

ORIGINAL

OFFICIAL TRANSCRIPT PROCEEDINGS BEFORE

NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

DKT/CASE NO. 50-322-OL

TITLE LONG ISLAND LIGHTING COMPANY
(Shoreham Nuclear Power Station)

PLACE Bethesda, Maryland

DATE December 9, 1982

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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: In the Matter of: :
: LONG ISLAND LIGHTING COMPANY : Docket No. 50-322-OL
: (Shoreham Nuclear Power Station) :
: :
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Bethesda, Maryland
Thursday, December 9, 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

1 APPEARANCES:

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C O N T E N T S

<u>WITNESS:</u>	<u>DIRECT</u>	<u>CROSS</u>	<u>REDIRECT</u>	<u>RECROSS</u>	<u>BOARD</u>
Richard B. Hubbard (Resumed)					
By Mr. Ellis		15,830			
By Judge Morris					15,918
By Judge Carpenter					15,920
By Mr. Bordenick		15,928			
Richard B. Hubbard (Resumed)					
By Mr. Lanpher			15,943		
By Mr. Ellis				15,988	

E X H I B I T S

<u>NUMBER</u>	<u>IDENTIFIED</u>	<u>RECEIVED</u>	<u>BOUND IN TRANSCRIPT</u>
LILCO 51	15,906		15,906

RECESSES:

Morning - 15,883
Noon - 15,940
Afternoon - 15,984

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(9:00 a.m.)

JUDGE BRENNER: Good morning. We have no preliminary matters. Do any of the parties have any?

(No response.)

All right, we are prepared to continue the examination.

Whereupon,

RICHARD B. HUBBARD,

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

CROSS EXAMINATION -- Resumed

BY MR. ELLIS:

Q Mr. Hubbard, when we recessed yesterday, one of the last things I asked you about concerned LILCO Exhibit 50, and I had asked you to help us by finding where, within the GAO -- or, not GAO. Yes, it is the GAO -- the GAO study, the statement on the cover, the summary or precis on the cover appears. In our brief review of it yesterday we weren't able to find it. What page is that on, please?

A (WITNESS HUBBARD) The words that are on the cover are not written exactly this way in the body of the report. However, the findings on the cover are

1 quite consistent with the body of the report. The top
2 paragraph, for example, is consistent with the
3 information on page 10 of the report.

4 The first item on improving inspection and
5 reporting practices -- an example of where that is
6 discussed is at page 12. The use of the inspector's
7 time and talents more effectively is generally described
8 around page 17. The need to better document inspection
9 findings is described at page 16.

10 So while the exact paragraph as shown in the
11 quotation that I used is not contained in the body of
12 the report, it does provide an accurate synopsis of the
13 report.

14 (Counsel for LILCO conferring.)

15 Q I take it you do not know whether that precis
16 was prepared by those who prepared the report or not?

17 A (WITNESS HUBBARD) I do not know, and I don't
18 think it is important. The statement is totally
19 consistent with what is in the body of the report. In
20 fact, the body of the report I think reads a little more
21 harder-hitting than this summary.

22 Q Mr. Hubbard, turn to page 60 of your prefiled
23 testimony, and there you quote from a transcript of a
24 discussion of quality assurance and quality control at
25 the NRC, and in particular, you quote from the

1 transcript at page 32 of that matter a statement by Mr.
2 Stello. Do you see that under paragraph (b)?

3 A (WITNESS HUBBARD) That statement was made by
4 Mr. DeYoung about Mr. Stello.

5 Q I see, that's right. Thank you. Now, that's
6 not all Mr. DeYoung said, is it, at that point in the
7 transcript?

8 A (WITNESS HUBBARD) I don't have that transcript
9 with me.

10 Q Let me furnish it to you.

11 (Counsel handing document to witness.)

12 You are in general agreement, aren't you, with
13 Mr. Stello's remarks?

14 MR. LANPHER: Do you mean Mr. DeYoung's?

15 MR. ELLIS: Mr. DeYoung's. Thank you. I'm
16 sorry.

17 WITNESS HUBBARD: I am in general agreement
18 with the part of Mr. DeYoung's remarks that I cited.

19 BY MR. ELLIS (Resuming):

20 Q I see. Well, would you read aloud please on
21 page 32 of the transcript the portion of Mr. DeYoung's
22 statement that immediately follows where you ceased
23 quoting on page 60 of your prefiled testimony?

24 A (WITNESS HUBBARD) "We are doing a fairly good
25 job on construction. We catch it before the plant goes

1 into operation. But it is that cap of the
2 implementation of the design that we have had several
3 problems. Problems do occur in fabrication and
4 construction, but eventually they are picked up in one
5 way or another generally."

6 Q Now, you agree with that as well?

7 A (WITNESS HUBBARD) In part I agree with it. I
8 think the I&E program has concentrated more on
9 construction than design, and that's the point I was
10 making.

11 I think the evidence would show, though, that
12 while they have caught some problems in construction,
13 that still, in my opinion, has not been an adequate
14 review of construction activities.

15 Q So you think that while I&E has done something
16 on design, it has not concentrated enough on design? Is
17 that your testimony?

18 A (WITNESS HUBBARD) My testimony is that the I&E
19 program has concentrated more on construction activities
20 than design activities in terms of implementation. And
21 I agree with Mr. DeYoung that there appears to be a gap
22 in the review of the implementation and design.

23 Q But you chose to not to say the rest of what
24 Mr. DeYoung indicated; that they were doing a fairly
25 good job on construction.

1 A (WITNESS HUBBARD) His opinion was that they
2 were doing a fairly good job and that they generally
3 catch things in one way or another. I also don't agree
4 with him that they catch the problems necessarily in
5 fabrication that have to do with the Region 4 inspection
6 of manufacturers.

7 So in terms of Mr. DeYoung's remarks, I think
8 there is a gap in design. I think fabrication is not
9 looked at in a great deal of detail by the NRC. And
10 that construction is looked at in more detail for an
11 order of magnitude, but still, problems do come through.

12 Q So you elected to quote just the portions you
13 agree with?

14 A (WITNESS HUBBARD) That is correct.

15 Q Mr. Hubbard, it is true, isn't it, that the
16 NRC has reviewed the topical reports for Stone & Webster
17 and GE relating to the quality assurance programs of
18 those two organizations, including the design aspects of
19 quality assurance and quality control?

20 A (WITNESS HUBBARD) Yes, they have. The NRC
21 has, Mr. Ellis, but that misses the point. The point
22 that Mr. DeYoung is making is not that there is a
23 program; it has to do with how the program is being
24 implemented. That is really the whole subject of this
25 particular section of my testimony, as you can see by

1 the title. It is Staff Review of Design Activities. I
2 am not talking about construction or fabrication here;
3 I'm talking about design.

4 Q All right. Let's turn to that. Do you know
5 what the licensee vendor -- the licensee
6 contractor/vendor inspection program is?

7 A (WITNESS HUBBARD) Yes, I'm familiar with that.

8 Q Isn't it true that that involves the review by
9 NRC staff of the design control process and its
10 implementation?

11 A (WITNESS HUBBARD) Not as I would see it, Mr.
12 Ellis. The vendor inspection program might come to, oh,
13 for example, Stone & Webster four times a year for maybe
14 three to four days. And my experience while at GE
15 during those reviews was that they primarily looked at
16 procedures to see if we had procedures at GE. When they
17 would come four times a year, one time they might look
18 at design and another time procurement, another time
19 manufacturing. So that this was not a detailed review
20 of implementation; it was more a review of did we have
21 procedures.

22 Q Do you know when the LCVIP program was
23 initiated?

24 A (WITNESS HUBBARD) I recall it being initiated
25 around 1974, in July. The first company audited was GE,

1 and I can recall having the kick-off meetings with Mr.
2 Reinmuth of the NRC. And then they were back in 75.

3 Q You left GE in 75, didn't you?

4 A (WITNESS HUBBARD) No, I left in 76, Mr. Ellis.

5 Q I'm sorry. When in 76?

6 A (WITNESS HUBBARD) February of 76.

7 Q All right. And you've not been involved in
8 any LCVIP inspections since 76, have you?

9 A (WITNESS HUBBARD) No, I have not. However, I
10 have reviewed, for example, the GAO report that we were
11 discussing earlier. It has a long section about the
12 licensee/vendor reports. And I have also, for example,
13 looked at the Stone & Webster I&E reports from Region 4,
14 and it shows a consistent pattern of visiting, about
15 four times a year. And in the write-ups where it says
16 what was looked at, there was the same pattern I saw in
17 74 and 75.

18 Q So your testimony is that while there is staff
19 review of the design control process through the LCVIP
20 program, you're just saying that that is not enough;
21 that four times a year is not enough; they ought to do
22 it more often.

23 A (WITNESS HUBBARD) That is correct. I think
24 Mr. DeYoung, again, says it in quote (c) where he says,
25 We spent little time looking at implementation and

1 design criteria basis to get to the drawings, and that
2 is where the gap is. And that is my view, also. The
3 same thing is said by Mr. Denton in quote (a). "One of
4 the areas we never inspected very heavily was at the
5 architect engineer's design office." He does
6 acknowledge they've done lots of inspection over the
7 years of the quality of construction, but they always
8 assumed that the blueprints were correct.

9 (Counsel for LILCO conferring.)

10 Q So your testimony, then, as I understand it,
11 goes to the review of activities, the vendor's inhouse
12 activities, that translate the design from the design
13 criteria to the drawings.

14 A (WITNESS HUBBARD) That is correct, Mr. Ellis.

15 Q And you didn't intend for any of your
16 testimony, then, to imply that NRR or the staff does not
17 adequately review many features in the design of the
18 plant?

19 MR. LANPHER: Could I have that question read
20 back, please?

21 (The reporter read the record as requested.)

22 WITNESS HUBBARD: Mr. Ellis, I believe the
23 staff does review the criteria for the design -- what's
24 set forth in the FSAR, and I will call that the design
25 criteria or commitments. The part that I'm addressing

1 is starting at page 60 of my testimony and has to do
2 with the implementation of those criteria into design
3 documents.

4 And this is where I feel there is a gap in the
5 NRC's program. And I'm doing this from a quality
6 assurance standpoint. Quality assurance covers have the
7 criteria been implemented properly. That is a quality
8 assurance problem, and that is really what my testimony
9 is directed to.

10 BY MR. ELLIS (Resuming):

11 Q You also, I take it, agree, Mr. Hubbard, that
12 the NRR also reviews the design methodology and how the
13 design is developed?

14 A (WITNESS HUBBARD) Mr. Ellis, I don't
15 understand what you mean by design methodology and how
16 it is developed, so I can't agree with that.

17 (Counsel for Suffolk County conferring.)

18 Q Well, Mr. Hubbard, it's true, isn't it, that
19 the NRR looks at a great deal of the calculations and
20 criteria used to develop the final design?

21 A (WITNESS HUBBARD) No, I don't think that is
22 true. And in any case, that is really not what my
23 testimony is about. My testimony has to do with how the
24 criteria are implemented.

25 Q Well, let me see if I understand. You have

1 agreed with me that they review the program, isn't that
2 right?

3 A (WITNESS HUBBARD) When you say the program, I
4 will interpret that as meaning the design criteria that
5 are set forth in the FSAR and PSAR. I agree that they
6 review that. But that is not what my testimony is about.

7 I am, for the sake of this testimony, assuming
8 that those criteria are accurate and reasonable. So I'm
9 looking at the QA process, assuming that is true.

10 Q All right. You also indicated, I believe,
11 that they review the design control program and the
12 topical reports; isn't that right?

13 A (WITNESS HUBBARD) Yes, they do. And that is
14 done by the QA Branch.

15 Q And you've indicated that they audit that
16 program, but your view, as I understand it, is that the
17 audits are not -- they are not as frequent as they
18 should be.

19 A (WITNESS HUBBARD) Yes. Part of the problem is
20 frequency, and another part of the problem is that they
21 primarily look at documentation and procedures rather
22 than the actual calculations and implementation.

23 JUDGE BRENNER: This is starting to get a
24 little reptitious; not in terms of the precise question
25 and the precise answer, but in the sense of the same

1 information.

2 MR. ELLIS: Yes, sir. I'm just trying to get
3 an understanding myself because I may take a concrete
4 example. But I think we are working to something that
5 will help me understand it.

6 JUDGE BRENNER: Let's go.

7 BY MR. ELLIS (Resuing):

8 Q It is true also, isn't it, Mr. Hubbard, that
9 the NRC reviews -- strike that.

10 (Counsel for LILCO conferring.)

11 Let's take perhaps an example of calculations,
12 Mr. Hubbard. It is true, isn't it, that the NRC in some
13 instances requests -- or not only reviews -- well,
14 strike that.

15 It is true, isn't it, apart from reviewing the
16 program for how calculations are handled and the audits
17 three or four times a year, that they also, in certain
18 instances, ask for details including assumptions and
19 equations for various subjects?

20 A (WITNESS HUBBARD) That is correct, and that is
21 really what Mr. Volmer says in footnote (d). And also,
22 --

23 JUDGE BRENNER: That is footnote 57 of your
24 testimony.

25 WITNESS HUBBARD: Footnote 57, item (d) on

1 page 61. Thank you, Judge Brenner.

2 BY MR. ELLIS (Resuming):

3 Q So again, this is a case where they do this
4 activity, but in your opinion,, they do not do enough of
5 it. Is that correct?

6 A (WITNESS HUBBARD) That is correct. My opinion
7 is they don't do enough of it, and I think that was also
8 Mr. Volmer's and Mr. Denton's opinion.

9 Q Now, that is a general opinion. Have you
10 reviewed specifically with respect to Shoreham how much
11 of that particular activity has been done with respect to
12 Shoreham?

13 A (WITNESS HUBBARD) No, I have not. In the
14 general sense that some of the design was done by
15 General Electric and there were various types of reviews
16 at General Electric that have gone on, some of it by
17 Stone & Webster and then part of it through the LILCO
18 chain. So that is not nicely summarized in one place.

19 JUDGE BRENNER: Incidentally, Mr. Hubbard, as
20 long as you drew attention to section (d) of your
21 footnote 57, I do not have that page 34 from the
22 original transcript, but I feel confident that the first
23 word of the fifth sentence should probably be "Piping."

24 WITNESS HUBBARD: I do, too.

25 MR. LANPHER: Judge Brenner, I think we

1 corrected that in the errata.

2 MR. ELLIS: Yes, we did. Yes, that was
3 corrected.

4 BY MR. ELLIS (Resuming):

5 Q You are not familiar, are you, with the
6 question and answer in the FSAR relating to detail
7 including all assumptions and equations for
8 determination of break flow rates?

9 A (WITNESS HUBBARD) No, I am not.

10 Q Or the one that is related to mathematical
11 model for analysis of containment liner and its
12 anchorage system?

13 A (WITNESS HUBBARD) No, but I am familiar with
14 the MARK II containment problems where that review has
15 been going on since 1975. There are numerous documents
16 that have been transferred back and forth between GE and
17 the Commission on the MARK II containment.

18 Q So that is another example, that MARK II
19 containment review is another example of NRC review of
20 the design process and its implementation, isn't it?

21 A (WITNESS HUBBARD) It is. But again, you have
22 to look at the concept. It was an after-the-fact sort
23 of review of the problem, and a number of MARK I
24 containments had been built, and a number of them were
25 in operation before the problems even surfaced. So it

1 is more looking at the problem after it had been
2 identified. And again, the focus of the staff's review
3 has been on the criteria for the MARK II loads; not the
4 detailed implementation and all of the design documents.

5 (Counsel for LILCO conferring.)

6 Q Well, Mr. Hubbard, is it your testimony that
7 the NRC, with respect to the MARK II load review, has
8 not looked at the methodologies, test programs, computer
9 codes and calculations actually used in any of the
10 instances?

11 A (WITNESS HUBBARD) I am sure, Mr. Ellis, they
12 have looked at it in some instances. I also accompanied
13 the NRC when they went to Diablo Canyon in 1978 to look
14 at the PG&E seismic calculations, and they spent a week
15 there looking at some of them. A couple of weeks,
16 actually. But in hindsight, it turned out that there
17 were a lot more problems with implementation than came
18 out of that rather brief look.

19 Q Mr. Hubbard, before we leave this area of GAO,
20 and given that you have mentioned the Diablo thing, I
21 would like for you to confirm for me, please, the
22 information that you have given to us relating to
23 sections of your testimony that came from other sources.

24 Just confirm for me, please, that section
25 III.A, portions of Section III.A and III.B are from the

1 Diablo Canyon affidavit, Section V.B.1 and V.B.2.
2 Portions of those came from the Diablo Canyon affidavit,
3 Minnesota study, MHB study. Oh, MHB Sandia study, I'm
4 sorry. That those sections appeared, as I think you've
5 advised us, in all of those reports and others.

6 Section VI.B is testimony --

7 JUDGE BRENNER: Mr. Ellis, it's getting very
8 complicated. Is it possible to break it up and get
9 answers as to subparts? You're just asking him if
10 portions, so for all I know, it is a word or two or 90
11 percent of a section or 10 percent of a section in your
12 question.

13 MR. ELLIS: All right. I will break it up.

14 JUDGE BRENNER: Why don't you ask him as to
15 each section, and then he can answer.

16 BY MR. ELLIS (Resuming):

17 Q Mr. Hubbard, let's go back to Section III.A
18 and III.B. That came from, as you've advised us, from
19 the Diablo Canyon affidavit. Will you confirm that
20 substantial portions of Section III.A and III.B came
21 from the Diablo Canyon affidavit?

22 A (WITNESS HUBBARD) Yes. Sections III.A and
23 III.B. There is substantially similar information in
24 the Diablo Canyon affidavit that I filed on June 11th.
25 I was doing these two tasks concurrently; the Diablo

1 affidavit and the preparation of this testimony.

2 JUDGE BRENNER: That was your own affidavit,
3 right?

4 WITNESS HUBBARD: Yes. My own, filed on June
5 11th.

6 BY MR. ELLIS (Resuming):

7 Q All of the material that you told us that it
8 came from was material that you did; is that correct?

9 A (WITNESS HUBBARD) That is correct. That is my
10 belief.

11 Q Okay. Section V.B.1 and V.B. 2. Confirm for
12 me, if you will, please, that substantial portions of
13 those were taken from --

14 (Counsel for LILCO conferring.)

15 -- the Diablo Canyon affidavit, the Minnesota
16 study, the MHB study and others. Is that correct?

17 A (WITNESS HUBBARD) Where you say MHB study I
18 assume you mean the DOE report.

19 Q Yes, sir.

20 A (WITNESS HUBBARD) V.B.1, the Sania study, I
21 think that is mentioned in the Diablo affidavit and the
22 Minnesota study and the DOE study, though I don't recall
23 the GAO study. V.B.2, the introductory part including
24 the quote, I believe that was in the Diablo affidavit.
25 Diablo was also one of the plants looked at by GAO in

1 the six plants.

2 Q Well, I understood that substantial portions
3 of V.B.1 and B.2 were verbatim in the Diablo Canyon
4 affidavit, the Minnesota study and the MHB Sandia study
5 and, perhaps, others. Is that correct?

6 A (WITNESS HUBBARD) That may be correct, yes.

7 Q And VI.B, substantial portions of that were
8 verbatim from the South Texas testimony that was
9 prepared by you as well; is that correct?

10 A (WITNESS HUBBARD) On VI.B it would be the part
11 in VI.B.1, as I recall. That some of the paragraphs are
12 similar to those that are in South Texas.

13 Q Well, -- on VI.B.1, page 69, you state that in
14 your experience, special process is defined in a certain
15 way. Did that experience include reviewing any
16 testimony in the Black Fox proceeding, and taking that
17 from testimony in the Black Fox proceeding?

18 A (WITNESS HUBBARD) I recall having discussions
19 on that with Mr. Long at the Black Fox proceeding. This
20 also -- I am on the National Standards Committee that
21 wrote the IEEE standard on electrical equipment, and
22 items B and C are consistent with the definitions that I
23 developed for that standard. I wrote that part of it.
24 I recall something like this being discussed at the
25 Black Fox proceeding, but B and C of that are close to

1 the words that are in IEEE standard, I believe, 498,
2 that I am one of the authors of.

3 Q Well, isn't it true that that definition of
4 special process is verbatim what Mr. Long said in his
5 testimony in Black Fox, with the exception of everywhere
6 it says "safety functional" in your testimony, it says
7 "safety-related" in Mr. Long's testimony?

8 A (WITNESS HUBBARD) I don't know that to be a
9 fact, and I don't think Mr. Long had anything in about
10 particularly the long-term operation. But if you would
11 like me to look at what Mr. Long said, I would be glad
12 to look at it.

13 Q I see. So you do remember enough of Mr.
14 Long's then to know that particularly the long-term
15 operation is not in his, and you also remember that you
16 changed the safety related to just safety?

17 MR. LANPHER: Judge Brenner, if they have
18 something they want to show Mr. Hubbard, I think they
19 ought to just show him. Whatever Mr. Long's testimony
20 says, it says. To have Mr. Hubbard try to guess or
21 remember what Mr. Long said at some other time really is
22 not a very productive way to go after this.

23 JUDGE BRENNER: It is okay for them to ask him
24 preliminarily, but I think we're at the point where if
25 you're going to inquire into this to this extent, show

1 it to him.

