are filed in a way that is probably not as familiar to the people who are doing the analysis. It is on microfilm where a specific reference to a document number is necessary if you are going to have ready traceability.

That is the kind of situation where we have insisted and continued to insist on strict traceability to specific input documents.

JUDGE CARPENTER: So you are saying that in the case where the calculation is made because of some input that is coming from another division or another area of work, you said in general, I believe, that these people would know the parent documents because it is sort of generated within that section.

You see, I was thinking about the other class

where the calculation is made in response to work that is going on in some other section, and you have to know -- you have to trace it back to that other section. I take your testimony to be that those cases are very rare.

WITNESS EIFERT: No, I didn't mean to imply that, if I did. Whether the input is generated within the discipline that is generating the new calculation, or whether it comes from another discipline within our organization, or whether it comes from a vendor with respect to vendor equipment, my point was that the engineers preparing the calculation and the engineer who is experienced and assigned to review the calculation are all extremely familiar with that process of where that information comes from and have access to it at that point in time when the calculation is prepared.

JUDGE CARPENTER: Thank you.

BY MR. LANPHER (Resuming):

Q Gentlemen, if I could turn your attention to Engineering Assurance Audit 20, first of all, just a general question. There is a change in format, I think, that takes place here. We are going to audit observations. Is there any substantive change in the auditing process represented by this?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) No, there wasn't any

substantive change in the process. There was a change in format, standardizing the form in which we reported the conditions identified. The most significant thing is it is probably more efficient to do it this way without typing the concerns twice; once in the report and once on an infraction notice.

Q And this is the format that is used today, is that correct? The same basic format?

A (WITNESS EIFERT) The format, from the standpoint of a cover letter report with attached audit observations, yes. The audit observation form is different today in engineering assurance audits. And the text of the reports themselves are much different now. Just recently, we have tried to put more into the reports to give management more information about the areas that we audited where we found no observations, so that they have a better measure or feel to understand how the activities on that particular project are progressing.

Q Gentlemen, turning to Audit Observation 001, it indicates that 25 calculations called "preliminary" have not been checked. Do you have any reason to doubt this finding that these calculations had, in fact, not been checked?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, I don't have any basis to doubt that. These were identified as preliminary calculations. They are marked, apparently, "preliminary." The audit observation says they are called preliminary observations, so I have no basis to doubt the specific observation.

Q Does Stone & Webster have a category called "preliminary calculations"?

(Panel of witnesses conferring.)

And, Mr. Eifert, just so my question is clear, and if so, is there a different control procedure other than 5.3 that would control preliminary calculations?

A (WITNESS EIFERT) We don't have a category "preliminary" and a procedure for preliminary calculations. However, in the design process it is common practice to develop preliminary calculations for conceptual designs and preliminary designs where we have to proceed with assumptions with respect to, for example, equipment where we won't be receiving the equipment data until a much later date.

Q Mr. Eifert, -- I am sorry, did you finish your answer?

A (WITNESS EIFERT) I believe I did.

Q Some of these, the oldest calculations, are indicated to be about seven years old, given the fact

that this audit observation is from early 1977. Do you have any explanation of how they could have gone unchecked for so long?

A (WITNESS EIFERT) I don't know the specifics here, but it could very simply be that they have gone unchecked for that lenght of time, awaiting appropriate vendor input data. I cannot tell from the audit observation whether or not they had received that input data, or when they received that input data. I would speculate that being that we audit these calculations on a regular basis, this came to light in this audit because the discipline had probably received the data necessary to revise those calculations, and in the judgment of the auditor, have not proceeded to do so, for example, since the last audit.

Q You would agree, would you not, that this is an example of a failure to carry out requisite checking of calculations?

A (WITNESS EIFERT) No, Mr. Lanpher. The procedural requirements are that file calculations must be reviewed and approved and filed and controlled. In this particular situation, the preliminary basis of this is not a procedural violation, as stated here.