2 Incidentally, I don't know if I care. Who is
3 Mr. Long?

4 MR. ELLIS: Mr. Long is right there. He was a
5 witness.

6 JUDGE BRENNER: Nothing personal, Mr. Long,
7 but in terms of materiality and what we're doing here.

8 MR. ELLIS: I don't propose to mark it. I
9 will just show the witness and get him to confirm what I
10 have been asking.

11 (Counsel handing document to witness.)

12 MR. LANPHER: Can you tell me what you are
13 showing him?

14 MR. ELLIS: Yes. I will give you a copy.

15 (Counsel handing document to counsel.)

16 MR. LANPHER: Thank you.

17 JUDGE BRENNER: Okay, why don't you ask him
18 again.

19 BY MR. ELLIS (Resuming):

20 Q Mr. Hubbard, the testimony that appears on
21 page 69 of your testimony indicating the definition of
22 "special process" is the same as that that appears in
23 Mr. Long's Black Fox testimony at page 2, with the
24 exception of the parenthetical at the end of the third
25 paragraph indicating particularly the long-term

1 operation in parens. And then where you have "safety"
2 Mr. Long has "safety-related," isn't that right?

3 A (WITNESS HUBBARD) Yes, that is correct. And
4 it is also consistent with the definition in IEEE
5 standard 467, 1980 that I am one of the authors of.

6 So when Mr. Long says that GE has concluded
7 that the process is special if it meets the following
8 criteria, I was part of the people at GE at the time
9 that decided what the definition of a special process
10 should be.

11 (Counsel for LILCO conferring.)

12 Q Mr. Hubbard, are you aware that the LILCO --
13 and I'm moving on to another subject, Judge Brenner.
14 Are you aware that the LILCO OQA Section has been doing
15 surveillances?

16 (Counsel for LILCO conferring.)

17 Let me strike that and start again.

18 Are you aware that the LILCO QA Department has
19 done surveillance of welding, cleanliness, storage, weld
20 material control, electrical cable terminations,
21 electrical cable installation, ASME pressure testing,
22 training procedures and performance qualifications?

23 A (WITNESS HUBBARD) I am generally aware of
24 that. The QA Department has conducted surveillances and
25 all of the items in your list I am not aware of. I

1 would have to go back and look at the surveillance
2 reports, but I do remember in the welding area and the
3 cleanliness area.

4 So I cannot agree with your total list because
5 I don't have total recall of the surveillance reports I
6 looked at. But some of the items on the list I do
7 recall, and yes, surveillance work was done for those.

8 (Counsel for LILCO conferring.)

9 Q And are you aware that the LILCO QA Department
10 has also done inspection and surveillance of
11 pre-operational testing which is conducted during
12 construction?

13 JUDGE MORRIS: Mr. Ellis, just to avoid
14 potential confusion, are we talking about the OQA
15 Section at the plant or the LILCO QA Department?

16 MR. ELLIS: Thank you, Judge Morris, I
17 appreciate that.

18 BY MR. ELLIS (Resuming):

19 Q The first question, Mr. Hubbard, you
20 understood me to mean the QA Department, didn't you?

21 A (WITNESS HUBBARD) Yes, the QA Department and
22 not the OQA Section.

23 Q And in the second question where I'm asking
24 you are you aware of inspection or surveillance and
25 pre-operational testing done during construction; that

1 is done by the OQA Section, isn't it?

2 A (WITNESS HUBBARD) I am aware there is a
3 commitment to do that. I haven't seen the results of
4 those audits or surveillances.

5 Q So you really don't have the knowledge that
6 would permit you to tell us in detail what the
7 activities of the surveillance activities of the QA
8 Department during construction or the inspection and
9 surveillance activities of the OQA Department or Section
10 have been during construction? Isn't that right?

11 A (WITNESS HUBBARD) No. We went through, during
12 when the LILCO witnesses were on the stand, some of the
13 LILCO QA Department audits, and I am familiar with
14 those. We also went through some of the surveillances.
15 Obviously, I had limited documentation of some of the
16 other OQA activities, but we have pretty well addressed
17 the ones that LILCO has provided during discovery.

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1 Q Well, you indicated that you could not tell me
2 the extent or range of the subject matter covered by the
3 QA Department surveillance activities. Wouldn't you
4 need to know that information in order to make some
5 judgment about the role of the QA Department during
6 construction?

7 A (WITNESS HUBBARD) No. I think I know the
8 role of the QA Department during construction by
9 reviewing the QA Manual and what is in the FSAR and PSAR.
10 (Counsel for LILCO conferred.)

11 Q Mr. Hubbard, have you made a comparison of the
12 section in the FSAR relating to special processes, the
13 QA section 17.2.9 in the Shoreham FSAR, with other FSARs
14 for other operating nuclear power plants?

15 A (WITNESS HUBBARD) No, I have not. I compared
16 it to what I thought should be there to describe whether
17 and how the program was going to be implemented.

18 Q Well, you are aware then, aren't you, that it
19 is the NRC Staff's normal practice to approve of an FSAR
20 section dealing with OQA at the level of detail that
21 appears in the Shoreham FSAR?

22 A (WITNESS HUBBARD) They may have aproved some
23 at that level of detail, but that to me my comments are
24 still accurate and applicable, that that doesn't really
25 describe how special processes are going to be

1 controlled.

2 Q And you also have not reviewed QA Manuals or
3 topical reports for operating nuclear power plants to
4 determine whether the level of detail there is
5 consistent with that in the LILCO QA Manual, have
6 you, Mr. Hubbard?

7 A (WITNESS HUBBARD) Mr. Ellis, let me make sure
8 I understood the question. You are saying, reviewing
9 topical reports versus what is in the LILCO QA Manual?
10 We are not talking about the FSAR now?

11 Q Let me rephrase the question. You have not
12 reviewed, have you, quality assurance manuals or topical
13 quality assurance reports for operating nuclear power
14 plants to determine whether the level of detail in the
15 Shoreham QA Manual is consistent with those for
16 operating nuclear power plants?

17 A (WITNESS HUBBARD) No, I have not. However, I
18 have reviewed, for example, the GE topical report on
19 quality assurance, and that provides more details in
20 some areas than that that is provided in either the FSAR
21 -- well, than that provided in the FSAR.

22 Q Well, Mr. Hubbard, since you have not reviewed
23 other FSARs for operating nuclear power plants to
24 determine, or to compare them to the Shoreham FSAR
25 sections on OQA for level of detail, and the same is

1 true for manuals, isn't it fair to say that you would
2 have no basis for any opinion on what the normal NRC
3 Staff practices are with respect to the description of
4 the programs in the FSARs and the manuals?

5 A (WITNESS HUBBARD) When I was using "normal
6 Staff practices" in my testimony, it was based on what I
7 read in the Standard Review Plan, and I don't feel that
8 the NRC has actually achieved what is set forth in the
9 Standard Review Plan.

10 Q But what you said on page 70 of your testimony
11 at the bottom, you said normal NRC -- that LILCO's
12 cursory recitation of the 18 criteria of Appendix B
13 fails to comply with either the intent of the
14 regulations or with the normal NRC Staff practices.
15 What you are now saying is that it fails to comply with
16 either the intent of the regulations or with the
17 Standard Review Plan as you interpret it. Isn't that
18 what you are really saying, Mr. Hubbard?

19 A (WITNESS HUBBARD) Yes. And that is
20 consistent with the information up in the top part of
21 that paragraph where I quote that the regulations say
22 how. And then the Reg Guide 1.70, which describes how
23 an FSAR is to be written, talks about sufficient detail
24 about whether and how. There is also information in the
25 Standard Review Plan that talks about that one should

1 look at how.

2 Q I understand your point. But you will agree
3 with me, won't you, that the term "normal NRC Staff
4 practices" on page 70 does not accurately reflect what
5 your view is today; namely, that your view of the
6 cursory recitation is that it doesn't comply with either
7 the intent of the regulations as you interpret them or
8 with the Standard Review Plan as you interpret it?

9 A (WITNESS HUBBARD) That is correct, Mr. Ellis.

10 Q Mr. Hubbard, you were the manager of Quality
11 Assurance Section of the Nuclear Energy Control and
12 Instrumentation Department at General Electric in 1975
13 and early 1976 until your departure. To whom did you
14 report in that instance?

15 A (WITNESS HUBBARD) I reported to the general
16 manager of the department.

17 Q And did you have sufficient independence to
18 accomplish your job as the manager of the Quality
19 Assurance Section?

20 A (WITNESS HUBBARD) I would say --

21 JUDGE MORRIS: Excuse me, Mr. Hubbard.

22 I do not understand that question.

23 Independence from what?

24 MR. ELLIS: Thank you, Judge Morris.

25 BY MR. ELLIS: (Resuming)

1 Q Did you have sufficient independence from
2 considerations on cost and schedule to accomplish your
3 job?

4 A (WITNESS HUBBARD) Not in all cases. I did
5 receive some pressure of cost and schedule. That was
6 one of the reasons that we had a reorganization. At one
7 time I reported to the manufacturing manager in the
8 period 1971 through, oh, I don't know, '74 or so. There
9 was a manufacturing manager, and I reported to him, and
10 the production manager did, and the materials manager.

11 And around 1974 it was changed, and all of the
12 other manufacturing activities, materials control, shop
13 operations, manufacturing, engineering, that reported
14 directly to the department manager as well as
15 engineering. So the engineering manager and I had the
16 same reporting level.

17 And in addition to that, we had a
18 division-level quality assurance operation. And I
19 reported also to this particular man. But I can't say I
20 was free from cost and schedule. That was a
21 consideration.

22 Q Mr. Hubbard, your answer covered a fairly
23 large time span. I want to focus. First of all, let's
24 get the facts down. I want to focus on the time that
25 you were manager of Quality Assurance Section of the

1 Nuclear Energy Control and Instrumentation Department.

2 Now, at that point in time it was after any
3 reorganization that you have just referred to?

4 A (WITNESS HUBBARD) That is correct.

5 Q And you at that point reported to the general
6 manager of the Department of Control and
7 Instrumentation, didn't you?

8 A (WITNESS HUBBARD) That is correct.

9 Q And there was also at that time at General
10 Electric a separate Quality Assurance Department, wasn't
11 there?

12 A (WITNESS HUBBARD) I don't recall if it was
13 called a department. There was a separate part of GE
14 that was a staff-level quality assurance.

15 Q And you didn't report to that one, did you?

16 A (WITNESS HUBBARD) I provided reports to them,
17 and they audited me. And we had the BWR quality
18 console. We had meetings. But in terms of who decided
19 what my pay was and who gave me a performance appraisal
20 each year, that was the general manager of the
21 Instrument Department.

22 Q All right, sir. And that was never changed as
23 a result of any organizational change while you were at
24 GE, was it?

25 A (WITNESS HUBBARD) No; other than the change

1 that was made prior to that. That put me at the same
2 level as the engineering manager.

3 Q And you would agree, wouldn't you, that the
4 general manager of the Department of Control and
5 Instrumentation certainly had some responsibilities for
6 cost and schedule?

7 A (WITNESS HUBBARD) Yes, he did, and so did I.

8 Q And you would also agree that the general
9 manager of the Control and Instrumentation Department
10 also had responsibilities relating to quality, didn't he?

11 A (WITNESS HUBBARD) Everybody has
12 responsibilities dealing with quality, yes.

13 Q Now, during that period, that appears to be
14 from May or June of '75 until February of '76. Is it
15 your testimony that you did not have sufficient
16 independence from cost and schedule considerations
17 adequately to perform your duties as the manager of
18 Quality Assurance Section at Nuclear Energy Control and
19 Instrumentation Department?

20 A (WITNESS HUBBARD) Yes.

21 Q Did you ever make that view or position known
22 to the General Electric Company in writing?

23 A (WITNESS HUBBARD) I may have. I don't
24 recall. I mean I can recall the pressures on cost and
25 schedule, that that as a quality manager I would be

1 there and people would come in and say, well, we've run
2 out of the right material and we've got this other
3 material you might want to accept. And then they would
4 say, but if you don't accept it, we have got to send 500
5 people home today.

6 So I definitely felt some pressures from cost
7 and schedule as the quality manager.

8 Q But even though you felt those pressures, did
9 you knuckle under to those pressures or did you manage
10 to perform your duties in a responsible and competent
11 fashion?

12 A (WITNESS HUBBARD) Well, I would say that I
13 did it in a competent fashion, but it was a learning
14 experience. I can recall the materials manager coming
15 to me and a lot of pressure to accept things to meet
16 monthly billing commitments in order to ship equipment.
17 And I remember early on struggling with that because as
18 Mr. Muller says, you do feel part of the team or
19 something like that.

20 And after agonizing about it, I said to the
21 man, no, we can't ship the equipment. And to my
22 surprise, he said, well, he said, I thought that's what
23 you would say, but I figured I had to ask you. And that
24 to me was a very powerful lesson that people felt they
25 had to ask. And so from then on, I didn't agonize as

1 much about saying, no, we can't do that. But there is
2 always that pressure to go ahead and ship.

3 (Counsel for LILCO conferred.)

4 Q Mr. Hubbard, you are aware, aren't you, that
5 there are other General Electric facilities in the
6 Nuclear Division where the quality assurance manager
7 reports to the department head who has overall cost and
8 schedule responsibilities, isn't that right?

9 A (WITNESS HUBBARD) That was true in 1976 when
10 I left General Electric. I don't know what it is
11 today. And, Mr. Ellis, I might add that that was a
12 matter that was always under discussion with the GE
13 quality counsel, of who we should be reporting to.

14 Q So it's a matter that is carefully thought out
15 by GE, isn't it?

16 A (WITNESS HUBBARD) One could say that there
17 was thought given to it. I wouldn't characterize it as
18 carefully thought out.

19 Q Do you know whether Westinghouse is organized
20 in the same way?

21 A (WITNESS HUBBARD) No, I don't.

22 Q Do you know how the fuel processing plant at
23 Wilmington for General Electric is organized with
24 respect to the reporting obligations of the quality
25 assurance manager?

1 A (WITNESS HUBBARD) I knew how it was.

2 MR. LANPHER: Judge Brenner, I object to
3 further pursuit of this line. I think when they were
4 talking about Mr. Hubbard's personal involvement, I
5 could see the relevance. I think we are getting outside
6 the bounds of relevance at this point.

7 JUDGE BRENNER: No, we are not outside the
8 bounds yet. We are approaching the borders yet. I will
9 allow the question.

10 WITNESS HUBBARD: The QA manager in 1976 had
11 the same reporting relationship I had. That is my
12 recollection. I don't know what it is today.

13 (Counsel for LILCO conferred.)

14 MR. ELLIS: Judge Brenner, I propose to go on
15 to another subject.

16 JUDGE BRENNER: Let me try something while
17 it's fresh in our minds, Mr. Hubbard, in terms of the
18 conflicts you had when you were in your position, and
19 conflict in the sense that you knew that one of the
20 results of your decisions could be that things wouldn't
21 be able to be done and the secondary results would be
22 that people's ability to work for X period of time might
23 be adversely affected and so on.

24 Isn't that the case no matter who a QA manager
25 reports to -- that is, no matter what reporting scheme

1 you set up as a knowledgeable individual in whatever
2 field of endeavor -- that the QA manager is involved in,
3 he has to know that the side effects of his decisions on
4 quality could be adverse to the interests of other
5 people?

6 So the conflict that you said you agonized
7 over, you or any other QA manager who diligently
8 approached his job or her job would also have those same
9 problems no matter what? There is no way to remove
10 that, isn't that correct?

11 WITNESS HUBBARD: I think that in some manner,
12 that is true. But it also gets into budgeting, that if
13 you start off and say there is so much money to be
14 budgeted and a department general manager has to decide
15 how many of his eggs he is going to put in quality, how
16 many in design and how many in -- for example,
17 production workers, my experience was that when the
18 budget crunch comes, there are basically two areas you
19 can reduce the budget. One is in the design end,
20 deferring development testing. We would do much like
21 your typical government agency or city council. We
22 would take all of our development programs and list them
23 in order of priority, and we would then either eliminate
24 them or we would stretch them out.

25 So that had to do with quality. So I would

1 say, very rationally, this is all we can afford. But
2 whether what we can afford was good enough is yet
3 another question.

4 A second area was quality assurance. They
5 would say to me, well, Dick, the noise level is
6 acceptable -- that was the word that was used. The
7 complaints or the noise level, it is acceptable, so
8 let's change your sampling frequency; let's go to a
9 little less and we will see if the noise level changes.

10 So when you are part of what I would call that
11 team and you are involved in the budgeting process,
12 somebody has to make a decision of how resources are
13 allocated. And I think if you were in a different
14 reporting chain, some of those budgetary decisions might
15 be looked at differently.

16 JUDGE BRENNER: As applied to the subject we
17 have all been interested in on the record here, the
18 operating QA organization at LILCO, and who their QA
19 engineer reports to, is it your impression that it is
20 the plant manager that has the ability to determine the
21 budget for Mr. Muller's group? In other words, I am
22 trying to see if these concerns that you have discussed
23 in terms of the context at GE would apply here.

24 WITNESS HUBBARD: Well, there is really a
25 couple of things. One is that if you are all reporting,

1 like to a plant manager, you have got to be an equal.

2 JUDGE BRENNER: I want you to answer my
3 question about the budget first.

4 WITNESS HUBBARD: Well, first of all, on the
5 budget, my impression is that the plant manager does
6 control that budget, not the QA Department Manager. And
7 secondly, you get into -- and it is a discussuion I had
8 with Judge Morris early on -- you get into a case that
9 there can be many people reporting to a manager, but in
10 terms of the real power within an organization, you have
11 to be equals. For the QA Manager to prevail, he has got
12 to be a strong individual.

13 And so that is something else I would assess,
14 and no matter what the organization chart says, how
15 strong is that individual. And you have to make a
16 judgment on is he going to be able to speak up and
17 prevail.

18 JUDGE BRENNER: That is beyond what I asked
19 you. But I thought about that a lot. And also, let me
20 tell you one problem -- you don't have to answer, and
21 you can think about it too -- if you get too
22 individualized in making assessments in terms of using
23 that individualized assessment to counter or to support
24 a view of the organization, you have a problem from the
25 point of view of the Board because that individual could

1 be here today and gone tomorrow. And we are trying to
2 assess something, the ability of a good program,
3 assuming -- and a normal range of competence on the part
4 of an individual.

5 Now, if there are indications on the record
6 that there is a distinct problem at the moment, that is
7 an easier situation to deal with from the point of view
8 of a board. But if you are going to say, well, it looks
9 okay only if you continue with the strong individual in
10 the future, then that is something that is a way for us
11 to take care of that.

12 I haven't solved that problem, and that is why
13 we are focusing on the organization and all of the
14 checks and balances and so on.

15 As long as we are on OQA, the organization
16 part of OQA, Mr. Muller, I believe, and other people
17 made the point that when you have an operating nuclear
18 plant as distinguished from a manufacturing operation or
19 construction of a nuclear plant and other endeavors in
20 life, it is very important to have everything plugged in
21 through that manager of the nuclear power plant because
22 that is the individual who needs to be there on the spot
23 to determine what changes can be permitted consistent
24 with safety.

25 And it was the testimony, or the spirit of the

1 testimony if not the expressed words, that it was in the
2 interest of safety that an operating QA organization be
3 very thoroughly coordinated and integrated with the
4 plant manager. And that is why, although they could set
5 up the organization the other way -- that is, having Mr.
6 Muller report to somebody other than the plant manager
7 -- it would not be desirable for that reason. What do
8 you think of that?

9 WITNESS HUBBARD: Well, I think that you can
10 have the same amount of coordination with either
11 reporting scheme, and so then it seems to me then you
12 have to look beyond that and to say, well, and do you
13 want some level of independence? And that would be
14 through the Gerecke chain and really to then look at Mr.
15 Gerecke's boss really to see how involved he is in
16 really the implementation of quality assurance. You
17 would to weight that.

18 Those are things, in my opinion, that are
19 central to this issue. I don't see any reason why you
20 couldn't have the same coordination with either
21 reporting scheme.

22 JUDGE BRENNER: Is it possible that, in
23 essence, either reporting scheme -- and I think we know
24 the general nature of the two we are talking about --
25 relates to the two main options that we asked Mr. Muller

1 about, that either scheme, even with different labels
2 and different semantics, could, in essence, be the same
3 program as applied?

4 That is, in the one case you're on the plant
5 manager's staff but you have the checks and balance of
6 the outside organization up to the vice presidential
7 level although not directly there; and in the other case
8 you have che reporting to the same people off site that
9 you have authority to go to now if there is a problem,
10 yet at the same time maintain very close coordination
11 although not reporting to the plant manager?

12 And what I am saying is, is it apparent that
13 if the right checks and balances are placed into both
14 organizations, even though they're semantics in the
15 organization chart looks a little different, you are
16 really implementing very similar ideas?

17 WITNESS HUBBARD: That was very long, and I
18 tried to listen, but I think it is more than semantics.
19 I think you can achieve with an organization where Mr.
20 Muller reported to Mr. Gerecke. There are advantages to
21 that in the budgeting process and in getting the right
22 type of personnel. And in also reporting to top
23 management, there are advantages in that scheme over the
24 one that LILCO has presently implemented. And I don't
25 think the disadvantages outweigh those advantages. I

1 think you can, as I said before, in a lot of the
2 coordination that can go on with either organization,
3 you can have actually the same QA procedure with either
4 organization, but you are really talking about the
5 perceived emphasis of the program and then I think some
6 better control on the budgeting and administration and
7 reporting.