Q Is it your testimony, then, that QAP-5.3 was not violated by this?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) I am sorry, but I do not have specifics with respect to this set of calculations. But it is not a procedural violation, as you have indicated, to develop preliminary calculations that are unchecked while awaiting final data. I think that is what I was responding to.

Q Didn't the auditor think it was a violation? And if not, why would he put it down, or she put it down, as an audit observation?

A (WITNESS EIFERT) Again, without going back and probably speaking to the auditor in this particular case, it seems to me, based on my experience with conditions involving preliminary calculations, that the auditor judged that the facilities group has information necessary now to finalize those calculations and should finalize those calculations.

But prior to this audit in earlier years where we had not written that, this problem, as requiring to analyze these calculations, my assumption is that the facilities group did not yet have that input, and it was a judgment on the part of the auditors that the input was available and the group was not taking timely action to finalize the calculation.

Q Mr. Eifert, is it fair to say that unless you

reviewed the backup data, so to speak, for this, you really don't know whether it is a violation or not? A violation of the procedure?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) That is correct. I would have to go into the backup documentation, and possibly even go back and talk to the auditors, to evaluate this one. This is an unusual -- not a common problem.

Q Turning to the next page, Audit Observation 002, it indicates with respect to electrical calculations that numerous calculations have sources of input that are not adequately identified to insure positive traceability. Do you have any reason to doubt this finding?

(Pause.)

A (WITNESS EIFERT) Mr. Lanpher, this audit observation, as all audit observations, reflects the understanding of the situation by the auditor at the time of the audit. This is probably an actual condition. However, many audit observations in the response contain clarifying information, additional information not provided to the auditors during the conduct of the audit that in some cases modify the identified or apparent problem identified by the auditors. And in some cases, an apparent problem turns

out not to be a problem.

Q Based on the information set forth in this observation, would you agree that this is an example of a source of input which is not -- strike that.

Do you agree that this is an example of a traceability problem?

A (WITNESS EIFERT) No, Mr. Lanpher, I do not consider this a traceability problem. I consider it a problem with identification of sources of input. I am confident that the electrical engineers involved here were able to trace and find the source documentation.

Q Well, isn't the reason that you identify the source of input to insure positive traceability?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, we discussed the identification of input and the term "positive traceability" as it would have been used by the auditors in this audit observation is not in reference to positive traceability with respect to future use of the calculation, but for changes during the engineering construction phase or as necessary during the operation phase.

JUDGE BRENNER: Mr. Eifert, under this new format, there is a box for reply for each audit observation sheet that comprises the audit. Are they

used for the replies? And if so, is the form on which the reply is placed kept on file with the audit observations?

WITNESS EIFERT: Yes, they are. The process is that we issue the report with a copy of the audit observation and that gets distributed to many people at Stone & Webster, as indicated on the distribution. The originals of these reply forms were provided to the project for development of their response. The reply would be typically handwritten, possibly sometimes typed on the original of the form.

Additional documentation, correspondence between engineering assurance and the project, all make up the total response to the finding that is the basis for the acceptance of the response and closed out by engineering assurance. They are kept on file.

JUDGE BRENNER: All right. I don't know whether to ask Mr. Lanpher or LILCO, depending on who made what available to whom, but why don't we have the final copies? That is, the versions with the replies. Recognizing that the format changed somewhat and some of the earlier ones might be a little different due to format problems.

MR. LANPHER: I can't state whether we asked for the replies in discovery. We got these from LILCO

in discovery. We asked for audits. I am not sure -- I don't have the discovery request right here, Judge Brenner, so I don't know --

JUDGE BRENNER: Your short answer is, this is what they gave you.

MR. LANPHER: This is what we have available and are making available as exhibits. That is right.

JUDGE BRENNER: And you don't have --

MR. LANPHER: I do not have the replies, that is right.

JUDGE BRENNER: Okay. Turning to my left --.