8 JUDGE BRENNER: Aside from your concern with
9 budgeting, which I understand, as of this moment I don't
10 recall if we know on this record the extent of the
11 involvement of the plant manager in the budget, ultimate
12 involvement. Certainly, he is involved. But how about
13 with respect to the day-to-day decisions that Mr. Muller
14 has to make in terms of when to stop work or what to
15 approve and when to disapprove? Would there be a big
16 difference between those two different organizations if
17 the obvious checks and balances were put into both
18 organizations?

19 WITNESS HUBBARD: I think that the
20 organization with Mr. Muller reporting to the QA
21 Department has some advantage on freedom from cost and
22 schedule, that he would feel a little more totally
23 responsible for cost and schedule rather than how many
24 hours the plant operates a year. So there would be some
25 amount of additional freedom that would come his way by

1 reporting through the Gerecke chain.

2 JUDGE BRENNER: Okay. I think you have
3 answered the question. I guess we should say expressly
4 when you say the Gerecke chain, one reason you like that
5 is through Mr. Gerecke, the QA manager, that would be
6 the access up to the vice president of engineering?

7 WITNESS HUBBARD: Yes. I have tried to look
8 at the whole chain, and again I am looking at the vice
9 president, engineering, to the QA manager and then to
10 the operating QA, that whole line of how that is
11 operating and what the advantages could be of having
12 that operate in a strong fashion. And my experience
13 with the missile and space program, interviewing some of
14 them about how they did things, that sort of system
15 appeared to work.

16 JUDGE CARPENTER: I wonder if you could help
17 me with a perplexity that I have. Judge Brenner asked
18 you whether perhaps it would come out as a wash with
19 adequate checks and balances with either structure.
20 What mystifies me is how either structure would
21 compensate for incompetence in the person of the plant
22 manager.

23 I like your notion of the watchers and the
24 doers. That is very graphic to me. And if the doer
25 isn't capable, no matter how independent the watcher is,

1 he simply documents the disaster.

2 WITNESS HUBBARD: I think that is true. I
3 think if you don't have people, good people, no
4 organization structure is going to get the job done.
5 However, I think there are organization structures that
6 can tend to bring out the best in people or give them
7 the maximum opportunity, and that is why I think, or in
8 my opinion, we proposed a slightly different
9 organization for this utility at this time really.

10 JUDGE CARPENTER: Well, there has been a lot
11 of mention of cost and schedule. I can't imagine in the
12 real world, as Judge Brenner indicated, ever being free
13 from that. In fact, I get very worried when I see
14 people making plans that don't consider cost and
15 schedule for any activity. Central planners who don't
16 look at the strengths, certainly at the federal level,
17 that we get away from budgetary constraints, and that's
18 just your point.

19 You said earlier, looking at a municipality,
20 for example -- and I have worked with municipalities,
21 so I don't quite see -- is it freedom from consideration
22 of cost and schedule or freedom to balance cost and
23 schedule against quality, looking at the whole equation,
24 if you will, rather than freedom from those terms, not
25 saying they are negligible, putting an X through them,

1 but freedom to try to achieve that balance between them?

2 WITNESS HUBBARD: Well, I think by looking,
3 Judge Carpenter, at the two organizations that have been
4 discussed here, if the plant manager is responsible for
5 quality, then in the budgeting process and manpower
6 allocations he is saying, well, now, I could add an
7 engineer or I could add a maintenance worker or I could
8 add a quality assurance person or I could buy more test
9 equipment or I could buy some other sort of equipment.
10 Those are the competing decisions he would have to make.

11 Or if you go to the second organization, where
12 it's reporting through the QA Department chain, then now
13 you have raised the budget discussions, so the
14 discussion would be between the manager of engineering
15 talking about how many resources he thought he needed
16 versus the man over here in the production end saying,
17 in order to get our production, this is what I think I
18 need. So you do have a change in the budgeting process
19 and where that decision is made about how much emphasis
20 should be put on quality.

21 JUDGE CARPENTER: That is helpful to me to see
22 the evaluation made with a different perspective by
23 changing the structure. I see your point.

24 JUDGE BRENNER: Why don't we proceed for a few
25 more minutes, and then we will break whenever it is

1 convenient? In about 10 minutes or so, we will take a
2 break.

3 MR. ELLIS: Yes, sir, I think that might work
4 out well.

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1 BY MR. ELLIS: (Resuming)

2 Q Mr. Hubbard, your view on the organizational
3 structure is based on your judgment rather than on your
4 opinion that the regulation in all instances precludes
5 the kind of structure that LILCO has used for OQA, isn't
6 that correct?

7 A (WITNESS HUBBARD) Not entirely. I think that
8 it's like everything else. The regulation over time has
9 had some degree of interpretation, and I think my
10 judgment would be consistent with the regulations and
11 consistent with the experience that the nuclear industry
12 has had.

13 Q Yes, but my question is it is not your
14 testimony, is it, that the regulation does not by its
15 terms permit the structure that LILCO uses for its OQA
16 reporting?

17 A (WITNESS HUBBARD) I think I would agree with
18 you on that, Mr. Ellis, that that has always been a
19 matter of interpretation. And my judgment is that based
20 on my experience plus what I have seen in the nuclear
21 industry that a better organization is the one where the
22 OQA manager reports to the offsite manager.

23 Q Let me return to one other item before I go
24 on. In your days at General Electric you indicated that
25 you were audited by NRC. Were you also audited by the

1 utilities and clients?

2 A (WITNESS HUBBARD) Yes, that is true. In an
3 average year we would have about 71 audits by utilities
4 or architect-engineers.

5 Q And did findings, observations and open items
6 result from these audits?

7 A (WITNESS HUBBARD) Yes, they did.

8 Q A substantial number of them?

9 A (WITNESS HUBBARD) I don't know what you mean
10 by "substantial number."

11 Q Well, more than 50.

12 A (WITNESS HUBBARD) I don't recall the number
13 for a year, Mr. Ellis.

14 Q Well, certainly more than ten.

15 A (WITNESS HUBBARD) Well, you have used some
16 words, findings and observations, that have meanings in
17 the QA community, and I'm not sure you're using them in
18 that context. And different utilities have different
19 ways of describing whatever they determine needs to be
20 done.

21 (Counsel for LILCO conferring.)

22 A (WITNESS HUBBARD) So I am not trying to hedge
23 with you, but there are a lot of differences in
24 terminology, so it would be helpful to me if I knew
25 exactly what you meant.

1 Q Well, the findings and observations just as
2 they are, those terms are used, an open item says those
3 terms are used, unresolved items, findings,
4 observations, open items, nonresolved items, and
5 violations as those terms are used in the CAT report.
6 That ought to focus it a little bit for you.

7 MR. LANPHER: I object to the question. I
8 don't recall "findings" being used.

9 MR. ELLIS: I think that is right.

10 MR. LANPHER: In the CAT report. I think the
11 whole question is still vague.

12 JUDGE BRENNER: Okay. Mr. Hubbard, he wants
13 to know if they found a lot of stuff that had to be
14 fixed in one way or another by corrective action or
15 action for the particular thing and so on.

16 WITNESS HUBBARD: No. I do not think that a
17 lot of these audit, whatever we might call them, when I
18 talked about before what the noise level is, that is
19 what my manager was referring to.

20 JUDGE BRENNER: We are talking about the
21 clients and utilities.

22 WITNESS HUBBARD: The clients and utilities.
23 As long as we were -- what he thought had -- if we
24 didn't get any, then we were doing too good a job. And
25 if we got a certain amount that was what he described as

1 sort of about the right noise level out there. So, yes,
2 we had some.

3 BY MR. ELLIS: (Resuming)

4 Q And did you also have some from the NRC
5 audits, findings and observations violations?

6 A (WITNESS HUBBARD) Yes, we did. In particular
7 on one we were building a waste canister for the breeder
8 department in the development shop, and we were just
9 building it to sketches because we thought it was a
10 prototype, and it turned out that another part of GE,
11 the breeder department, had said that this was something
12 to be built to 10 CFR 50. So we were building it in our
13 model shop, and it was supposedly a safety-related item,
14 so there were a number of violations, as I recall, in
15 that particular instance.

16 Q And you considered all of these to be QA/QC
17 breakdowns?

18 A (WITNESS HUBBARD) It was surely a breakdown
19 of the QA/QC program. We thought we were building
20 something in the model shop.

21 Q Not that one specifically. I'm talking about
22 all of the findings and observations, open items of the
23 NRC and the utilities and clients.

24 MR. LANPHER: I object to the question. It is
25 far too broad.

1 JUDGE BRENNER: I don't think so given the
2 prior testimony of this witness. I will allow the
3 question. He can answer it, and then depending upon the
4 answer it may or may not have been a useful question,
5 but you don't always know that in advance.

6 MR. LANPHER: Could I ask for a clarification
7 of the question then?

8 JUDGE BRENNER: No. I think the witness can
9 answer it, and we have given the witness a lot of leeway
10 to explain his answers, so we will certainly permit him
11 to do that, too. I don't want to get too hung up on
12 each of the items. I think it is pretty clear where the
13 questioning and answering is going on this point.

14 WITNESS HUBBARD: I did look at them as
15 breakdowns, yes.

16 (Counsel for LILCO conferring.)

17 JUDGE BRENNER: I wanted to add, Mr. Lanpher,
18 the same thing I told Mr. Ellis when he was in the same
19 situation: you can come back on redirect. And that is
20 part of the reason I just plowed ahead.

21 MR. LANPHER: Judge Brenner, I recognize that
22 I can and probably will. I thought I had a legitimate
23 reason to seek some clarification on that, but I will
24 wait until redirect given your ruling.

25 BY MR. ELLIS: (Resuming)

1 Q But you and GE did not conclude from that, did
2 you, that your program was ineffective, did you?

3 MR. LANPHER: I object to that question, did
4 you conclude from that. I don't know what he means by
5 that.

6 JUDGE BRENNER: I think it is pretty clear
7 what he means by that, and I will allow the question.

8 WITNESS HUBBARD: I would say in general I
9 concluded there was ineffective in the areas that were
10 found, and then the question was how fast we could get
11 it corrected. And so once you have a QA breakdown, then
12 I think that the real measure of it is in the adequacy
13 of the corrective action. Do you address just the
14 particular program or look more broadly at the root
15 cause of it, and then how fast do you address it.

16 So my recommendation would be to take the
17 audit findings, observations, whatever, look at them
18 thoroughly and then make the proper corrective action in
19 a very quick time frame, and then take care of whatever
20 we have done in the past in light of a similar problem.

21 MR. ELLIS: Judge Brenner, I think this might
22 be an appropriate time, and I think it would also be
23 appropriate for me to mention a time estimate.

24 JUDGE BRENNER: Okay. And after you do, I
25 will get back to Mr. Bordenick right now after you and

1 ask him what his time estimate would be.

2 MR. ELLIS: We will next be going to Roman IX,
3 and my estimate within the confidence limits rationally
4 permissible in this situation is an hour to an hour and
5 a half -- not for IX but for the end, for everything.

6 JUDGE BRENNER: Okay. We will see whether
7 your estimate is right or my estimate in reading your
8 plan.

9 MR. ELLIS: Well, that is unfair to you. It
10 is not clear that I am going to do everything that is on
11 the plan.

12 JUDGE BRENNER: Okay. But you have given us
13 an updated feeling as to how long might be involved, and
14 that is all we are asking at this time.

15 Mr. Bordenick, how about you?

16 MR. BORDENICK: Based on Mr. Ellis' cross
17 examination to date, I'm going to be very brief.
18 Certainly well under an hour or an hour at the outside,
19 and I don't think it's going to be that long.

20 JUDGE BRENNER: All right. It looks like we
21 will be able to start redirect today based upon those
22 estimates.

23 How long do you think your redirect might
24 take, Mr. Lanpher? And I guess the time frame I had in
25 mind is would you be able to finish redirect this week

1 with the normal Friday adjournment assuming you start at
2 some point late this afternoon?

3 MR. LANPHER: Yes, Judge Brenner. I am giving
4 this some thought, and I thought about it some last
5 night also. It would be very helpful for me to have an
6 opportunity to work with Mr. Hubbard somewhat in
7 preparing that so it can be telescoped. My best
8 estimate is two or three hours, maybe three and a half
9 hours of redirect. An opportunity to work with Mr.
10 Hubbard will help to telescope that.

11 JUDGE BRENNER: Can you start, though?

12 MR. LANPHER: I could start this afternoon. I
13 had a proposal that I was considering, and that was if
14 we adjourned early this afternoon we would be happy to
15 start early tomorrow morning, if that were convenient to
16 the Board, say start at 8:30 or 8:00 to make up any time
17 that we didn't use productively today, and so that there
18 is a real opportunity to finish tomorrow, especially
19 given some other schedules that we have to work on. It
20 is very important, if it is possible, to get Mr. Hubbard
21 out this week. We would like to. If it is not, we will
22 live with that.

23 But why don't we wait and see where we end up this
24 afternoon? And if we could defer starting until
25 tomorrow morning but start early, I would appreciate

1 that.

2 JUDGE BRENNER: Okay. Let's wait and see
3 where we are. I think we could have some flexibility.
4 If there is a lot of time, if we are ready to start
5 quite early this afternoon, it might be useful to
6 balance it -- and you think about this -- that is, start
7 on things you know you can start on with the
8 understanding that perhaps we would adjourn a little
9 early to give you the time and start a little earlier
10 tomorrow morning. But we will talk about it also. I
11 think we can work something out. Don't forget you have
12 to leave time off the back end of your redirect for the
13 other parties to follow up.

14 MR. LANPHER: Well, I was, I guess when I
15 suggested, for instance, maybe starting at 8:00 tomorrow
16 morning, it was with the idea of trying to be done by
17 11:00 with the thought that if we did that, that would
18 hopefully be enough time for any followup, two hours.
19 But I appreciate your willingness to consider it.

20 JUDGE BRENNER: We are very willing to
21 consider it, and we will talk about it and see if we can
22 work something out. It makes sense.

23 MR. ELLIS: I am a little concerned about the
24 substantial amount of pressure too on the other end,
25 since it is a Friday and not making him come back. That

1 is why I would like to use as much of this so we are not
2 faced with that.

3 JUDGE BRENNER: Well, let's see where we are
4 this afternoon. I think I have indicated, and I think
5 Mr. Lanpher has, too, that there is only an hour left.
6 I think his suggestion is a very good one, to just
7 adjourn. On the other hand, if there is two hours left,
8 let's do what we can for an hour and then draw the
9 balance that way.

10 We are not going to require you to finish your
11 followup tomorrow. We understand the pressure. But we
12 do want to get close enough to keep a little bit of
13 pressure on in the sense that we don't want to avoid the
14 pressure by saying we won't even try to get close. That
15 alternative is not palatable to anybody either. But we
16 will see.

17 MR. LANPHER: If we could talk about it again
18 at lunchtime and see where we are, and maybe if it looks
19 like there's going to be a substantial amount of time
20 this afternoon that an extra 15 or 20 minutes at lunch
21 may let me coordinate at least the initial part of
22 redirect with Mr. Hubbard.

23 JUDGE BRENNER: That's a very good suggestion
24 also.

25 We will come back at 10:55.

- 1 (Recess.)
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1 JUDGE BRENNER: Let's go back on the record.

2 MR. BORDENICK: Judge, I have one preliminary
3 matter which I apologize for not raising this morning,
4 but I did not at that time have copies of the
5 professional qualifications of Stuart D. Ebnetter, who
6 is the gentleman I spoke about the last thing
7 yesterday. And I have given copies of his
8 qualifications to the Board and the parties, and
9 hopefully that will assist the parties in their further
10 thought processes relative to the matter I raised
11 yesterday.

12 JUDGE BRENNER: And as we said, we direct the
13 parties to talk to each other about it and either work
14 something out or come back to us with the differences
15 next week.

16 Okay, Mr. Ellis. We will continue your
17 examination at this point.

18 MR. ELLIS: Thank you, sir.

19 BY MR. ELLIS: (Resuming)

20 Q Mr. Hubbard, in your earlier testimony at
21 transcript 15,317 you indicated that you, and I believe
22 Mr. Minor and Mr. Goldsmith, had recommended to the
23 County a design, construction and operational QA
24 inspection to the tune of \$150,000, and you thought that
25 was adequate.

1 Wasn't the scope of that proposal I believe in
2 April of 1981 one mechanical and one electrical system
3 and limited to review of onsite QA/QC records?

4 A (WITNESS HUBBARD) That is a multi-part
5 question, Mr. Ellis. It was two systems. We did
6 recommend it to the County, and in terms of you used the
7 word "adequate." And there was not a part of design
8 involved in it, as I recall; so it was only onsite
9 activities.

10 But if you want to get into the details of it,
11 I don't have that particular agreement in front of me,
12 and I would be glad to look at it, and we could talk
13 about the details if you would like.

14 Q Well, I was referring to your testimony at
15 15,317. Will you confirm for me that that proposal that
16 you recommended was limited to a review of onsite QA/QC
17 records?

18 MR. LANPHER: Judge Brenner, if we're going to
19 use that transcript, I've got it just in the other room,
20 and I would like to get it.

21 JUDGE BRENNER: Okay.

22 MR. ELLIS: I'm sorry. I didn't realize that.

23 (Pause.)

24 BY MR. ELLIS: (Resuming)

25 Q Mr. Hubbard, I'm referring to that portion of

1 the testimony that begins generally around line 10. Do
2 you see, "We had outlined a design and construction and
3 operational QA audit to the turn" -- and I think that
4 may be a typo -- "to the tune of \$150,000." Do you see
5 that?

6 A (WITNESS HUBBARD) Yes.

7 Q "And at the time when we started on that back
8 in April or so I thought that was a pretty good program
9 because it would have been the first of a kind." Do you
10 see that? That was really before some of the South
11 Texas and Diablo problems.

12 A (WITNESS HUBBARD) Yes.

13 Q Now, that program that you thought was a
14 pretty good program and that you recommended to the
15 County along with Mr. Minor and Mr. Goldsmith was one
16 that involved two systems and limited to review of
17 onsite QA/QC records, isn't that right?

18 A (WITNESS HUBBARD) I do recall it was two
19 systems. I do not recall that it was onsite only.

20 And, Mr. Ellis, to make sure we don't have --
21 well, to clarify, this part on quality assurance was
22 just one part of a settlement agreement. There are
23 other parts of that total agreement included, like a
24 County member on the Nuclear Review Board for the life
25 of the plant, which to me was part of really looking at

1 the quality. And there are other aspects of settling a
2 number of other issues.

3 So when I said before I thought the settlement
4 agreement was one that I recommended, it has to be in
5 the context of the whole agreement of which the QA one
6 on construction and operation was an aspect of that.

7 Q Well, in looking, in recommending this
8 \$150,000 inspection as an adequate inspection or review,
9 isn't it true that you and your firm agreed that the
10 sampling technique to be used in connection with the two
11 systems was appropriate or acceptable?

12 A (WITNESS HUBBARD) I would have to look at the
13 words in the agreement. The sample of two systems was
14 there, and then there were some criteria about if there
15 were things found in the two systems, then the sample
16 would have to be expanded.

17 JUDGE BRENNER: Mr. Ellis, do you think you
18 are starting to butt against an area of the law that
19 should not be inquired into, that says these matters
20 should not be inquired into for good reason?

21 MR. ELLIS: Well, Judge Brenner, ordinarily
22 the settlement negotiations are that way. However, when
23 they are raised and testified to by the witness and when
24 they bear on the basis for the witness' views on what he
25 is proposing in this instance, I think, A, it is

1 relevant; B, it is probative.

2 JUDGE BRENNER: They are always relevant, but
3 the reason we are not inquiring into them has to do with
4 other than relevance. All right. I accept your second
5 point, but let's not push it too far because we're not
6 going to.

7 MR. ELLIS: All right, sir. I understand.

8 JUDGE BRENNER: But I'm not going to stop you
9 from questioning him about any of his statements in our
10 record when he relied on other things in answering those
11 questions, because I accept your other point.

12 MR. LANPHER: Judge Brenner, it should be
13 noted, I think, that he raised that in response to Judge
14 Morris' question about when have you ever talked with
15 LILCO management personnel about QA matters.

16 JUDGE BRENNER: There were a couple of
17 contexts, but all right. But it came in in his
18 testimony. I'm not faulting the witness for talking
19 about it, but I'm accepting Mr. Ellis' point as to why
20 he should be allowed to inquire, but how important it is
21 beyond clarifying or kneeling down -- kneeling down
22 statements of the witness. I don't know.

23 MR. ELLIS: Well, I may not succeed in showing
24 you, but I will try. And on one issue let me --

25 JUDGE BRENNER: I'm not stopping you. You

1 answered my question. You can proceed.