MR. ELLIS: My short answer is we gave them what they asked for, to the best of my knowledge.

MR. LANPHER: I have no reason to dispute that.

JUDGE BRENNER: This is not in the context of a discovery dispute. We are now trying to get a current record. Would it have made sense, assuming that they asked for the audit reports, to get the copy back that included the reply? Let me phrase it more currently.

Would it be better if we had the copies with the reply now in the record instead of sloughing through this further on redirect, if that is what is going to happen? Or instead of the witnesses going through documents that we don't have in front of us and telling us that they have other information? I am not

precluding that the witnesses are quite proper in doing that, depending on the question.

MR. ELLIS: Well, I think my previous point was that if he -- if the audit observations that were of interest, if we had to do further research on those I think it might be important for us to know which ones those were. It may go beyond the documents, this last form down here. I don't know.

JUDGE BRENNER: All right. I am going to leave it. You can think about it and maybe work it out. I agree with you, it may go beyond that but it may be a step in the right direction to have that. You all have your own individual cases in mind as to how you are going to proceed.

It would be a shame to have Exhibit 51 containing 40 audits, Suffolk County Exhibit 51 for identification containing 40 audits and then three weeks from now to get LILCO Exhibit "Whatever" containing 40 of the identical audits except that we now have the reply box filled in. You all can think about it.

Maybe it is not necessary to where you are going with the case, but it might have been pertinent information. And I am keeping in mind what I discussed yesterday, wanting to think about the contention which is talking about trends and recurring problems. I don't

believe we are getting overly hung up on any individual finding; I am simply saying that because you made a few comments along those lines, Mr. Ellis.

MR. ELLIS: Yes, sir. I think the contention speaks in terms of pattern of QA breakdowns. And, of course, our initial position is that these are not QA breakdowns.

JUDGE BRENNER: Maybe your reply would have been pertinent to that. Maybe the reply is so succinct that only somebody working with this at Stone & Webster would understand that from the language.

All right, let's proceed. I got the short answer to my question. Mr. Lanpher, I have but in already, when you get to a convenient point why don't you stop, because I have a few observations that I wat to talk about on some housekeeping matters in terms of location of the hearing and so on.

MR. LANPHER: Let me try to finish this audit.

BY MR. LANPHER: (Resuming)

Q Mr. Eifert, looking at the recommended actions section of this audit, it says to review the existing calculations and "positively identify sources of input for traceability." It also says to prevent recurrence of this deficiency.

In stating to "positively identify sources of input for traceability," does that mean -- what does that mean?

A (WITNESS EIFERT) That means to identify the specific document which contained the information that was used as input to this calculation. I'm not very familiar with the electrical, so I can't give you a good electrical example, but the pipe stress analysis to the pipe support is my best example.

Q The failure to identify the sources of input or positively identify the sources of input for traceability is a violation of EAP 5.3, correct?

A (WITNESS EIFERT) Yes, it is.

Q And the recommended action also stated to take action to prevent recurrence of this deficiency. Is that an indication that -- or a parallel to "take preventative action" under your old terminology, because

this is a recurring problem, or what? Or is that because it says "numerous calculations"? I'm trying to put this in context.

A (WITNESS EIFERT) The recommended action first says to review existing calculations and positively identify. That is, correct the situation in all the existing calculations. The balance of the statement, which says "and take action to prevent recurrence," is referring to ensuring that future calculations do contain the specific detailed reference to the input sources that we require.

Q This corrective action would be taken only within the electrical discipline?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) Mr. Lanpher, this is an example where in the audit program, in the audit program follow-up, we would specifically follow up with the electrical discipline on the project. I would point out that all the audit reports go to the project engineer, who has an opportunity to look at them and consider the need for action in other disciplines for those disciplines under his direct auspices on the project. And it's very possible that, for example, if the preventative training was the preventative action, he would have more people than just his electrical people

attend that training.

Q Is the project engineer in the QA department at Stone & Webster?