2 MR. ELLIS: Was there a question pending?

3 JUDGE BRENNER: No.

4 BY MR. ELLIS: (Resuming)

5 Q I will come back in a moment to the sampling,
6 Mr. Hubbard, but it is true, isn't it, that you
7 testified publicly before a subcommittee of Congress
8 that the physical reinspection that you recommended to
9 the County -- and that is referred to on page 15,317 of
10 the transcript -- would appear to provide a meaningful
11 measure of the quality of the plant as well as the
12 quality of the paper?

13 A (WITNESS HUBBARD) Do you have a specific
14 reference? That sounds familiar.

15 Q Yes.

16 (Document handed to witness, counsel, and the
17 Board.)

18 MR. ELLIS: Judge Brenner, I don't think
19 there's any need to mark this. I was just going to ask
20 that one question, and there may be others.

21 BY MR. ELLIS: (Resuming)

22 Q Do you recall my question, Mr. Hubbard? Look
23 on page 122.

24 A (WITNESS HUBBARD) Yes, sir.

25 Could I have your question again, please?

1 MR. ELLIS: Would you read it back?

2 (The Reporter read the record as requested.)

3 WITNESS HUBBARD: I did testify to that, Mr.
4 Ellis. I would like to go through what I said.

5 I said that LILCO is proposing -- well, let me
6 go back. The means to do so would be through a physical
7 reinspection of a few critical electrical and mechanical
8 systems. There is precedent for such a reinspection.
9 Currently, Long Island Lighting Company is proposing
10 such a reappraisal for the Shoreham plant in response to
11 concerns expressed by the Suffolk County legislature.

12 Such a physical inspection when combined with
13 -- and this is important now -- when combined with the
14 audit areas proposed by the NRC would appear to provide
15 a meaningful measure of the quality of the plant as well
16 as the quality of the paper. There is also a footnote
17 that says guidance -- "Guidelines for an independent
18 physical reinspection and design verification audit
19 program for Diablo Canyon were attached to Governor
20 Brown's October 30th letter."

21 And then I go on to say, "The proposed audit
22 for Diablo Canyon is similar to that for Shoreham but
23 reduced in scope by not including a pressure vessel
24 inspection."

25 But I think the key thing in this is that

1 there was a design verification portion of it as well as
2 physical inspection at the plant.

3 BY MR. ELLIS: (Resuming)

4 Q You are saying there was a design verification
5 portion of it. You are referring to what you
6 recommended to the legislature and referred to on page
7 15,317 of your testimony, is that right?

8 A (WITNESS HUBBARD) No. I am referring to what
9 was -- I was testifying about in front of Congress; that
10 the NRC -- the audit areas proposed by the NRC had to do
11 with design. And I was saying you take the design
12 audits proposed by the NRC and you look at construction
13 audits similar to what was proposed for Shoreham, and
14 that together would be a measure of the quality of the
15 plant.

16 The context of that, Mr. Ellis, is that
17 Diablo, the NRC always wanted to or always had the
18 position that the problem was only in the design area.
19 And what I was trying to do was to say well, while it is
20 good to look at the design area in the audit, one should
21 also take a look at the quality of the installed
22 hardware as well.

23 (Counsel for LILCO conferring.)

24 Q In April, though, of '81 it was your view that
25 the \$150,000 inspection --

1 (Counsel for LILCO conferring.)

2 Q I'm sorry. In the fall of '81 it was your
3 view that the \$150,000 inspection was adequate to
4 confirm the quality of Shoreham?

5 MR. LANPHER: Judge Brenner, I think that
6 mischaracterizes what he has already testified to.

7 JUDGE BRENNER: He's asking him the question.

8 MR. LANPHER: I think it is repetitive because
9 he told --

10 JUDGE BRENNER: He's following up on Mr.
11 Hubbard's previous answer, explaining his answer before
12 Congress, and the cross examiner is entitled to some
13 leeway to come back when he gets another answer.

14 WITNESS HUBBARD: No.

15 BY MR. ELLIS: (Resuming)

16 Q Let me try it this way, Mr. Hubbard. In the
17 fall of 1981 for the physical reinspection part to check
18 construction quality, it was your view that the \$150,000
19 plan that you recommended to the County was adequate to
20 confirm a meaningful measure of the quality of the
21 construction of the plant but not the design, is that it?

22 A (WITNESS HUBBARD) No. I would need to see
23 that agreement. I thought there were things about the
24 design. I recalled the agreement having like the very
25 first item was to look at the designation of items to

1 see if the structures, systems and components had been
2 properly classified. If we're going to talk about it, I
3 would really like to see the draft agreement.

4 JUDGE BRENNER: I think you misunderstood the
5 question, Mr. Hubbard, although I see how you could give
6 it the reading you just did. Why don't you rephrase the
7 question, Mr. Ellis?

8 (Counsel for Suffolk County conferring.)

9 BY MR. ELLIS: (Resuming)

10 Q Do you see in your testimony where you say
11 "such a physical resinspection" in your testimony on
12 page 122 of the Congressional testimony?

13 A (WITNESS HUBBARD) Yes.

14 Q Now, that physical reinspection, you are
15 referring there, aren't you, to the \$150,000 proposal
16 relating to checking the construction quality?

17 A (WITNESS HUBBARD) I am referring to the
18 aspects of it that had to do with construction quality.
19 I think there were aspects that went to design. And
20 remember again I'm saying that in context when combined
21 with the audit areas proposed by the NRC, which we are
22 all in the design area.

23 MR. LANPHER: Judge Brenner, I didn't want to
24 interrupt that question and answer, but could we get a
25 copy of the agreement for Mr. Hubbard from LILCO? He's

1 been asked a lot of questions, and he has asked to see
2 it.

3 JUDGE BRENNER: I just didn't think it was
4 necessary up to that point, as I understood the
5 question. I understand why it would be necessary for
6 Mr. Hubbard to include what he wants to include; that
7 is, he is unsure whether other parts of the agreement
8 talk about the design. Maybe Mr. Hubbard has got the
9 question right and I don't.

10 But I think what Mr. Ellis was attempting to
11 inquire into is solely as to the construction quality.
12 Did you feel that that program which Mr. Ellis asked you
13 about was sufficient to give the answer one way or the
14 other as to whether the quality of construction was
15 adequate and acceptable and met all the requirements
16 without regard to potential problems in design.

17 I thought that is what he was asking you.

18 MR. LANPHER: My concern, Judge Brenner, was
19 that --

20 JUDGE BRENNER: Let me see if I can get that
21 answer, and then I will see how far he is going to go
22 and make an accommodation if necessary on access to the
23 agreement.

24 WITNESS HUBBARD: That is a hard question to
25 answer in the context of a choice between litigating

1 this matter and going and doing an independent review.
2 I preferred the idea of a settlement agreement to what
3 we have been doing. And my theory was that when you go
4 to look under a rock, if there's a problem, you don't
5 have to look under too many rocks to find it. And so I
6 thought it was more important to look under the rock
7 than not.

8 So in the \$150,000 it was laid out enough
9 areas to look under that I thought there would be an
10 indication of the quality achieved. And we had a lot of
11 negotiation on how many systems would be looked into,
12 and we ended up with words that if certain things were
13 found, the audit would be expanded. And my view at the
14 time was it is more important to get such a review going
15 and then if when one looks under the rock one finds
16 things, then it's going to get expanded. But you've got
17 to get the look going.

18 And so my view always was that it would
19 probably end up being expanded, but at least we would
20 have some basis.

21 JUDGE BRENNER: Aside from the dynamics of
22 what goes into settlements, which I don't want to get
23 involved in here on this record, your testimony before
24 Congress, now that you have clarified it, seems to be
25 stating outside of the context of the settlement

1 negotiation in this hearing that the physical
2 reinspection that you proposed for Shoreham would be
3 adequate in your mind for construction problems now that
4 you've explained the other part of what the staff was
5 doing which was most important for the design
6 implementation area. So that suggests that beyond just
7 the give and take of negotiation you in fact thought
8 that program was adequate to get going.

9 WITNESS HUBBARD: Well, I said it provided a
10 meaningful measure, and I think that's right. You go
11 spend \$150,000 and you look under some rocks in the
12 areas I had outlined, and I think that would give some
13 indication. And I was thinking of it again the way a
14 financial auditor does it; that you can go in and spend
15 \$150,000, and if you use good auditing techniques you
16 can get some indication. And I called it a meaningful
17 measure, and I think that is true.

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1 JUDGE BRENNER: Let me come back to your
2 point, Mr. Lanpher, on the agreement. I thought that
3 was the question Mr. Ellis was asking, and if I'm wrong,
4 he can ask his own questions.

5 Now, are we going to ask any further questions
6 of Mr. Hubbard as to the agreement? If so, I think we
7 should give him a copy.

8 MR. ELLIS: I think so. I have no problem
9 with giving him a copy.

10 JUDGE BRENNER: Can we do that now?

11 MR. LANPHER: My only concern was that I was
12 afraid we were getting into the details of it and there
13 was no reason to have him try to --

14 JUDGE BRENNER: I accept that, and before we
15 get into the details, he can have a copy. I just didn't
16 think the immediate questions that I re-asked off Mr.
17 Ellis' questions required that, and I wanted to get that
18 done before the trail went cold in Mr. Hubbard's mind.

19 [Copies handed to Board and parties.]

20 MR. LANPHER: Judge, this isn't a complete
21 copy.

22 JUDGE BRENNER: It seems awfully thin to me.

23 MR. ELLIS: This is all I have, and if it
24 isn't enough, I certainly didn't plan to use it as a
25 document in his cross-examination other than to guide.

1 JUDGE BRENNER: Let's see where it goes, and
2 if there are problems, we will hear about it from Mr.
3 Hubbard and we will stop and get a copy. It may be that
4 the nature of it can be cured on redirect. I am also
5 again getting concerned. We will see where it goes. Let
6 me not anticipate in advance, because the last time I
7 anticipated in advance, the very next thing was public
8 testimony, which is okay.

9 Go ahead, Mr. Ellis.

10 BY MR. ELLIS: (Resuming)

11 Q Now Mr. Hubbard, it is fair to say, isn't it,
12 that what you testified to under oath to Congress in
13 November of 1981 is still your view in December of 1982?

14 A (WITNESS HUBBARD) When you said what I
15 testified to, are you referring to what we just went
16 over?

17 Q Yes, indeed.

18 A (WITNESS HUBBARD) Oh, you always learn a
19 little bit more, and today I would have more emphasis on
20 design than I did construction. That is one of the
21 things that I have learned over the last year or two.

22 Q But your view as to the physical reinspection
23 adequacy, what you testified to under oath in 1981 in
24 November is still your view today, isn't it?

25 A (WITNESS HUBBARD) It is my view that that

1 would still give a meaningful measure.

2 [Counsel for LILCO conferred.]

3 Mr. Hubbard, with respect to the two systems
4 that were to be involved in the Shoreham reinspection
5 that you referred to in your congressional testimony and
6 in your testimony at 15,317, it was not to be a 100
7 percent look at all facets of those two systems, was
8 it? It was to be an audit or a sample, is that right?

9 A (WITNESS HUBBARD) That is correct, it was a
10 sample. And Part 3 of the agreement talks about if the
11 recommendations include the need to conduct further
12 inspection and testing of the sample or other systems,
13 the work will be conducted in accordance with mil
14 standard 105(d).

15 Q That would be if the recommendation of the
16 firm conducting the reinspection recommended the need to
17 conduct further inspection and testing; isn't that right?

18 A (WITNESS HUBBARD) If it is the
19 recommendations of the Nuclear Review Board, which the
20 County would be a member of.

21 Q But the original inspection, the QA/QC report
22 and its recommendations that are referred to there did
23 not require the use of any quantitative statistical
24 method for the selection of samples, did it?

25 A (WITNESS HUBBARD) Mr. Ellis, no, it doesn't

1 say that, but that is why it was really covered in the
2 review part where I am talking about going to additional
3 sampling; that it was always intended that that would be
4 done on a statistical basis, and so that is why in the
5 review part it does talk about statistics and sampling.
6 It was always the intent of the County to draw some
7 conclusions on a statistical basis.

8 Q But my point, Mr. Hubbard, was that in the
9 selection of the original samples for the contractor to
10 look at on the reinspection, there was no contemplation
11 or requirement that that contractor be required to use
12 statistical methods to select his sample; isn't that
13 right?

14 A (WITNESS HUBBARD) No. You used the word
15 "contemplation." It was always contemplated that it
16 would be done that way. There was no requirement that
17 it be done that way but it was always contemplated that
18 there would be a basis for the sample.

19 Q So your testimony, by "contemplated," you mean
20 you contemplated it; is that right?

21 A (WITNESS HUBBARD) Yes, I contemplated it and
22 talked to people about it, and there was a lot of
23 thought given to the use of the words "mil standard
24 105(d)" going to additional testing and inspection. So
25 I think it was always contemplated that statistical

1 techniques would be used.

2 Q But you didn't see fit to put that in the
3 agreement? It is not stated there, is it? It is just
4 stated for what happens after the report is completed;
5 isn't that right?

6 A (WITNESS HUBBARD) It doesn't state how the
7 independent auditor will select his sample.

8 Q So it was left up to the auditor's judgment,
9 wasn't it?

10 A (WITNESS HUBBARD) Yes, but I think it was
11 also contemplated that both the County and LILCO would
12 be discussing the review procedures or the study plan
13 that was developed by the auditor. In any sort of
14 agreement like this, there are a lot of things that
15 don't get written down.

16 [Counsel for LILCO conferring.]

17 Q The reference in your testimony to the
18 congressional testimony to the audit areas proposed by
19 the NRC, that is a reference, isn't it, to what
20 ultimately resulted in the Teledyne review at Shoreham?

21 A (WITNESS HUBBARD) I believe so, Mr. Ellis.
22 The particular day that was presented on the morning of
23 November 19th, and later that particular day the
24 Commission issued their order on the Phase I, Phase II
25 review at Diablo Canyon, but there had been a series of

1 meetings leading up to the congressional testimony on
2 November 19th where the NRC had identified problems with
3 the control of the design interface information.

4 MR. LANPHER: Judge Brenner, Mr. Ellis'
5 question referring to this transcript from the
6 congressional hearing says when combined with the audit
7 areas proposed by the NRC, and his question said
8 proposed by the NRC for Shoreham, and I'm wondering if
9 he meant to say Diablo Canyon.

10 JUDGE BRENNER: No, I think he meant -- well,
11 I don't know. Mr. Hubbard answered Diablo. I heard
12 Shoreham, too, I thought. I assume unless I am told
13 differently that Mr. Ellis meant what he said,
14 Shoreham. And if he now wants to continue that link, I
15 guess I will have to ask one other question, at least
16 given Mr. Hubbard's answer.

17 MR. ELLIS: I did intend Shoreham.

18 JUDGE BRENNER: Mr. Hubbard took the link
19 through Diablo Canyon in his answer.

20 MR. LANPHER: This was one case where I
21 thought there was a misunderstanding or an error, and I
22 don't mean to jump in. I could wait until redirect. I
23 thought his answer just didn't connect with the question.

24 JUDGE BRENNER: Well, you are right about that.

25 MR. LANPHER: And that he probably

1 misunderstood the question.

2 JUDGE BRENNER: Well, it didn't connect fully,
3 but I'm not criticizing your jumping in.

4 MR. ELLIS: Well, I certainly don't want for
5 something to go unintended. I thought --

6 JUDGE BRENNER: Why don't you ask -- if you
7 want to connect what was done at Diablo to what Teledyne
8 is doing for Shoreham, you didn't make that connection
9 with that question and answer. That is the only point,
10 given the answer.

11 MR. ELLIS: That wasn't what my intent was on
12 the question anyway. He answered it to my intent when
13 he said yes, and that was all I was after.

14 JUDGE BRENNER: Well, he said yes thinking
15 Diablo Canyon. That is clear from the rest of his
16 answer.

17 BY MR. ELLIS: (Resuming)

18 Q Did you answer the previous question thinking
19 I was referring to Diablo Canyon or to Shoreham?

20 A (WITNESS HUBBARD) I thought you were
21 referring to Diablo Canyon because Teledyne was hired to
22 do the independent audit on Diablo Canyon.

23 Q I see.

24 A (WITNESS HUBBARD) I apologize.

25 Q That is quite all right. I'm glad we got to

1 that. Let me restate my question, then.

2 JUDGE BRENNER: Wait a minute. Hold it. Now
3 he wants to know if what Teledyne is doing at Diablo
4 Canyon is about the same as what --

5 MR. ELLIS: No.

6 JUDGE BRENNER: I know what the answer is.

7 MR. ELLIS: Well, I didn't ask that question.

8 JUDGE BRENNER: Well, in that case you see the
9 problem you have with your previous question and answer,
10 then.

11 MR. ELLIS: Well, I thought --

12 JUDGE BRENNER: Go ahead and ask it again.

13 [Counsel for LILCO conferring.]

14 BY MR. ELLIS: (Resuming)

15 Q Mr. Hubbard, with reference to a clause in
16 your testimony on 122, "when combined with the audit
17 areas proposed by the NRC," isn't that a reference to
18 individual consultations and negotiations that have gone
19 on between the NRC and individual utilities as to the
20 nature and extent of audit areas to be proposed for the
21 specific utilities?

22 A (WITNESS HUBBARD) No.

23 Q Okay. You were referring there only to Diablo
24 Canyon?

25 A (WITNESS HUBBARD) Yes. All of this, Mr.

1 Ellis, was before Chairman Palladino made his speech in
2 San Francisco in December and the NRC started having
3 meetings with the individual utilities.

4 [Counsel for LILCO conferred.]

5 Q Mr. Hubbard, do you have any facts to indicate
6 that the Torrey Pines inspection of Shoreham was not
7 independent from LILCO or any of its contractors?

8 A (WITNESS HUBBARD) No, I don't have any facts
9 of whether it was independent or it wasn't independent.
10 I do state in my testimony that it is not the protocol
11 that the County had in mind, that it was all done behind
12 closed gates, and I and the County had no role in the
13 inspection at all, so I don't know how independent it
14 was.

15 MR. LANPHER: Judge Brenner, if we are going
16 to another topic, it seems to me we have had enough
17 questions on this that maybe it ought to be bound in or
18 marked as an exhibit, the hearing.

19 JUDGE BRENNER: Okay. I think independently I
20 wouldn't have thought that was necessary, but I
21 certainly have no problem with doing it if you would
22 like to have that done.

23 MR. ELLIS: Well, I didn't intend to have --

24 JUDGE BRENNER: But if one counsel would like
25 it done given that counsel's view of the use of it, we

1 will do it. We don't have to have a big debate.

2 MR. ELLIS: That is fine, yes, sir.

3 JUDGE BRENNER: We will give it a LILCO
4 exhibit number for identification. That will be 51. So
5 that will be LILCO Exhibit 51 for identification. Now,
6 what the exhibit consists of, even though not all of it
7 was referred to, is the cover page, titled "Quality
8 Assurance in Nuclear Power Plant Construction, Oversight
9 Hearing Before the Subcommittee on Energy and the
10 Environment of the Committee on Interior and Insular
11 Affairs of the House of Representatives, 97th Congress,
12 First Session, on Quality Assurance in Nuclear Power
13 Plant Construction," and it is the November 19, 1981
14 hearing. The publication bears the serial number
15 97-26, and beyond that cover page, the pages included
16 from the publication are pages 121 and 122.

17 (The document referred to
18 was marked LILCO Exhibit
19 No. 51 for
20 identification.)

21 JUDGE BRENNER: And we will also bind in a
22 copy for convenience here, too.

23 [The document referred to, LILCO Exhibit
24 No. 51 for identification, follows:]

25

INSERT#1

ENVIRONMENT LIBRARY

**QUALITY ASSURANCE IN NUCLEAR
POWERPLANT CONSTRUCTION**

**OVERSIGHT HEARING
BEFORE THE
SUBCOMMITTEE ON
ENERGY AND THE ENVIRONMENT
OF THE
COMMITTEE ON
INTERIOR AND INSULAR AFFAIRS
HOUSE OF REPRESENTATIVES**

NINETY-SEVENTH CONGRESS

FIRST SESSION

ON

QUALITY ASSURANCE IN NUCLEAR POWERPLANT CONSTRUCTION

**HEARING HELD IN WASHINGTON, D.C.
NOVEMBER 19, 1981**

Serial No. 97-26

**Printed for the use of the
Committee on Interior and Insular Affairs**



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Full compliance with the NRC QA requirements is of fundamental importance to safety. There can be no doubt as to whether PG&E and its subcontractors have developed and implemented a QA program in full compliance with the regulatory criteria -- they have not. Thus, there is substantial uncertainty surrounding the actual quality level achieved in the design and construction of Diablo Canyon.

In recognition of the PG&E QA shortcomings, it is imperative that an independent audit be initiated. The audit should include two vital elements: (1) the audit should provide for a physical reinspection of plant equipment as well as a design reverification of Diablo Canyon safety systems; and (2) the audits, and any plant modifications, should be completed prior to plant operation. The two key elements are set forth in more detail in the following.

First, the audits must address construction QA. The NRC has assumed that "the weaknesses in the [QA] program are focused in the service contract area and that it is not a universal breakdown throughout the company."^{6/} There is insufficient data to support this conclusion. Rather, repeated QA program breakdowns have been found in all areas subject to the NRC's narrow reinspection program. In addition, there is evidence that construction QA may have experienced the same basic problems as design QA.

-- Construction QA was covered by the same QA manual as design QA, which has been shown to have been inadequately planned and implemented.

^{6/} November 9 NRC Commission meeting transcript, p. 22.

-- In 1980, PG&E reported that its inspections pursuant to I&E Bull. 79-14 revealed that 26 percent of as-built piping required reanalysis. See Attachment C hereto, p. 2. Dr. Cloud found similar discrepancies between "as-built" and designed configuration of supports for electrical conduits. This indicates a clear potential problem in construction QA or, at least, in the interface between design and construction QA.

-- There have been numerous past instances of construction defects at Diablo Canyon and allegations of construction QA problems. Examples included inadequate training of welders and radiographers, widespread defects in welding of pipe supports and pipe whip restraints, and over 10,000 defective anchor bolt installations.

Since there can be no confidence in the quality of the "paper" documenting the Diablo Canyon design and its construction implementation, it is therefore imperative that the actual quality of installed safety-related structures, systems, and components be established. The means to do so would be through a physical reinspection of a few critical electrical and mechanical systems. There is precedent for such a reinspection. Currently, Long Island Lighting Company (LILCO) is proposing such a reappraisal for the Shoreham plant in response to concerns expressed by the Suffolk County legislature.^{1/} Such a physical reinspection, when combined with the audit areas proposed by the NRC, would appear to provide a meaningful measure of the quality of the plant as well as the quality of the paper.

^{1/} Guidelines for an independent physical reinspection and design verification audit program for Diablo Canyon were attached to Governor Brown's October 30 letter. The proposed audit for Diablo Canyon is similar to that for Shoreham, but reduced in scope by not including a pressure vessel inspection.

1 BY MR. ELLIS: (Resuming)

2 Q Judge Brenner, since we didn't include the
3 specific page that makes it clear, let me just ask Mr.
4 Hubbard whether what has been marked as LILCO Exhibit 51
5 is his sworn testimony before Congress on November 19,
6 1981.

7 A (WITNESS HUBBARD) Yes, it is a portion of it,
8 Mr. Ellis.

9 JUDGE BRENNER: I don't know if it is
10 important; it appears that it was your prewritten,
11 prepared written portion rather than something you just
12 gave extemporaneously or orally for the first time. Am I
13 correct?

14 WITNESS HUBBARD: That is correct, Judge
15 Brenner.

16 BY MR. ELLIS: (Resuming)

17 Q Mr. Hubbard, I take it that your answer with
18 respect to whether you have any facts indicating --
19 well, let me just ask, do you have any facts to indicate
20 whether the Teledyne independent review which is ongoing
21 has not been independent to date?

22 A (WITNESS HUBBARD) No, I do not, and I would
23 have the same qualifier as I had for Torrey Pines. It
24 has all been done without any involvement of the County.

25 Q Torrey Pines was a contractor originally

1 recommended by the County in connection with an
2 independent inspection for Shoreham; isn't that correct?

3 A (WITNESS HUBBARD) No.

4 Q Well, was it on a list of acceptable
5 contractors, contractors acceptable to the County for an
6 independent inspection of Shoreham?

7 A (WITNESS HUBBARD) Yes, it was, Mr. Ellis, and
8 also part of the list was that there be an acceptable
9 protocol. So the statement was made assuming an
10 acceptable protocol could be worked out. We felt that
11 Torrey Pines was one of the companies that was
12 technically qualified to do this work.

13 [Counsel for LILCO conferring.]

14 Q Well, there was no qualification of that sort
15 attached to the original statement relating to the
16 recommendation of Torrey Pines; isn't that correct?

17 A (WITNESS HUBBARD) That is not correct.

18 Q Was Teledyne also on the list of acceptable
19 contractors to the County?

20 A (WITNESS HUBBARD) Yes, it was, with the same
21 statement about an acceptable protocol.

22 MR. LANPHER: Judge Brenner, I am going to
23 object at this point to further inquiry into where I
24 think Mr. Ellis is going, into the so-called
25 negotiations this year in April and May, which I don't

1 believe were invoked in his earlier testimony here.

2 JUDGE BRENNER: Yes, I will tell you how he
3 might be permitted to get into it further. If you asked
4 him what he thinks now and he says he thinks they are
5 terrible, you can come back perhaps to some extent and
6 ask him about it, although even that is a bit of a
7 delicate area; but there may have been no need to refer
8 to what was done in the past. And in addition, it
9 doesn't answer the question which you properly asked
10 last time you did about what he thinks now.

11 I am also a little concerned, although I am
12 not going to cut off as long as he is not going to be
13 too long, because I understand why you might want to ask
14 about it in this context. But I am concerned about how
15 much of this we are going to have to hear again anyway,
16 or how much of this could be done on the Torrey Pines
17 depositions. But there are some uncertainties, and the
18 context is here, and Teledyne remains an uncertainty in
19 terms of this record, so I am not going to cut you off
20 but draw some time judgments based on that.

21 The judgment I have applied is that you only
22 had about an hour and a half plus or minus on your
23 estimate before, and as long as we were talking about
24 that type of thing, it is okay.

25 [Counsel for LILCO conferring.]

1 JUDGE BRENNER: Mr. Lanpher, even though I
2 didn't grant your objection, there is something in Mr.
3 Hubbard's testimony about it, and I can't find the
4 reference off-hand. I thought --

5 MR. LANPHER: It is in the last -- well, the
6 section prior to the conclusions, Judge Brenner.

7 JUDGE BRENNER: So to some extent, even though
8 the phrasing of the questions wasn't focused there, we
9 might be able to get at very similar information going
10 directly to the testimony if the cross-examiner wishes,
11 and I would point that out also.

12 MR. ELLIS: What was the reference?

13 JUDGE BRENNER: I think it starts at the
14 bottom of page 90 of the testimony, and in fact, the
15 material before that is pertinent also. I guess it is
16 all of Roman VII, starting on page 83, but some of the
17 particular points were refocused again starting at the
18 bottom of page 90 and continuing on. My point being in
19 part Mr. Hubbard keys off some of those negotiations in
20 things he references, so that is why you have all
21 presented a difficult area for us and we are giving more
22 leeway than we might have otherwise.

23 BY MR. ELLIS: (Resuming)

24 Q Mr. Hubbard, focusing for a moment on the '81
25 agreement or proposed agreement which you recommended to

1 the County and testified to in Congress, there was no
2 qualifier on that particular list, was there, with
3 respect to stating that Torrey Pines and Teledyne were
4 acceptable contractors?

5 A (WITNESS HUBBARD) I would have to see the
6 letter. I recall the negotiations that as part of the
7 settlement agreement LILCO provided the County with a
8 proposed list of contractors, so in the context of the
9 protocol agreed upon in the settlement agreement, we
10 then looked over that list and marked some off and added
11 some and said that is an acceptable list. Then in May
12 of this year, that issue came up again and there is a
13 letter from the County that says Torrey Pines is
14 acceptable, assuming there is an adequate protocol, and
15 that had always been the County's position, that you
16 have to have both a protocol and a contractor.

17 Q There was nothing -- well, let me put it this
18 way. When you participated in or when you recommended
19 the approval or the acceptance of Teledyne and Torrey
20 Pine as contractors, you did so on the basis of your
21 judgment that they were technically competent and that
22 they had integrity as professional organizations; isn't
23 that right?

24 A (WITNESS HUBBARD) That is correct.

25 Q Am I correct that you have not reviewed the

1 Torrey Pines report as yet?

2 A (WITNESS HUBBARD) That is correct.

3 Q I take it, then, you cannot tell me whether,
4 as you state on the bottom of page 88, there has been
5 equivalent review of the conduits and raceway systems to
6 that proposed for piping systems?

7 A (WITNESS HUBBARD) No, I cannot at this time.
8 I don't think, Mr. Ellis -- I think I can say I don't
9 think there has been an equivalent review; that in
10 reading the summary report of the Torrey Pines, there is
11 a mention that large-bore pipes, that particular review
12 took in excess of 20,000 of the 30,000 man hours. So I
13 think what is here at page 88 of the testimony is still
14 correct, that the emphasis on the Torrey Pines work
15 scope was on mechanical and particularly the large-bore
16 piping systems.

17 Q Mr. Hubbard, you would agree, wouldn't you,
18 that whether statistical methods are used to select
19 sample sizes or whether judgment is employed is a matter
20 of judgment and dispute between reasonable experts in
21 the area; wouldn't you agree?

22 A (WITNESS HUBBARD) No. I think there has been
23 enough history of financial auditing where people know
24 how you statistically go about taking an audit,
25 financial numbers and inventory numbers in order to

1 reach a conclusion. So I think if you are going to take
2 some samples and draw a conclusion about a whole
3 inventory or plant or whatever from those samples, there
4 are techniques for doing them that have been around for
5 a number of years.

6 Q But whether you used those techniques or you
7 used technical judgment and experience is a matter upon
8 which reasonable experts can and do disagree; isn't that
9 right?

10 A (WITNESS HUBBARD) Surely they can disagree,
11 but I think that if you are setting out to take samples
12 and extrapolate those to a whole population, if you are
13 going to use sampling, then there are statistical
14 techniques for doing that that are proven and should be
15 used.

16 Q Well, is it your testimony, then, that every
17 audit that selects samples on the basis of judgment and
18 extrapolates the results to the population involved in
19 the audit is invalid unless it uses statistical bases
20 for the selection of samples?

21 A (WITNESS HUBBARD) Yes, in the sense of
22 extrapolation it has some value. It gives you an
23 indication. But if you are trying to extrapolate from
24 that small sample to the total population, if you don't
25 use statistical techniques you can't make that

1 extrapolation. You can only draw a conclusion about
2 what you specifically looked at.

3 Q So in other words, sampling, using judgment in
4 any audit, unless it uses statistical bases, you cannot
5 draw any conclusions as to the whole population? That
6 is your testimony?

7 MR. LANPHER: Could I have that question
8 repeated, please?

9 MR. ELLIS: I will restate it just to save
10 time.

11 BY MR. ELLIS: (Resuming)

12 Q It is your testimony, then, that in any audit,
13 unless statistical bases are used for the selection of
14 samples, that samples selected on the basis of judgment,
15 one cannot draw any conclusions concerning the whole
16 population?

17 A (WITNESS HUBBARD) That is a complicated
18 question, Mr. Ellis, and I will try to answer it. You
19 can draw some conclusions. If you don't use statistical
20 techniques and you take a sample, of course you can draw
21 some conclusions and you can get some valuable insights.
22 However, if you are trying to go about in a disciplined
23 manner taking some samples and say based upon that I
24 will get some level of confidence about a total plant or
25 a total inventory or a total financial condition, then

1 you need to combine the judgment which you always should
2 use with the use of the right scientific techniques.

3 Q Well, you said that you could draw some
4 conclusion and some valuable insights from an audit
5 based on samples selected on the basis of judgment. Are
6 these conclusions and insights relating to the whole
7 population or just to the sample?

8 A (WITNESS HUBBARD) Well, an example might be
9 you look at ten pipes or ten electrical cable raceway
10 supports, and five out of the ten are in the wrong
11 place. That is a pretty strong indication that if you
12 sample a lot more, you are going to find a bigger
13 problem. So you do get some insight. But say you look
14 at ten and you don't get any that are in the wrong
15 place. Can you then infer that the entire population is
16 correct? No, I don't think you can.

17 Q So your testimony is that you can only draw
18 negative conclusions or derive negative insights from
19 samples based on judgment as to the whole population?

20 A (WITNESS HUBBARD) You used the word
21 "negative." I am saying that by a small sample, if a
22 lot of the items do not agree with the standard, you can
23 get an indication that there is a problem.

24 Q Well, can you ever select a sample on the
25 basis of judgment in an audit and get a positive

1 indication that there aren't problems with the entire
2 population?

3 A (WITNESS HUBBARD) You could get a statistical
4 reliability of that, yes. If you said there was a
5 population of 1000 and you wanted to have 95 percent
6 confidence with less than 5 percent errors, you would,
7 say, take a certain sample size, and if all of those, if
8 a certain number of them are acceptable, then you could
9 statistically say you have that level of confidence.

10 Q Well, without regard to statistics, and maybe
11 I misunderstood your answer, but without regard to
12 statistics, assume you select a sample to audit at a
13 nuclear power plant and you do so on the basis of your
14 judgment and experience in conducting audits. Is it
15 your testimony that the results of that audit will never
16 permit an experienced inspector or auditor to draw
17 positive conclusions about the remainder of the
18 population?

19 A (WITNESS HUBBARD) I hesitate to use the word
20 "never." I would say in general that is true, that if
21 you don't use sampling techniques for picking your
22 initial sample, then that in general it is difficult to
23 mathematically extrapolate from that sample if it wasn't
24 done in a random fashion to begin with.

25 Q Let me try once again because I think we are

1 injecting statistics into it at both ends and I am
2 trying to eliminate it at both ends. Let's assume that
3 you are auditing a nuclear power plant and you select a
4 sample based upon your judgment and experience. From
5 the results of that audit, is it possible for an
6 experienced auditor or inspector without using
7 statistical techniques to extrapolate to the whole
8 population positive conclusions?

9 MR. LAWPER: I object. I think that is
10 exactly what he has just answered, Judge Brenner.

11 JUDGE BRENNER: Let him ask it again in the
12 sense that Mr. Ellis is unclear. If Mr. Ellis is
13 unclear, I can understand why he might be given some of
14 the previous questions and answers, and he has to make
15 some judgments where to follow up and where not to
16 follow up, so let's let him ask it.

17 WITNESS HUBBARD: I would say in general no,
18 Mr. Ellis, particularly since you used the words
19 "without the use of any statistical techniques."

20 [Counsel for LILCO conferring.]

21 MR. ELLIS: Judge Brenner, no further
22 questions.

23 JUDGE BRENNER: You did that on purpose just
24 to beat your estimate by a lot.

25 [Laughter.]

1 JUDGE BRENNER: All right. In my defense, you
2 cut out one Roman number that I didn't think you were
3 going to cut out which I thought would not be as fast as
4 you thought it would be.

5 MR. ELLIS: In my defense, I think I alluded
6 to that.

7 JUDGE BRENNER: Yes, you did.

8 EXAMINATION BY THE BOARD

9 BY JUDGE MORRIS:

10 Q Mr. Hubbard, I just wanted to follow up on
11 this last exchange to be sure I understood your views. I
12 believe I distilled out of what you said that it is your
13 position that in order to make an extrapolation which
14 has any quantitative use, you must start with a
15 statistical sample to begin with.

16 A (WITNESS HUBBARD) In general yes, that is
17 what I said. When you said any quantitative use, well
18 obviously there is always some quantitative use, but the
19 general concept that if you are going to have an
20 extrapolation that is repeatable, that you need to start
21 with a random sample and use statistical techniques,
22 that is the way you get repeatability in a sampling or
23 in a sampling process, and repeatable extrapolations.

24 Q I really think I understand what you are
25 saying. Just to worry it a little bit more, it would be

1 an extrapolation that according to a disciplined manner
2 that other people would understand and be familiar with
3 the techniques of.

4 A (WITNESS HUBBARD) Yes, sir, and in particular
5 emphasis on the word "repeatability." In using
6 statistical techniques, if five different investigators
7 did the same thing, there is a high likelihood of the
8 repeatability of the results.

9 Q I think the point that perhaps Mr. Ellis had
10 in mind was an exercise where investigation or an audit
11 was being done with the specific purpose of trying to
12 find out if there was anything wrong at all, and looked
13 at a homogeneous population of welds, for example, and
14 said the chance that a weld is deficient is more likely
15 if the guy had to do it overhead in a confined space,
16 and therefore he might focus his attention more on that
17 kind of situation rather than a random sample in order
18 to see if there was any problems with welding.

19 Is that a concept that you would agree with?

20

21

22

23

24

25

1 A (WITNESS HUBBARD) I would, Judge Morris. We
2 have had some discussion here which seems like judgment
3 and statistics are exclusive of each other. I think you
4 should use judgment to the maximum extent possible in
5 deciding what one should audit on a statistical basis.
6 And then even your example of ones close to a ceiling --
7 well, that again are the sorts of things one could
8 address in a stratified sampling. That, I think, is
9 totally consistent with my view.

10 JUDGE MORRIS: Thank you, I understand.

11 BY JUDGE CARPENTER:

12 Q Unlike Judge Morris, I might just be worrying
13 on this question but it seems so fundamental that you
14 say used statistical techniques. Isn't it true that
15 statistical techniques are simply a formal way of
16 exercising judgment, of stating exactly what assumptions
17 are made, et cetera? So I think it is a matter of
18 defensibility of the conclusions rather than the
19 question which you respond to -- can he come to any
20 conclusions.

21 I am thinking about your thrust, which is the
22 defensibility of those conclusions.

23 A (WITNESS HUBBARD) I would agree with you,
24 Judge Carpenter. Obviously, people can make
25 conclusions, but in order to have repeatability and in

1 order to have a basis for those, a technical basis for
2 it, then I think one needs to use the statistical means
3 to extrapolate.

4 I am trying to say yes to your question.

5 Q But isn't it true that if you wish to
6 extrapolate from some set of data, you must have a
7 sampling theory to justify the extrapolation? No
8 statistician can answer the question: is it a valid
9 extrapolation, unless you tell him your sampling theory.

10 A (WITNESS HUBBARD) That is correct, so that is
11 part of the design of your experiment. That you have to
12 -- you know, you use judgment to decide what is going to
13 be included in the experiment, but then you use the
14 random sampling techniques.

15 You start with statistics in the beginning of
16 your experiment in the design of the experiment. In
17 other words, the general subject of experimental design.

18 Q I think you start with the theory. The
19 statistician will say to a scientist, tell me your
20 theory and I will help you test it. And you, from a
21 quality assurance point of view, come back to Judge
22 Morris's point of view that you might very deliberately
23 choose a non-random sampling if your theory says that
24 the individual might have the most trouble in making a
25 weld that is hard to get to.

1 A (WITNESS HUBBARD) Well, that is still a random
2 sample. You come up with what you say you're going to
3 sample, which might be ones close to the ceiling, or it
4 might be those of one particular welder. But once you
5 have picked your experiment, then you design your
6 sampling based upon statistical techniques. Is that
7 understood? Am I clear?

8 Q Yes. It is a matter of emphasis. Just the
9 arm waving toward statistics, you see, without saying
10 you have to understand as an engineer what it is you are
11 sampling. And the statistical part is just a tool.

12 A (WITNESS HUBBARD) That is absolutely correct.
13 I guess I get bothered when you say "just." I see a lot
14 of people going out and taking samples and then making
15 conclusions about entire populations, with the absence
16 of any statistical techniques, and that is what I was
17 trying to address in my testimony; that if one wants to
18 take a sample and draw a conclusion about anything,
19 whether it's one welder or welds close to the ceiling or
20 welds in general, there are scientific methods for doing
21 that, and they haven't been used at Shoreham.

22 Q Nor specified in the regulations.

23 A (WITNESS HUBBARD) There I guess I do disagree
24 with you because in criterion 18 it says an audit
25 program shall verify, and that says to me that if you're

1 going to verify, well, you're going to go take some
2 samples. So I guess we could have a difference of
3 opinion on what the word "verify" means.

4 But it would seem to me if you have an
5 obligation to verify, then there are techniques for
6 verifying. Just like you verify inventory or you verify
7 other financial numbers.

8 Q Yes, it is 18. In particular I find it
9 perplexing because the next sentence says, -- is written
10 as though one expects to find efficiencies, and zero
11 deficiencies are not to be expected. So that is where
12 my problem comes; back here. What numbers do we pick?
13 You say 95/95.

14 A (WITNESS HUBBARD) That is an example, and it
15 might be inappropriate for certain things. But once you
16 decide that that is the method you're going to use to
17 verify, it is like the discussion Mr. Ellis and I had
18 yesterday about baseline criteria. You would say well,
19 for things like reviewing radiographs, I would like to
20 be able to be at 98 percent maybe on that. Or, you
21 know, the chance would only be, oh, 2 percent that I
22 would have not properly looked at a radiograph.

23 There might be other areas that you wouldn't
24 need to be that confident, but you would be making a
25 technical judgment on that as part of your overall

1 quality verification program. So you would look at
2 things and you'd say well, signatures on purchase orders
3 -- did QA review them, and is the signature there. You
4 might have one standard for that. And we discussed
5 calculations on whether they were traceable. You could,
6 again, go and do a random sampling and you could have a
7 certain acceptance criteria on that that you could say.

8 Q But isn't it always an attempt to make the
9 reportable deviations go toward zero as the program is
10 pursued?

11 A (WITNESS HUBBARD) I definitely support that.
12 As a quality manager, you want zero non-compliances.
13 You want to be in total compliance. However, you also
14 want a basis for an audit program. If you're going to
15 go out and do an audit program it seems, in my judgment,
16 -- and you're going to use that to then say the program
17 either is or is not working -- you need to upfront have
18 thought about what it is that is important to audit, and
19 then have some basis for then saying either the program
20 is working or isn't, based upon what you find. And
21 there are mathematical techniques that can assist one in
22 doing that.

23 Q My point is I don't think there is agreement
24 on numerical standards for all of these categories.

25 A (WITNESS HUBBARD) Well, that may be true, but

1 that doesn't say one shouldn't use some sort of a
2 statistical technique to arrive at some conclusion and
3 then be able to say to somebody well, this is what I
4 have done and this is what I've looked at, and based
5 upon what I found this is the degree of confidence I
6 have.