A (WITNESS EIFERT) No. Project engineer is the senior individual from the engineering department responsible for engineering.

Q Well, the QA department also would make a decision that, because of the nature of the problem, the corrective or the preventive action should cover multi-disciplines, correct? It wouldn't have to go to the project engineer for that decision?

MR. ELLIS: May I have an understanding of what is meant by multi-discipline? There are other divisions that are audited here, and if they have those findings in that area then they would be covered here specifically. And I think we need to know what he means by multi-discipline.

JUDGE BRENNER: I think I know what he means, because it is a follow-up to some matters that were discussed this morning with Mr. Eifert. It means a discipline other than the particular discipline labeled in the audit report. I don't know whether that's a division or a unit or a branch, but the audit reports are categorized. For example, it will be electrical calculation; another one will be building service design

calculations, and so on.

Is that what you meant, Mr. Lanpher?

MR. LANPHER: Yes, sir. It was in the nature of a follow-up on, I think it was, the Board's questions earlier today.

MR. ELLIS: That is helpful.

BY MR. LANPHER: (Resuming)

Q My question was whether also the QA department can make that determination.

A (WITNESS MUSELER) Mr. Lanpher, the project engineer, correctly stated, is not a member of the quality assurance department. However, both in the Stone & Webster and the LILCO organizations, in this case the Stone & Webster organization, the project engineer is the individual who is responsible for the design of the plant.

He therefore is responsible for taking any action that is required in order to ensure the quality of the plant. Your question I believe was going to the particular audit observation was leveled against the electrical engineering department. And again, I think to a similar question asked this morning, didn't that have implications across the board.

And let me make the point that the audit reports that we are talking about are sent to the

project engineer for action. The individual audit findings go to the people who were audited, but the audit report and the responsibility for replying to that report goes to the project engineer. So he is fully cognizant of both the audit findings and the responses to those audit findings.

So if a particular audit finding did have applicability across all of the engineering disciplines that he is responsible for, he would do something about that. And I will cite again audit number 4, because it is an analagous situation with a different discipline, where the particular audit findings went to specific disciplines, engineering safeguards and mechanical.

The engineering assurance audit observations, which were not formalized the way they are in the audits we're looking at now, did not call for any across the board action. They called for -- they pointed out the problems in these particular areas, and the project engineer took the action to implement a change in the general project procedures based on audit observations in only two discipline areas.

He might also have to inaugurate additional training, if that were required. The point I am trying to make is that that is the project engineer's responsibility. He is responsible for evaluating these

audit findings and taking action if in fact an audit finding might have applicability in the other disciplines.

I can't comment on how this particular audit finding tracked out to the end, but that is not something that is done in a vacuum and there is someone who was responsible for ensuring that if it does apply to more than one discipline that in fact a problem is looked at in the other disciplines.

Q Mr. Eifert, let me go back to you because that did not answer my question. My question was whether, in addition to the project engineer, whether the Stone & Webster QA department can make the determination to apply corrective/preventive action across multi-disciplines?

A (WITNESS EIFERT) Mr. Lanpher, we are discussing engineering assurance audits here and engineering assurance is not in the quality assurance department.

Q Let me change my question to engineering assurance. Can you make that determination?

A (WITNESS EIFERT) Yes, we can. We are not restricted to operate this way. If the auditor judged during conduct of the audit that the apparent cause of a condition was not restricted to a specific discipline,

in most cases of that nature we would ask for action in more than the specific discipline that was identified.

For example -- I can't think of a specific example, but if a cause was a misinterpretation of a project procedure and the project procedure applied to other than one discipline activity, although we only audited one discipline's activities, we would probably ask that the project review other work to see if the other disciplines had the apparent same concern.

Q Gentlemen, I'd like to turn your attention to observation 007. It is the last observation in this audit, next to the last page. The third observation noted therein -- and this relates to hydraulic calculations -- it states that some of the calculations do not positively identify the sources of input data.