7 Q In the sense of being defensible and
8 understandable.

9 A (WITNESS HUBBARD) Yes.

10 Q But given all of that, there is still the
11 fundamental question of what these numbers, what the
12 goals should look like. That is where I am struggling
13 in the context of criterion 18, which implies that some
14 deficiencies will be found.

15 A (WITNESS HUBBARD) I could understand why
16 you're struggling with that. I was thinking this
17 morning in the shower that is a little equivalent to the
18 safety goal. But it still says to me that you ought to
19 embark upon the mathematical techniques to give you an
20 answer, and then you have achieved a certain amount of
21 knowledge just by the discipline of doing that. And
22 then, there is still going to be some amount of
23 discussion on what is acceptable.

24 But I think that you're going to have to walk
25 before you run maybe, so it makes some -- it makes a lot

1 of sense to me to start out with these techniques, to
2 use random sampling, to use the statistical techniques
3 and then to try to set up some baseline criteria.

4 Q Well, as I say, my problem as an experimental
5 scientist used to doing such things, where I'm having
6 trouble is finding the regulations and guidance as to
7 what is required and what is not required. And I agree
8 philosophically with you perhaps, but I am having a lot
9 of trouble seeing exactly how the regulatory framework
10 meets those enthusiasms at the present time.

11 Thank you.

12 JUDGE BRENNER: One thing we had in mind --
13 and I will leave this up to the parties -- I guess
14 immediately, Mr. Bordenick, we thought it might be
15 useful if we could start the staff's questions and break
16 for lunch a little later, at about 12:30, thereby giving
17 Mr. Lanpher the benefit of at least part of the staff's
18 questioning. But if you want to take the lunch break
19 first, Mr. Bordenick, I will give you that option.

20 MR. BORDENICK: Judge Brenner, I think my
21 cross examination is going to be relatively short and
22 I'm willing to forge ahead now.

23 JUDGE BRENNER: Let's do that. We will take a
24 longer lunch. We will discuss how long right around
25 12:30. We're thinking of about two hours to give you

1 more time, Mr. Lanpher, with the thought that we would
2 then be back here at approximately 2:30, and then ask
3 you to proceed as far as you can, hopefully making as
4 full use of the time remaining today as you believe you
5 reasonably can. But as you approach the end of the day,
6 even if you finish everything you have today, we will
7 give you the option to come back tomorrow morning and
8 say you have more, even if you don't know as of the time
9 you finish today whether you have more or not.

10 We will let you think about that overnight.
11 Does that make sense to you? You're looking as if it
12 doesn't. Even if we get lucky and you've asked
13 everything you were going to ask today.

14 MR. LANPHER: On all of Mr. Hubbard's cross
15 examination?

16 JUDGE BRENNER: Yes. Even if we're going to
17 get that lucky, we would give you the opportunity to
18 come back tomorrow morning. We are willing to start
19 earlier tomorrow but we would prefer to do it at 8:30
20 rather than 8:00. And let's see where we are near the
21 end of the day today. I want to sandwich in the
22 discussion on the schedule of the other items at the
23 most opportune time. That might be the end of the day
24 today, depending upon wherever Mr. Lanpher's redirect
25 goes, or it might be at the end of the day tomorrow.

1 But we won't do it first thing tomorrow because we want
2 to make sure we finish Mr. Hubbard before we do that.

3 Okay. So let's proceed with the staff's
4 examination of Mr. Hubbard at this time.

5 MR. BORDENICK: For the benefit of the Board
6 and Mr. Hubbard, I'm really going to have what are in
7 the nature of follow-up questions on Mr. Ellis's cross
8 plan, I guess would be Part V. And that generally
9 corresponds, Mr. Hubbard, to Part V of your testimony.

10 CROSS EXAMINATION

11 BY MR. BORDENICK:

12 Q In your testimony, Mr. Hubbard, just looking
13 at Part V at the major subheadings, A, B and C and the
14 discussion contained in those subparts of your testimony
15 and the various answers to Mr. Ellis's questions over
16 the last several days as regards that particular
17 subpart, for the sake of discussion, assuming all of
18 those what I will call criticisms by you of the NRC
19 inspection program are valid, would it be a fair
20 statement on my part to say that those criticisms are
21 really generic in nature rather than a criticism of the
22 specific program by I&E at Shoreham?

23 (Pause.)

24 A (WITNESS HUBBARD) No, Mr. Bordenick. There
25 are some generic discussions about my belief of the

1 effectiveness of the I&E program, and that is given, I
2 guess, as more of a context in which I then address
3 Shoreham, and I get into some Shoreham specifics using
4 the generic information in the context or as setting the
5 context. So I think it discusses both generic and some
6 Shoreham-specific items.

7 Q In your testimony at various times you have
8 referred to QA problems discovered at various other
9 facilities under construction. I think you have
10 referred on numerous occasions to mainly Diablo Canyon.
11 I think you referred to South Texas, Midland, Marble
12 Hill. Have I included them all? Were there any other
13 facilities I have left out that you can recall offhand?

14 JUDGE BRENNER: Zimmer.

15 BY MR. BORDENICK (Resuming):

16 Q Yes, Zimmer. Are you suggesting either in
17 your written testimony or in response to questions by
18 Mr. Ellis or the Board that any of the same types of
19 problems that have been discovered at those facilities
20 exist at Shoreham?

21 A (WITNESS HUBBARD) I will have to answer that
22 yes and no. I'm suggesting that the NRC's program has
23 not brought out quality problems in a timely fashion at
24 a number of sites, in the ones we just mentioned. And
25 then I'm suggesting that that same program was applied

1 at Shoreham, and then the conclusion I draw is that it
2 is difficult to get a great deal of confidence, then,
3 that the program has, in fact, been effectively
4 implemented.

5 I wouldn't give it a lot of weight of proof as
6 a scientist.

7 Q But you are not suggesting that there is any
8 evidence that you are aware of that these problems you
9 have alluded to at other facilities exist at Shoreham?
10 You are simply suggesting that you don't have full and
11 complete confidence that those problems might exist?
12 You are not suggesting they do exist; is that correct?

13 A (WITNESS HUBBARD) I am suggesting that, in
14 fact, they may exist. An example would be like, oh,
15 criterion 13; that there have been repeated findings in
16 that area. There was the staff's finding in, oh, around
17 1980 that new measures had been established to meet
18 criterion 13 and things were now under control. And
19 then we looked at Mr. Gerecke's reports of that same
20 time period saying that there were will problems with
21 criterion 13. And we have the CAT, and recent audit
22 reports which show problems with criterion 13.

23 I think we have also -- that brings up some
24 questions about implementation of criterion 16. So in
25 the design and construction, I think the pattern of what

1 the NRC has found; for example, the pattern of lack of
2 FSAR configuration control, the pattern of criterion 13
3 violations, those sorts of indications would indicate
4 that there may be a problem at Shoreham.

5 Q Again, as I understand your testim. -- you're
6 suggesting that there may be a problem; you are not
7 suggesting that, in fact, you have concrete evidence to
8 point to at this time to show that there, in fact, is a
9 problem. Is that correct?

10 A (WITNESS HUBBARD) That is correct, Mr.
11 Bordenick. I'm talking in terms of the effectiveness of
12 implementation of the quality assurance program. When
13 you find 50-some examples where criterion 5 wasn't met
14 over a number of years, that indicates to me that people
15 do work before the procedures are available, or they
16 don't follow the procedures.

17 And so, I conclude based on that that there is
18 a question that the program was effectively implemented.

19 Q Are you aware of any instances during the
20 construction of Shoreham where any allegations regarding
21 QA problems have been made by members of the public,
22 generally speaking?

23 A (WITNESS HUBBARD) I am aware that such
24 allegations have been made, yes.

25 Q Are you aware of the number? And I'm not

1 talking about the overall number of allegations but the
2 overall number of people that have made allegations?

3 A (WITNESS HUBBARD) No, I'm not.

4 Q But you are aware that there have been
5 allegations made?

6 A (WITNESS HUBBARD) That is right, I'm aware
7 they have been made but I haven't tried to look at the
8 complete history of them up to the present time.

9 Q To your knowledge, has the NRC, I&E or region
10 inspectors made investigations of those allegations?

11 A (WITNESS HUBBARD) I believe so, in general,
12 Mr. Bordenick, that there has been some investigation
13 but I really don't know. I mean, I have not tried to
14 keep a file of every allegation. I mean, first of all,
15 because I don't even know about it. They don't give me
16 the allegations; they give them to the NRC, so I don't
17 know what has happened to some of them once they got
18 inside the NRC.

19 Q Well, isn't it a fact that you have been
20 receiving copies of the NRC inspection reports for a
21 number of years?

22 A (WITNESS HUBBARD) Yes, that is true.

23 Q Can you tell us in round numbers how long it
24 has been since you have been receiving inspection
25 reports?

1 A (WITNESS HUBBARD) Well, I don't receive them
2 from the NRC. The county does. And it has only been
3 recently that I have received them. In fact, I received
4 them from you. Those are the only ones I received
5 directly from the NRC.

6 The county has been receiving them and I don't
7 know for how long that has been. But I have gotten my
8 copies either from you or from the public document room.

9 Q Do you know where the results of NRC
10 inspections of allegations made by members of the
11 general public are reported or documented? In other
12 words, --

13 A (WITNESS HUBBARD) I would expect they would be
14 documented in the I&E reports that have the serial
15 numbers each year, just like the recent one we received.

16 Q You've mentioned a meeting that you attended
17 on, I believe, March 15th of this year that was
18 conducted by Mr. Harold Denton and attended by
19 representatives of the applicant in this proceeding.

20 A (WITNESS HUBBARD) Yes, that is correct.

21 Q Did I give the correct date of the meeting?

22 A (WITNESS HUBBARD) Yes, that is correct, March
23 15th.

24 Q Can you give me a very concise summary of what
25 you understood to be the purpose of that meeting and the

1 result of that meeting?

2 A (WITNESS HUBBARD) Well, I don't have the words
3 of the meeting notice in front of me.

4 Q Just based upon your recollection.

5 A (WITNESS HUBBARD) I recall that Mr. Pollock
6 and Mr. Museler presented the design and construction QA
7 program that LILCO had implemented. And that that took
8 up the majority of the day with transparencies and
9 viewgraphs of that.

10 And it was basically LILCO's description of
11 why they had confidence in the quality of the plant as
12 built. Operational QA was not discussed, as I recall,
13 and then at the end, Mr. Kelly of the QA Department very
14 briefly talked about some of the inspection activities
15 that had gone on at the plant. And I think the context
16 of this was part of meetings that, as I understood, Mr.
17 Denton was having with a number of the applicants for
18 near-term operating licenses.

19 And then following that meeting, there was
20 then the LILCO proposal to have the Teledyne review done.

21 Q Why was it that LILCO made that particular
22 proposal, if you can recall?

23 A (WITNESS HUBBARD) That would be pure surmising
24 on my part. It seemed to me that it was evident at the
25 March 15th meeting that applicants were -- and I use

1 "voluntarily" in quotes -- doing some independent design
2 reviews and physical inspections. And I know -- I
3 recall some discussions of them at the March 15th
4 meeting about what LaSalle was doing and about what some
5 other plants were doing, and Mr. Denton expressing the
6 opinion that everybody had a QA program, so he didn't
7 want to hear about that. He was really interested in
8 implementation. And he was particularly interested in
9 implementation in the design area, and in particular,
10 where design changes had occurred late in the project,
11 like the MARK II or the seismic redesign at Diablo.

12 But it was a far-ranging discussion, Mr.
13 Bordenick, so I wouldn't want to surmise why it is that
14 LILCO ended up proposing the Teledyne -- I don't think
15 they were ordered to do that.

16 Q In fact, they didn't propose to do the
17 Teledyne study at that meeting, did they?

18 A (WITNESS HUBBARD) To the best of my
19 recollection, no, they did not.

20 Q Do you recall Mr. Denton asking you for your
21 observations at that meeting?

22 A (WITNESS HUBBARD) I have attended a lot of
23 meetings where he has asked me for my observations, so
24 if you say he did, --

25 Q Well, I take it from your answer you don't

1 recall?

2 A (WITNESS HUBBARD) I don't recall what I
3 observed.

4 Q That is understandable. You talked about, in
5 response to questions from Mr. Ellis, the GE topical
6 reports. Is that correct?

7 A (WITNESS HUBBARD) The GE topical report on
8 quality assurance, yes.

9 Q When you were responding to those questions,
10 what particular timeframe were you talking about? The
11 1975-1976 timeframe?

12 A (WITNESS HUBBARD) Well, I wasn't responding
13 with any timeframe in mind. I have kept some track of
14 the GE topical report over time, the number of revisions
15 it has been through.

16 Q Actually, that was going to be my next
17 question. Have you kept current on the GE topical
18 reports?

19 A (WITNESS HUBBARD) Only in the broadest sense,
20 that I have tried, when I saw they were revising them,
21 and I get a daily accession list of what goes into the
22 PDR. And when I am in my office in San Jose, which
23 hasn't been too frequent, I review that, and when I see
24 that they revised it, then I ask for the latest
25 revision. But it has not been something on my list but

1 it something that I have had a continuing interest in.

2 Q So you're generally familiar with the changes
3 that have taken place over the last few years?

4 A (WITNESS HUBBARD) I am familiar that changes
5 have taken place, but I wouldn't want to go into the --

6 Q You couldn't give specifics?

7 A (WITNESS HUBBARD) No.

8 Q Does LILCO reference the GE topical QA reports
9 in the FSAR?

10 A (WITNESS HUBBARD) I didn't study that in
11 detail because that had to do with design and
12 construction, and I felt that that was not the part of
13 the program that was being looked at. But I don't
14 recall LILCO referencing it in the design and
15 construction section, 17.1.

16 Q Mr. Hubbard, again in Part V of your testimony
17 you referenced the GAO report, you referenced the Sandia
18 1976 study, you referenced the -- I should say
19 referenced and discuss the so-called Kemeny Commission
20 review. Would you agree that with respect to QA --
21 well, let's take, for example, the Sandia 1976 study.
22 If you take a snapshot of the staff's efforts, for
23 example, in QA at that time and compare it to a snapshot
24 that you take, for example, today, that the picture is
25 going to change?

1 A (WITNESS HUBBARD) Yes, I think that is
2 correct, Mr. Bordenick.

3 Q But in summary, I guess it is your testimony
4 that although improvements have been made since some of
5 these reports and studies that there is room for further
6 improvement?

7 A (WITNESS HUBBARD) That is correct. You have
8 to decide what is a minimum acceptable level, and in my
9 opinion, the net of changes hasn't gotten up to that
10 level which I call minimum acceptable.

11 Q And if I recall your testimony given the QA
12 program regulatory requirements to be more specific,
13 over the years and up till now, it is not your
14 contention that the NRC people involved with review of
15 Shoreham either lacked qualification or dedication to
16 what it is they were doing. Is that a fair statement of
17 my recollection of your testimony in that regard?

18 A (WITNESS HUBBARD) I don't testify about
19 qualification and dedication of the NRC people, but I
20 have no reason to doubt that they are dedicated, and I
21 haven't studied their qualifications. And the main ones
22 I would be familiar with would be Mr. Gilray of the NRR
23 who has been looking at the program, and then Mr.
24 Higgins at the site.

25 So when you say the NRC personnel, I don't

1 know exactly who you have in mind.

2 Q Well, I will concede there have been a lot of
3 people, and I'm sure you're not familiar with all of
4 them. And I think I would agree or I would ask you
5 whether you would agree with me that Mr. Higgins and Mr.
6 Gilray, who are on the panel, are probably two of the
7 more vocal or important people as regards the review of
8 Shoreham; is that correct?

9 A (WITNESS HUBBARD) I think in general I would
10 agree with that. I am not sure if Mr. Gilray did some
11 of the reviews that are documented in the SER. My
12 recollection is that it was done by somebody else, but
13 yes.

14 JUDGE BRENNER: Mr. Bordenick, I think we
15 would like to break at this point, unless you only have
16 one or two more.

17 MR. BORDENICK: Well, perhaps we can break,
18 and over the break I may or may not have some
19 additional, but perhaps it would expedite things to
20 simply break at this point.

21 JUDGE BRENNER: All right. Let's break and
22 come back with your additional questions, if you have
23 any. So we will break for two hours and come back at
24 2:30, and then do as much as we can today.

25 (Whereupon, at 12:35 p.m., the hearing in the

1 above-entitled matter was recessed for lunch, to
2 reconvene at 2:30 p.m. the same day.)

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1 AFTERNOON SESSION

2 (2:35 p.m.)

3 JUDGE BRENNER: All right. We are back on the
4 record.

5 Mr. Bordenick, do you have more questions?

6 MR. BORDENICK: No, I don't, Judge Brenner.

7 JUDGE BRENNER: We will go to Mr. Lanpher for
8 the redirect then.

9 MR. LANPHER: Is the Board going to have
10 questions, or are they going to hold it until after
11 redirect?

12 JUDGE BRENNER: I wanted to hold mine.

13 MR. LANPHER: Well, I'm ready to go forward,
14 Judge.

15 JUDGE BRENNER: We may jump in along the way
16 with you, but otherwise we will hold them.

17 MR. LANPHER: Judge Brenner, so you know and
18 everyone knows what I am proposing to do, I was a little
19 surprised that we finished as early as we did. I am
20 proposing to pursue at this time, subject to the caveat
21 you stated before lunch about tomorrow morning, all of
22 the redirect on items other than detailed questions on
23 the CAT inspection where we may need to go to the FSAR
24 and pull together a number of things. We have done some
25 work on that. I don't expect that to be extended

1 redirect examination.

2 I would be proposing to delay that until
3 tomorrow morning, but to try to accomplish everything
4 else this afternoon.

5 JUDGE BRENNER: Okay. And with that part
6 tomorrow morning could you estimate about how long it
7 would take? You said not very long. About an hour?

8 MR. LANPHER: Tomorrow morning?

9 JUDGE BRENNER: Yes. Just the detail on the
10 CAT.

11 MR. LANPHER: I think that is a fair
12 estimate. I doubt that it would be more than that.

13 JUDGE BRENNER: Okay. Let's see where we get
14 to today and then decide whether we should have some
15 followup on all areas other than that today if there is
16 still time left. And that will help assure that we will
17 be finished with Mr. Hubbard tomorrow also.

18 MR. LANPHER: Fine. I just wanted you to know
19 where I was going.

20 Whereupon,

21 RICHARD B. HUBBARD
22 resumed the stand and was further examined and testified
23 as follows:

24 REDIRECT EXAMINATION

25 BY MR. LANPHER:

1 Q Mr. Hubbard, shortly before we adjourned for
2 lunch Judge Carpenter asked you some questions in the
3 area of statistical methods and the use of judgment in
4 an audit program; and I believe the specific reference
5 was with respect to the I&E program in particular.

6 Could you please describe when in an audit
7 program you believe statistical methods are appropriate
8 and when judgmental factors are appropriate to be used?

9 A (WITNESS HUBBARD) I think that the judgment
10 first comes in where you are deciding what it is that
11 needs to be looked at. That would be to determine do we
12 want to look at welds or storage or receiving inspection
13 or qualifications of a particular type of welder. It is
14 scoping out what it is that needs to be looked at in the
15 audit program. Then the statistical techniques would
16 come in. Once one had made a decision based upon
17 judgment of what to look at, then one would use the
18 statistical techniques to take some samples, and then
19 based on that extrapolate that to whatever the
20 population had been selected as part of the judgment.

21 And then the next part where really judgment
22 would come in again would be on what do you do as a
23 result of the audit findings. You would make judgments
24 on that, judgments on what corrective action was
25 required, judgments on how fast the corrective action

1 should be completed, and judgments on what one might do
2 on work that had previously been accomplished under
3 whatever deficiencies might be detected.

4 So it seems to me that you use a great deal of
5 judgment in the design of an audit program, and you use
6 statistics to really support one narrow aspect of that
7 which is the selection of samples, and then the ability
8 to take the samples and extrapolate that to the
9 population so that -- and I think I've said this before,
10 to make sure I'm very clear -- that I think the two
11 areas of statistics and use of engineering judgment
12 complement each other. They do not contradict each
13 other. They are very complementary.

14 Q Mr. Hubbard, I believe it also was Judge
15 Carpenter who asked you shortly before lunch in the same
16 vein relating to statistics whether there was a
17 regulatory requirement for use of statistics, and you
18 referred him to Criterion 18 of Appendix B. I would
19 like to refer you back to Criterion 18, and could you
20 direct us to what word or words or portions of Criterion
21 18 you believe do require, or an interpretation of that
22 criterion, require the use of statistical methodology of
23 the kind you have been proposing?

24 A (WITNESS HUBBARD) Criterion 18, the first
25 sentence, it says that, "A comprehensive system of

1 planned and periodic audits shall be carried out to
2 verify compliance with all aspects of the quality
3 assurance program and to determine the effectiveness of
4 the program."

5 So I think some of the key words are
6 "comprehensive" and then "to verify compliance with all
7 aspects," and then also the part that one has to make a
8 determination about the effectiveness of the program.
9 Historically, that determination has been made by taking
10 samples; so if one is going to make a determination
11 about the effectiveness of the whole program based on
12 samples, then I think that statistical methodology would
13 be appropriate for use in that determination.