Do you have any reason to doubt that observation?

A (WITNESS EIFERT) No, sir.

Q Would you agree that this is very similar to observation 002 that we were just talking about?

(Panel of witnesses conferring.)

A (WITNESS EIFERT) As written, the audit observations are very similar. To totally evaluate the similarity of the concern, I would need to go back to the supporting documentation with respect to the

follow-up with respect to these, to compare, for example, such things as extent and cause of the concern for each of the disciplines.

MR. LANPHER: Judge Brenner, this is a convenienit time for me to stop.

JUDGE BRENNER: All right. As far as the witnesses are concerned, you can leave now, you can stay if you want. We've got about five minutes of mundane scheduling matters to talk about. So I won't feel as if you are interrupting if you wander out as we're talking here.

(Witnesses excused.)

JUDGE BRENNER: This is in the interest of attempting to give you as much information as possible into schedule locations, and it is a follow-up to my not wanting to say we will be in Bethesda only for October. As you know, we will be in hearing next week and then we are going to be in recess for two weeks, and then we will be resuming on Tuesday, October 12. And we will be in Bethesda at least through October.

It's clear to me, and I presume to everyone else here, that this hearing is going to continue into November, and we can have our own speculation as to which issues we will be up to then. But there are a sufficient number of issues left that we will be in

hearing in November. I have in mind the inadequate core cooling, perhaps the other previously deferred safety issues, on-site emergency planning. I don't know the extent of that and I will have more insight into it when I hear from the parties next week.

There are two federal -- well, two holidays that occur, one each in the first two weeks in November, that affect where we will be. The Board would have been willing to return to Riverhead the first week in November. However, we cannot use that hearing room during election day.

In light of that, we will stay in Bethesda the first week in November also if we are in hearing. And as I say, it is my expectation that we will be. We have a lot to do, so we are not planning another break certainly before the week approaching the end of November after this next break, subject to the caveat that we may have to be in hearing on another proceeding for one of those weeks. That would be the only reason that we would break between the week of October 12th through the third week in November at least.

As far as the second week in November is concerned, we cannot have the Riverhead hearing room on Veterans Day, November 11th. Veterans Day is a federal legal holiday. I want to put you on notice that we may

well be in hearing on that day, unless there is a particular objection, which I will entertain.

Where we will be I don't know. We may not be able to work things out. We may have to adjust our schedule that week to be in hearing the first three days, in which case we would go on a Monday. But if possible, we will try to work it out so that we can be in hearing that week on our normal Tuesday through Friday schedule. It may require staying in Bethesda for that week also for that reason, although I don't even know yet if I can have our own NRC hearing room that week.

If we have been in Bethesda all that time and there's only the third week in November left before a possible break, we will discuss as we approach it the location. So I just wanted you to understand that our choice of locations as we get beyond October has to do more with where we can be as the holidays fall, rather than any predilection on the part of the Board as to where we are.

And I say this because I heard Mr. Lanpher yesterday talk about his preference for certain issues being litigated here. You mentioned emergency planning on-site in particular. We are certainly very willing to accede to that, but to the extent it is possible given

the schedule.

Okay, that's all I have and I guess we can resume at 9:00 tomorrow. We will run not quite until 2:30 tomorrow. We will try to stop at around 2:15 or so.

(Whereupon, at 5:05 p.m., the hearing in the above-entitled matter was recessed, to reconvene at 9:00 a.m. on Friday, September 17, 1982.)

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NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

ATOMIC SAFETY AND LICENSING BOARD

In the matter of: LONG ISLAND LIGHTING COMPANY (Shoreham Nuclear Power Station)

Date of Proceeding: September 16, 1982

Docket Number: 50-322-OL

Place of Proceeding: Hauppauge, New York

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Susan A. Harris

Official Reporter (Typed)

Susan A Harris

(SIGNATURE OF REPORTER)