14 Q Am I correct, Mr. Hubbard, that the reason
15 that such statistical methodology is appropriate is
16 something you alluded to earlier, the need to
17 extrapolate to the entire population?

18 A (WITNESS HUBBARD) Yes, that is correct.

19 MR. ELLIS: I'm sorry. I wasn't quick enough
20 on the trigger. I objected to the question on the
21 ground that it was leading.

22 BY MR. LANPHER: (Resuming)

23 Q Mr. Hubbard, there has been substantial
24 testimony at various places in the last four or five
25 days regarding the coverage of Appendix B as it

1 complements and as it relates to General Design
2 Criterion 1 in the area of quality assurance. I believe
3 the question by Mr. Ellis clearly indicates you have a
4 disagreement with the scope of the quality assurance
5 programs that LILCO has in effect and proposes for the
6 future.

7 Could you briefly summarize that disagreement?

8 A (WITNESS HUBBARD) Yes.

9 MR. ELLIS: I object to the question. It is
10 repetitive and isn't in the form of redirect. It is in
11 the form of getting the witness to summarize testimony
12 he has already testified to and is already in his
13 written testimony.

14 JUDGE BRENNER: It wasn't typical type
15 efficient redirect in terms of focusing on something he
16 was asked about. I think we do have it already, and
17 we're going to hear something that we have already heard
18 based on your question.

19 Now, you may have something in mind that we
20 haven't heard, and if so, I can't tell that from the
21 question. Why don't you focus it a little better and
22 then just ask him for a general summary, Mr. Lanpher?
23 And I think that would help you as well as the record.

24 MR. LANPHER: Well, let me comment, Judge
25 Brenner, on one thing to the extent some of the matters

1 that I'm going to cover have been covered in the prior
2 testimony.

3 It is at diverse locations, and I think
4 sometimes it is hard to pull it all together. And my
5 purpose here is to pull it together so the points that I
6 think and Mr. Hubbard thinks are important are
7 emphasized.

8 JUDGE BRENNER: That is certainly true within
9 the realm of reason, but when you ask for a general
10 summary, it is not the most efficient way to do that,
11 and you may find out that the witness is not on the same
12 wavelength as you, or if you prepared him right that
13 won't be a problem.

14 But ask it a little more directly.

15 MR. LANPHER: Fine.

16 BY MR. LANPHER: (Resuming)

17 Q Mr. Hubbard, what systems, structures and
18 components in your opinion are covered by Appendix B to
19 Part 50?

20 A (WITNESS HUBBARD) Appendix B has primarily
21 been used to address safety-related items as used by the
22 Denton definition.

23 Q What structures, systems and components are
24 covered by the quality assurance requirements of General
25 Design Criterion 1?

1 A (WITNESS HUBBARD) General Design Criterion 1
2 covers a wider range of those important to safety where
3 the safety-related ones, structures, systems and
4 components, would be a subset of that larger category of
5 items important to safety.

6 JUDGE BRENNER: You didn't think we forgot
7 that testimony, did you, Mr. Lanpher? You see, I
8 understood your point about bringing things together.

9 MR. LANPHER: I'm just trying to lay the
10 context, Judge Brenner.

11 JUDGE BRENNER: That particular thing, those
12 two questions have so permeated extensive testimony
13 here, both in 7B and here, that it truly was
14 repetitive. But go ahead.

15 BY MR. LANPHER: (Resuming)

16 Q Mr. Hubbard, in General Design Criterion 1
17 there's reference made to quality assurance. What does
18 quality assurance mean to you as used in GDC 1?

19 A (WITNESS HUBBARD) Well, there are definitions
20 of quality assurance in the regulations, but in terms of
21 what we've been talking about in this proceeding, that
22 quality assurance is a process. It is a process that
23 goes all the way from design through to operation. It
24 is a discipline process that you basically plan what you
25 do and do what you plan and then document that you did

1 it. It is a process that is controlled by procedures,
2 and they are the type of procedures I have in mind are
3 the ones you assign who's responsible, what it is they
4 are going to do, when it is they're going to do it, and
5 how they're going to do it.

6 So that is why these are some of the aspects I
7 see of quality assurance as intended by GDC 1 and as set
8 forth by the 18 criteria of Appendix B.

9 Q Mr. Hubbard, you've testified you do not
10 believe LILCO complies with GDC 1, at least insofar as
11 systems, structures and components important to safety
12 but not safety-related are concerned. What is the basis
13 for that?

14 MR. ELLIS: Judge, isn't this repetitive of 7B
15 as well?

16 JUDGE BRENNER: If you're asking a question as
17 opposed to an objection --

18 MR. ELLIS: It is an objection. It is
19 repetitive.

20 JUDGE BRENNER: I will overrule the
21 objection. Yes, it is somewhat repetitive, but he is
22 hitting it in a fresh context here, and in fact, in the
23 same context that you considered fresh enough to inquire
24 into on cross examination.

25 Go ahead. Do you have the question?

1 WITNESS HUBBARD: I think I remember. I
2 reviewed the LILCO QA Manuals for design, construction
3 and operation, and I have also reviewed the Section 17.2
4 of the FSAR; and my judgment is that the QA Manuals and
5 the FSAR focus on compliance with the Appendix B
6 requirements for safety-related items, and that there is
7 not a systematic program described by LILCO for items
8 important to safety.

9 BY MR. LANPHER: (Presuming)

10 Q Mr. Hubbard, in earlier testimony it was
11 brought out that the I&E program has devoted between
12 7,000 and I guess 9,000 and 12,000 hours looking at the
13 Shoreham facility. Is your criticism of I&E's program
14 relating to Shoreham premised on the fact that that
15 number of hours is insufficient?

16 A (WITNESS HUBBARD) In part, yes, but my more
17 basic concern about the I&E program is that, one, that
18 it almost entirely focuses on safety-related activities,
19 and so the scope of the program is too narrow. It
20 doesn't look at the broader category of items important
21 to safety in a comprehensive manner.

22 And then secondly, the I&E program is based on
23 sampling without using the statistical methodologies for
24 extrapolation; and so I feel that if the scope and the
25 use of statistical methodologies were modified, as I

1 have suggested that one might be able to accomplish the
2 I&E function with about the same amount of hours, but
3 that hasn't occurred at Shoreham.

4 Q Mr. Hubbard, in cross examination by Mr. Ellis
5 from an earlier day -- and I don't have the transcript
6 reference with me -- you were asked questions regarding
7 Attachment 3 to your prefiled testimony, that portion of
8 the Dircks memorandum which indicated that six specific
9 activities were taking place to respond to some of the
10 quality assurance deficiencies that he addressed.

11 Do you recall that earlier testimony?

12 A (WITNESS HUBBARD) Yes, I do, Mr. Lanpher.

13 Q Is it your opinion that those fixes or
14 measures described by Mr. Dircks -- and it is at pages
15 3-16 through 3-18 of Attachment 3 to your testimony --
16 is it your testimony that those are sufficient fixes for
17 the I&E program?

18 A (WITNESS HUBBARD) No. These six specific
19 activities don't fix the problems with the I&E program.
20 First of all, they relate almost entirely to
21 construction activities, so that means that it doesn't
22 focus on the need for I&E's involvement in design
23 activities, in activities of the manufacturer and in
24 activities looking at the operating QA program.

25 And then secondly, even the part that has to

1 do with construction doesn't go to the two points I just
2 stated before. It doesn't go to compliance with GDC 1
3 to have an I&E program that is comprehensive looking at
4 items important to safety, nor does it cover the use of
5 statistical methodologies to extrapolate the results.

6 So the fixes, in summary then, I think will
7 have some benefit, but they don't address the complete
8 problem at all.

9 Q Mr. Hubbard, earlier this morning there were
10 questions relating to the question of the independence
11 of the operating quality assurance engineer under the
12 Shoreham or LILCO organization. I would like to direct
13 your attention to Attachment 7 of your prefiled
14 testimony.

15 Mr. Hubbard, do you find that that is the
16 utility, the so-called utility audit we referred to
17 before? Do you find support for your position that the
18 present organization reporting to the plant manager is
19 not the preferred one?

20 A (WITNESS HUBBARD) Yes, I do.

21 Q And what is that support?

22 A (WITNESS HUBBARD) At page 7.5 of the
23 attachment to my testimony, the area examined is the
24 reporting chain for the operations QA engineer, and the
25 assessment by the auditors is that the OQA reporting

1 functionally to the plant manager is not in concert with
2 current NRC thinking as noted in NUREG-0731 which
3 recommends that the onsite QA function should report to
4 the offsite QA manager. And then the recommended
5 action, again as stated at page 7.5 of the attachment,
6 is that LILCO should reassess the reporting chain for
7 the OQAE.

8 Q Mr. Hubbard, this morning there was
9 questioning related to the draft settlement between the
10 County and LILCO which was rejected by the County
11 legislature last December, December 1981. If that draft
12 settlement were proposed today would you support it?

13 A (WITNESS HUBBARD) No, I would not.

14 Q Why not?

15 A (WITNESS HUBBARD) Well, you have to get into
16 the context of history really. In March to April a year
17 ago a lot of the quality problems that eventually
18 surfaced had not, so at that time the idea of having an
19 independent auditor come in and look at the construction
20 QA program was, I think, a rather revolutionary
21 concept. It had not been tried at any plants and
22 anything of that sort.

23 So while the settlement agreement, including
24 that facet, was being reviewed, then you had the
25 continuing problems at South Texas and then the

1 beginning of the problems at Diablo Canyon, and I know
2 in my case the growing awareness of the real weaknesses
3 in the QA program implementation. And so --

4 JUDGE BRENNER: At Shoreham?

5 WITNESS HUBBARD: No. In general, Judge
6 Brenner.

7 So with that as context, and then further
8 things like I participated in the recommendations to
9 have an independent auditor at Diablo Canyon. I
10 mentioned before I testified in Congress about the need
11 of independent audits. Chairman Palladino picked up on
12 the ideas from this and a number of others and stated he
13 thought that was a good idea.

14 Southern Cal Edison in California which had
15 the San Onofre plant which was somewhat of a similiar
16 condition to Diablo Canyon on their own went ahead and
17 hired Torrey Pines and spent about a million and a half
18 dollars on a design review and physical inspection.
19 They did this on a voluntary basis. Harold Denton then
20 started having meetings with utilities and LaSalle,
21 Grand Gulf, Susquehanna and a number of these other
22 plants developed independent audits, as well as Shoreham.

23 And so what I see is that back in March of
24 1981 when we started the settlement discussion the idea
25 of an independent audit was a rather revolutionary

1 concept. But now looking at it with what we know today,
2 I think the County legislature when they turned down the
3 settlement in December made an appropriate decision
4 because it was not as comprehensive as the audits that I
5 think the County believes and I personally believe
6 should be done based upon what I know today.

7 BY MR. LANPHER: (Resuming)

8 Q Mr. Hubbard, LILCO Exhibit 50 for
9 identification are extracts from the GAO report from
10 1978, and in that exhibit one of the pages which was
11 provided by LILCO was page 31 which depicts areas where
12 in 1978 the NRC disagreed with GAO recommendations.

13 Mr. Hubbard, do you know whether the GAO
14 responded to these NRC comments?

15 A (WITNESS HUBBARD) Yes, they did.

16 Q Where did they respond?

17 A (WITNESS HUBBARD) They responded in detail at
18 pages 32 to 34 of the GAO report right after page 31
19 that Mr. Ellis provided. And they also summarized their
20 view of the GAO review at page 8 of the digest. And
21 here is what GAO said, and I quote: "GAO considered the
22 Commission's views in each of these areas and still
23 believes the conclusions and recommendations are valid.
24 Each area is dealt with as applicable in the body of the
25 report. See pages 31 to 34."

1 Q So is it fair to state, Mr. Hubbard, that GAO,
2 after considering the NRC comments, did not change any
3 of its recommendations?

4 A (WITNESS HUBBARD) I don't have the draft
5 report, Mr. Lanpher, so I don't know if they changed
6 their recommendations. But I would interpret what they
7 said and that they said that they still believe the
8 conclusion that their recommendations are valid.

9 Q And those are the recommendations which you
10 have quoted in your testimony that also appear on the
11 front of LILCO Exhibit 50? Are those the
12 recommendations you were referring to, Mr. Hubbard?

13 A (WITNESS HUBBARD) No, Mr. Lanpher. The
14 recommendations are throughout the report but are
15 summarized really in the digest which goes on for about
16 eight pages. So the recommendations go into a great
17 deal more detail than what is shown in the quote that I
18 cited in my testimony. However, the sum of the
19 recommendations, as I stated before, are consistent with
20 the brief quote that I have in my testimony.

21 Q Mr. Hubbard, I believe on the first day of
22 your cross examination -- I do have a page reference; it
23 was at transcript pages 15,285 through 15,291 -- you
24 indicated that you do not have extensive experience at
25 nuclear plant construction sites.

1 MR. ELLIS: Would you give us a minute to get
2 the book out, please?

3 (Pause.)

4 MR. LANPHER: This was the December 2
5 transcript.

6 MR. ELLIS: We have it now. Thank you.

7 BY MR. LANPHER: (Resuming)

8 Q Mr. Hubbard, do you believe that the amount of
9 -- notwithstanding the amount of experience that you
10 have had actually being at construction sites for
11 nuclear power plants, that you are in a position to
12 provide opinions on the quality assurance and quality
13 control during construction of a nuclear power reactor?

14 A (WITNESS HUBBARD) Yes, I do.

15 Q Could you please explain?

16 A (WITNESS HUBBARD) Both during the design and
17 manufacturing operations, which I managed, and during
18 the construction of the plant Appendix B applied. And
19 while I was at General Electric I developed the Appendix
20 B QA program. Also at GE I was responsible for the QA
21 program for the General Electric ASME Code Stamp.

22 So the 18 criteria are the 18 criteria, and
23 the idea that you have to have disciplined procedures
24 and you have to have discipline of the same, whether
25 it's manufacturing, design, construction. QA is QA, and

1 it is the same 18 aspects being looked at.

2 We spent a lot of time here talking about
3 storage, and I had some of the same storage problems at
4 GE that there are storage problems at a construction
5 site. For example, part of the QA group I managed had a
6 machine shop, so we had a lot of pipe and other types of
7 material that we stored outside. So I had storage areas
8 outside. I had storage areas inside where I had to
9 maintain cleanliness and maintain identification of the
10 equipment. And I also managed GE's spare parts
11 warehouse where we were keeping the spares for not one
12 plant but that we would -- that General Electric would
13 send to a number of plants.

14 Many of the activities were the same things.
15 Under the QA program I managed there was welding, there
16 was electrical, there were special processes, there was
17 cleaning -- by that, cleaning of pipes prior to welding
18 -- machining, cleaning rooms. I think the similarities
19 are much greater than the differences.

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1 Q Mr. Hubbard, in your cross-examination there
2 was on a number of occasions reference to design control
3 and the design process, particularly as it relates to a
4 discussion of Appendix B Criterion 3. With your quality
5 assurance work at General Electric, did that involve
6 responsibility in the area of implementation of a
7 program for Criterion 3?

8 A (WITNESS HUBBARD) Yes, it did.

9 Q Could you describe what those responsibilities
10 were?

11 A (WITNESS HUBBARD) Well, first of all, as part
12 of the ASME Code Stamp there was the design spec and the
13 stress analysis, the control of that, which is part of
14 the Code Stamp approval. And when I am talking about
15 the Code Stamp, GE had both an N Stamp and an NPT Stamp
16 for parts and appurtenances, and these were for nuclear
17 plants and for pressure-bearing components in general or
18 parts to them. And that was covered by the QA program I
19 managed.

20 Excuse me, Mr. Lanpher, the question has
21 totally slipped my mind. I have drawn a blank.

22 Q I asked you, Mr. Hubbard, to describe what
23 your responsibilities were with respect to
24 implementation of design control or the Criterion 3
25 program at GE.

1 A (WITNESS HUBBARD) Okay. The other area then
2 would be design to meet the 18 criteria for non-ASME
3 code items. And again in the Instrumentation and
4 Control Department, and then some other functions that
5 were done there outside of instrumentation and controls,
6 I was responsible for establishing the overall QA
7 program.

8 Now, the Engineering Department then wrote
9 their own practices and procedures, which I reviewed.
10 But they were written to be consistent with the QA
11 program requirements that I had outlined in the QA
12 program manual. And also, I was very involved in the
13 design review process that I personally spent many an
14 hour on GE's Design Review Committee where designers
15 would come in and present their review or their designs,
16 and we would critique them and do a formal review.

17 So I am familiar with the design process, the
18 design control process, and the reviews of design and
19 have done that personally.

20 Q Mr. Hubbard, in your answer you referred to
21 the N Stamp. What is an N Stamp?

22 A (WITNESS HUBBARD) That is what I was trying
23 to clarify. An N Stamp is a stamp, it is a code
24 authorization stamp that is issued by the ASME. And it
25 allows you to design and manufacture certain reactor

1 components.

2 JUDGE MORRIS: Excuse me, Mr. Lanpher.

3 Doesn't it go beyond that, Mr. Hubbard?

4 Doesn't it authorize the holder of the stamp to apply
5 that stamp to the component or equipment to then certify
6 that it meets the ASME Code?

7 WITNESS HUBBARD: Yes, it does. And in the
8 case of GE we did have an authorized inspector from the
9 State of California, that there was a constant
10 interaction with that authorized inspector all the way
11 that the authorized inspector had to approve, like our
12 receiving inspection procedures for incoming material.
13 And when we were ready to put on the code authorization,
14 the Code Stamp, we would put together a data package
15 that showed that we had been through all of the code
16 activities properly and the authorized inspector would
17 then look at that prior to us putting on the Code
18 Stamp. And likewise, the authorized inspector had the
19 ability to review our radiographs and things of that
20 nature.

21 So it was an ongoing relationship which ended
22 up with putting the stamp on some of these
23 pressure-bearing components.

24 BY MR. LANPHER: (Resuming)

25 Q Mr. Hubbard, in your earlier testimony you

1 described some of the IEEE work which you performed,
2 including that for replacement parts for Class 1
3 equipment in the area of calibration and in the area of
4 inspection and testing of electrical equipment. How did
5 this work relate to quality assurance?

6 MR. ELLIS: I object. We didn't ask any
7 questions that I can recall in this area during cross.

8 MR. LANPHER: There was discussion of it at
9 pages 15,241 and '42.

10 JUDGE BRENNER: I don't have the transcript.

11 MR. LANPHER: That is December 2.

12 JUDGE BRENNER: I know.

13 MR. LANPHER: Do you want to take a look at it?

14 JUDGE BRENNER: Please.

15 (Counsel hands document to Board.)

16 MR. ELLIS: Judge Brenner, I think he is
17 referring to the bottom of page 241 and the top of page
18 242. If that is responsive to my question, then my
19 objection is not well taken. If it is not responsive to
20 my question, then I think my objection is well taken.
21 And I repeated my question because I did not think that
22 it was responsive.

23 (Pause.)

24 JUDGE BRENNER: No, it wasn't responsive to
25 your question. However --

1 MR. LANPHER: May I be heard? I don't know if
2 I need to be heard.

3 JUDGE BRENNER: Well, you don't. His answer
4 did not respond to your question. That is number one.
5 So you get that so far, Mr. Ellis. It is pertinent to
6 the area. I am not going to let him, as a general rule,
7 allow nonresponsive answers to then bootstrap redirect,
8 which is your point although you do not phrase it that
9 way, ever since he started to talk about it.

10 And since you did inquire quite thoroughly
11 into his qualifications to give the testimony he gave,
12 we will allow leeway for that reason. So our analysis
13 goes beyond the mere fact that he stated it, that by
14 itself wouldn't have been sufficient where the answer is
15 not responsive. So we will allow the question and
16 answer.

17 BY MR. LANPHER: (Resuming)

18 Q Mr. Hubbard, do you recall the question?

19 A (WITNESS HUBBARD) No, I don't.

20 Q Mr. Hubbard, in earlier testimony you
21 described a reference or referenced some IEEE work which
22 you performed in the areas of replacement parts for
23 Class 1 equipment and calibration and inspection and
24 testing of electrical equipment. Would you please
25 describe how this work relates to quality assurance?

1 A (WITNESS HUBBARD) Yes. If one turned to page
2 13 of my prefiled testimony, I am one of the prime
3 authors of two of the standards that are listed in Table
4 III-1 of my testimony. First of all, the standard
5 N45.2.4, which is IEEE 336, which has to do with
6 installation, inspection, and testing requirements for
7 Class 1.E instrumentation and electric equipment at
8 nuclear generating stations, that is one that I am
9 author of.

10 I am also one of the authors of N45.2.16,
11 which is IEEE Standard 498, which is the requirement for
12 the calibration and control of measuring and test
13 equipment used in the construction and maintenance of
14 nuclear stations.

15 So both of these two standards that I am one
16 of the authors of have to do with activities at the
17 nuclear generating station. They have to do with
18 activities that are covered by a QA program; for
19 example, inspection and testing is Criteria 10 and 11,
20 and calibration is Criteria 12.

21 And not only do these standards address the
22 primary area like calibration, but they also address
23 such peripheral quality assurance program requirements
24 as records, things of that sort, nonconformances, and
25 other aspects of the 18 criteria.

1 Then the third standard -- well, there is
2 another standard that I am co-author of that only
3 applies to manufacturing but could be used in other
4 aspects. And that is the IEEE Standard 467, which is
5 the QA program requirements for the design and
6 manufacture of Class 1.E instrumentation and electric
7 equipment.

8 I have been for the last couple of years
9 working on a standard for replacement parts for Class 1
10 electrical equipment at nuclear stations. So this has
11 directly to do with operations. And I have been working
12 on the committee drafting that for a number of years.
13 So I am familiar with the QA standards that are used for
14 operation and have participated in writing a number of
15 them. And right now I am in the process of being one of
16 the co-authors on replacement parts standards. And
17 these all relate to QA activities.

18 The subcommittee I am on, Subcommittee 8, is
19 called -- or Committee 8 -- I am on Subcommittee 8.1 or
20 8.2 -- has to do with the general subject of quality
21 assurance.

22 Q Mr. Hubbard, in your earlier testimony in
23 response to Mr. Ellis, you indicated that you had never
24 written manuals or procedures for an operating quality
25 assurance program for an operating plant. Have you ever

1 written QA manuals?

2 A (WITNESS HUBBARD) Yes, I have.

3 Q Have you ever written QA procedures?

4 A (WITNESS HUBBARD) Yes, I have.

5 Q What criteria did you utilize in writing those?

6 A (WITNESS HUBBARD) Generally, Appendix B.

7 Q And in your opinion, is it significant in
8 terms of your qualifications -- you provide testimony
9 relating to the OQA program at Shoreham -- that you
10 haven't written an OQA manual or procedure?

11 A (WITNESS HUBBARD) No, it is not. I should
12 add to my last answer, I also was responsible for
13 writing the QA manual having to do with the ASME Code
14 authorization. And so I have written the procedures, I
15 have had the policies and procedures, I have had the
16 experience, and understand why one needs to document who
17 does what and when, because I have also had the
18 experience of not having procedures and not having
19 control and the discipline that is really required by a
20 quality program.

21 Q Mr. Hubbard, in a similar vein, you testified
22 in response to questions earlier that you have never
23 been involved in the implementation or responsible for
24 the implementation of an operating QA program for an
25 operating plant. Have you ever implemented or been

1 responsible for implementation of any QA program?

2 A (WITNESS HUBBARD) Yes, I have.

3 Q Were those the programs at General Electric
4 you testified to earlier?

5 A (WITNESS HUBBARD) Yes, they are.

6 Q Mr. Hubbard, let me show you transcript page
7 15,258. On that page you were asked whether it was "not
8 until the QA hearings began did you become aware of the
9 existence of what is, I believe, Attachment 4 to the
10 LILCO testimony?" And you answered, "That is correct."

11 Mr. Hubbard, the QA hearings began on
12 September 14. Did you know of Attachment 4 prior to
13 September 14?

14 A (WITNESS HUBBARD) Yes, I did.

15 Q When?

16 A (WITNESS HUBBARD) I knew about it about the
17 first of July, as soon as LILCO prefiled testimony was
18 filed.

19 Q Mr. Hubbard, in your previous testimony you
20 discussed your disagreement with or your reservations
21 about the FSAR discussion in section 17.2 of the FSAR
22 relating to the OQA program, indicating that you thought
23 the level of detail was not sufficient. Is the level of
24 detail the only problem in the OQA discussion with the
25 FSAR?

1 A (WITNESS HUBBARD) No.

2 Q What other problem have you identified, or
3 problems?

4 A (WITNESS HUBBARD) I think another major
5 problem would be with the OQA manual is that the OQA
6 description in the FSAR is that there is no description
7 of a comprehensive program to meet the requirements of
8 GDC 1. The FSAR description apparently only addresses
9 the narrower group of safety-related items. There are
10 other problems with the FSAR description which I set
11 forth in my testimony, such as the reporting chain for
12 the OQA engineer.

13 Q Mr. Hubbard, in earlier testimony you stated
14 that in your -- that a review of the I&E reports for the
15 Monticello and Prairie Island plants -- this was in
16 connection with the questioning on the MHB study --
17 several years ago was a valid way to get an outside
18 assessment of a QA program. Does this imply that in
19 your opinion it is proper to rely on the I&E program to
20 determine whether the quality assurance program at a
21 particular plant is adequate?

22 A (WITNESS HUBBARD) No.

23 Q Can you explain why?

24 A (WITNESS HUBBARD) Yes. I think if you have a
25 small amount of time, which we had in Minnesota, and you

1 are looking for areas which need to be delved into or
2 potentially delved into in more detail, the I&E program
3 results are a valid way of looking to see what the
4 pattern has been of findings, and it gives someone a
5 hint on where they should be using their judgment to
6 look at areas further.

7 However, as I stated before, I don't think
8 that the NRC program is comprehensive enough in what it
9 would allow one to extrapolate, that in fact a QA
10 program has been effectively implemented. I think the
11 NRC I&E program does give one some information on where
12 the potential problem areas are, but it doesn't provide
13 enough information that one can conclude that the
14 program, QA/QC program, has in fact been effectively
15 implemented.

16 And again, when I am talking about that, I am
17 saying only the I&E program for construction, knowing
18 that that is not addressing in detail the design
19 activities and the manufacturing activities. So it
20 gives information about one aspect.

21 Q Mr. Hubbard, at page 15,275 through '277 --

22 JUDGE BRENNER: Could I jump in just for one
23 second? When you had earlier talked about Prairie
24 Island and Monticello and again now up until your last
25 phrase, I thought you were including -- and with the

1 clarification you just made as to your use of the I&E
2 reports -- operations at those plants. Was I wrong as
3 to the time period of the I&E reports as to those plants
4 that was the subject of your study?

5 WITNESS HUBBARD: You are correct. In the one
6 I was looking at a minute ago I was thinking about
7 whether to say that or not. We did use it for
8 operations as well.

9 JUDGE BRENNER: And again, to the extent and
10 for the purpose you just indicated?

11 WITNESS HUBBARD: That is correct.

12 JUDGE BRENNER: Okay.

13 BY MR. LANPHER: (Resuming)

14 Q Mr. Hubbard, at pages 15,275 through '277. you
15 described your experience at General Electric in
16 assessing your needs for QA staffing. I believe you
17 discussed that a little bit today also in response to
18 Board questions. You also indicated, I believe it was,
19 at pages 15,281 that you think that the 14 persons
20 presently proposed by LILCO for the first year of
21 operation for OQA is in the right ballpark. What is
22 that based on?

23 A (WITNESS HUBBARD) It is based on a number of
24 factors, Mr. Lanpher. In a manufacturing area you
25 develop some rules of thumb about how many inspectors

1 one might need. For example, in a machine shop where
2 you are doing welding, using numerical tool and things
3 of that sort, it was not uncommon to have about a
4 10-to-1 ratio between craftsmen and inspectors.

5 And the electrical end, we might be making
6 circuit boards for broad position system or a neutron
7 monitoring system. The ratio between craftsmen and
8 inspectors and testers might run 4-to-1. I was involved
9 with a department of a thousand people, including
10 engineering and manufacturing. And as part of that, we
11 had about the equivalent of 200 QA people. So we had
12 about a 20 percent ratio.

13 I look at the 14 that LILCO is proposing with
14 a general staffing in the area of 150 or so. And that
15 is about a 10-to-1 ratio, or 10 percent of the total
16 people. And so based on that, it would seem to me that
17 the estimate by Mr. Muller of 30,000 hours is probably
18 someplace in the ballpark. I mean obviously I would
19 have preferred to have had him go through and list each
20 function and how many hours for each function and those
21 sorts of thing. But it appears to me it is in the
22 ballpark.

23 I do have some concern that if 30,000 is
24 right, that you don't really get 2,000 hours a year out
25 of a person. I mean you have vacations, holidays, and

1 so forth. And my recollection is his testimony was that
2 that 30,000 was really applied time or time the people
3 were on site. So I think the 30,000 hours, at least on
4 a judgment basis, is in the right ballpark. I think
5 that probably it takes more than 14 people to really do
6 30,000 hours without having a lot of overtime.

7 And then finally, I was concerned about that
8 beyond really the first year of operation, that we only
9 have a commitment in the FSAR for eight people beyond
10 that point in time. And I would have been more
11 comfortable and felt it more accurate if there had been
12 a commitment to keep it somewhere around the 14 level
13 following the first year.

14 Q Mr. Hubbard, at page 15 --

15 JUDGE CARPENTER: Excuse me, Mr. Lanpher, if I
16 may.

17 Mr. Hubbard, in that judgment, which as you
18 say leads you to the conclusion that it is no more
19 precise than it is "in the right ballpark," do you
20 consider the ISEG group, those five people, to be part
21 of this quality assurance team that contributes to
22 whether or not the program sits inside the ballpark or
23 not?

24 WITNESS HUBBARD: No, I do not, Judge
25 Carpenter. I think that the function that the ISEG

1 people perform is very important to quality in terms of
2 reviewing experience. But when I was speaking of the
3 ratios that I was using to develop the numbers, that
4 sort of analysis is done at a manufacturing plant in the
5 engineering function, that they do look at field
6 experience and to what has gone on at the operating
7 plant site and the construction sites.

8 And then in my reviewing of the transcripts on
9 ISEG, it was not clear to me how ISEG really fit into
10 the quality program or the quality personnel or
11 integrated into ISEG. And I think --

12 JUDGE CARPENTER: Yes, there was a fair degree
13 of independence.

14 WITNESS HUBBARD: So in a short answer to your
15 question, no, I haven't included them and I didn't also
16 include it in some of the 20-to-1 or 10-to-1 numbers,
17 that function.

18 JUDGE CARPENTER: Once again, acknowledging
19 that all you have testified to is that you felt it was
20 in the ballpark, I am still a little perplexed as to how
21 an operating power plant, whose principal product
22 presumably is electricity, is analogous to a
23 manufacturing plant in terms of the quality assurance
24 program.

25 To be more specific, for a manufacturing

1 plant, control of the quality of the product is
2 essentially a year-after-year question, whereas for the
3 power plant it looks like to me that there is very much
4 a graded quality assurance problem in terms of after a
5 few years either you are going to achieve them, get the
6 bugs out of the system or not.

7 I guess that perception comes more from my
8 thinking about taking delivery of some machinery, like a
9 ship, and shakedown cruises and rectifying deficiencies
10 where you might have to have quite a staff for that.
11 And in my mind, the analogy with the manufacturing
12 operation is not close. And I wonder if you could help
13 me a little with that.

14 WITNESS HUBBARD: I would be glad to take -- I
15 was going to say "a shot at that." But if you look at
16 the activities that go on, will go on during operation,
17 let's just whip through the 18 criteria, that there is
18 some amount of design activity going on because there
19 are continuing design modifications made to the plant.
20 So you have QA involvement in that, which is Criterion 3.

21 Then Criterion 4 has to do with procurement
22 document control, and again because of spare parts,
23 replacement parts, and also equipment for the new
24 designs that are being implemented, you have a constant
25 procurement cycle going on for the 40-year life of the

1 plant. So Criterion 4 is applicable. You have people
2 that have to be reviewing purchase orders, putting
3 quality requirements on them and so forth. They tend to
4 be lots of purchase orders with small dollar value. So
5 there is a lot of activity.

6 Criterion 5 and 6 are still applicable because you
7 are talking about needing to have document procedures
8 and seeing that they in fact are all at the right place.

9 And then 7 says that you will need to do receiving
10 inspection or qualifying your vendors. Well, the
11 qualifying of vendors for these replacement parts and so
12 forth is done off site, at LILCO, I understand.
13 However, you will still have the receiving inspection
14 function and the storage function and all of that. They
15 will be covered by Criterion 7.

16 8 has to do with tracability of material. You
17 keep your identification and the stores, warehouses, and
18 so forth. And again, you would have that in spades
19 during operation. You get a lot of equipment that you
20 are going to have to keep track of, and they tend to be
21 small.

22 And then 9, you are getting into special
23 processes. And again, you are going to be doing almost
24 all of the processes in the operating plant that were
25 done at the manufacturing or a number of them. You are

1 going to be doing soldering, you are going to be doing
2 welding, you are going to be doing cleaning, you are
3 going to be doing some machining, probably. So that
4 Criterion 9 activities will be going on.

5 Obviously, you do 10 and 11, inspection and
6 testing. 12 on calibration. You have got to keep the
7 instruments in the plant calibrated for that 40 years.
8 So you're going to -- and then you have to be sure that
9 the calibration lab is doing their work right.

10 13 is storage. And once again, there that
11 there is going to be QA activities like in a
12 manufacturing plant.

13 14 has to do with identification. And once
14 again, if you pull off leads or you tag things out, you
15 have got to have control, who can put tags on and who
16 can take them off and what the procedures are for doing
17 that.

18 And 15 is nonconforming material. Obviously,
19 that applies because when you are doing this maintenance
20 and that work, you have got to have some idea of have
21 you done it correctly. And so you are going to be doing
22 inspections and tests in 10 and 11 to make sure you
23 don't have the nonconforming material. That is
24 Criterion 15.

25 16 is corrective action. Again, if you have

1 problems in any of those activities, you would want to
2 do that. 17 is records, and there is going to be lots
3 of records during operation because you have to have
4 records on a number of these replacements and various
5 design modifications that are going on and records of
6 personnel.

7 And then 18 is audits, and we have already
8 heard that there will be an audit and surveillance
9 program.

10 So, I mean I have not thought out this answer,
11 but as I go through it, it seems to me that almost all
12 the activities will be going on, and it is fairly
13 comparable to the activities that would go on at a
14 manufacturing plant because you are doing work on
15 equipment.

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1 JUDGE CARPENTER: Has the NRC put any advice
2 in the form of a NUREG to licensees with respect to this
3 area?

4 WITNESS HUBBARD: I'm not aware that they have
5 come up with a number. The Kemeny report said 13 was
6 too small for a two-unit plant, 13 inspectors. And I
7 would expect some amount of benefits of sharing people
8 between two units. You would get some economies of
9 scale.

10 As I said, I felt uncomfortable with the
11 30,000, if I had to go in front of the Suffolk County
12 legislature and explain to them that that 30,000 hours
13 was a good number. I would have been much more
14 comfortable if somebody had said, these are the
15 activities, here is how many of these I'm going to do,
16 like activity is a review of procurement documents, I'm
17 going to review 100 of them, I will take two hours per.
18 That gives me 200 man-hours per year. That I am much
19 more comfortable with and feel I could defend a lot
20 easier.

21 So that is what I would have liked to have
22 had, and that is what I would have been much more
23 comfortable going in front of the legislature and
24 explaining as a reasoned basis that comes up with a
25 number. I don't have that from LILCO.

1 However, for these other reasons I gave, I
2 concluded that, while I would like to have the
3 documentation that sort of builds up the hierarchy, that
4 I could start with the answer and say it looks like it
5 is in the ballpark.

6 JUDGE CARPENTER: I guess what I am having
7 trouble with is in the context of the contention that
8 the operating QA program is inadequate and your
9 testimony that it is in the ballpark, how that fits.
10 I'm trying to get a feel for whether you think "in the
11 ballpark" is a close enough fit or not.

12 WITNESS HUBBARD: Well, in case it isn't
13 clear, the contention has to do with, is eight an
14 adequate number, because in the FSAR it says there will
15 be eight and the first time I had heard 14 was when we
16 had the testimony here, that there were going
17 to be six contract persons.

18 And then I think the Board looked at it and
19 said, well gee, if you know 14, do you still have a
20 concern. And my answer to that is that I think 14 is in
21 the ballpark and if the commitment were made for more
22 than that first year, then I would feel that that is in
23 the ballpark.

24 JUDGE CARPENTER: Don't you think the
25 evaluation of what is really needed can be made much

1 better after there is a year of experience of what it
2 actually took?

3 WITNESS HUBBARD: No. I think it can be made
4 better, but there is already some experience of how much
5 time is given over to audits and so forth. It seems to
6 me if one goes through the QA manual and you lift out
7 the work elements that you say you're going to do and
8 then you try to put some sort of a volume and an
9 allocation next to each one --

10 JUDGE CARPENTER: That's why I'm so surprised
11 there isn't a NUREG on this subject, you know, examples
12 and some advice. But there is no such thing?

13 WITNESS HUBBARD: Well, I have done that for
14 years. I testified earlier, I budgeted based on
15 historical numbers, and I have also budgeted for doing a
16 new activity that we have never done, a projection.
17 Obviously, after you run the plant for a couple of years
18 you're going to have more of a feel for what the number
19 is. I think you're absolutely right about that, because
20 there will be some history of how many contract people
21 one had to hire.

22 But I think another important thing is, you
23 can achieve almost any level of quality assurance
24 staffing that you wish based on some management
25 decisions, and that is what I talked about earlier this

1 morning. One can say, this is the number of audits we
2 are going to have this year, or this is the sampling
3 frequency we will do. Like when say soldering is done,
4 one can make a management decision you only inspect one
5 out of three or one out of five.

6 So there is some control over the number of
7 quality people by management's decision on how
8 vigorously you pursue the program. And the reason I
9 bring that up is, one could say, well we ran last year
10 and we only had seven, and that proved that seven is
11 adequate. And that might or might not be the case. It
12 could have been a management decision that for whatever
13 the reason they would go with seven and do the best they
14 could with seven.

15 JUDGE CARPENTER: Thank you.

16 JUDGE BRENNER: This might be a good time for
17 a break, as long as we have interrupted you anyway. Let
18 me ask one question before the break while it is fresh.
19 I was going to wait until the end, but since we asked
20 about this area.

21 Did you assign in your planning at GE or
22 elsewhere, Mr. Hubbard, a number to the number of hours
23 you would expect to get from a professional employee,
24 such as a QA inspector or auditor.

25 WITNESS HUBBARD: Yes.

1 JUDGE BRENNER: What was the working number
2 for the number of hours per year?

3 WITNESS HUBBARD: We had two numbers we used.
4 First of all, you would subtract vacations, holidays and
5 sick leave. We had two weeks of holidays and at least
6 another two to three weeks of vacation and another week
7 of sick leave. So you would as a minimum subtract six
8 weeks.

9 However, we did our work based on what I call
10 planned times, manufacturing standard times. So you had
11 times for setup and then for doing the operation, and
12 then other sorts of unapplied time. And typically the
13 real time it took to do something was about twice what I
14 would call planned time. We had time and motion people
15 that would plan how much an operation should take, and
16 that went into how efficient we were in labor.

17 So there was really two numbers. One, you
18 would do some amount of subtraction of like six weeks a
19 year, and that is a very rough number. And then the
20 other number was that it usually takes about twice as
21 long as the time and motion people think it should to do
22 something.

23 JUDGE BRENNER: Well, if the time estimate of
24 30,000 hours was real time, as opposed to time and
25 motion expert's time -- and we will go back and take a

1 look at the record to see if there is such a thing, but
2 -- so if you are balancing it against real time, real
3 reasonable time span, you are saying you would take the
4 2,080 hours of normal full time in a year and subtract
5 about 240 hours?

6 WITNESS HUBBARD: That is correct.

7 JUDGE BRENNER: Which by my calculation ends
8 up with about 1840 hours.

9 Do you know if that is a general rule of thumb
10 in industry or working endeavors, to use something
11 closer to 1840 hours rather than 2,000 or 2,080, if you
12 know?

13 WITNESS HUBBARD: My experience has been that
14 that is in general the case. Mr. Muller's numbers, it
15 was a little hard to decipher whether that included --
16 you know, how exact they were. And so that was one of
17 the first questions I had myself, is had he included the
18 inefficiencies of vacations, holidays, and that sort of
19 thing in his numbers. So part of it just depends on the
20 planning basis that is used.

21 I guess I didn't completely answer your question
22 yes or no. I think in the industry people generally do
23 make some allocations for sick leaves and things of that
24 sort. But I think that that is a small enough number --
25 we are talking ten percent -- that I don't think these

1 numbers are probably any more accurate than ten percent,
2 if they are that accurate.

3 And so I think that that is well within the
4 planning that Mr. Muller had. I mean, I would just use
5 the simple 2,000 hours a year and 15 people or
6 something. So that is why I said, well, 14 is in the
7 ballpark. It is probably at the low end of what one
8 might get with 30,000. That says you're going to have a
9 lot of overtime.

10 JUDGE BRENNER: Okay. Let me save any other
11 questions I might have in this area for later.
12 Actually, you answered my question better than I asked
13 it, which responds to your thought that maybe you didn't
14 answer it.

15 Let's take a break until five after 4:00.

16 (Whereupon, at 3:55 p.m., the hearing in the
17 above-entitled matter was recessed, to reconvene at 4:05
18 p.m. the same day.)

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1 AFTERNOON SESSION

2 (4:05 p.m.)

3 JUDGE BRENNER: All right, we are ready to
4 proceed to finish up the redirect, not counting the CAT
5 inspection areas.

6 BY MR. LANPHER: (Resuming)

7 Q Mr. Hubbard, at page 15293 you were asked if
8 you had ever developed or implemented a document control
9 program for the construction phase of a nuclear plant,
10 and you said no. Have you ever developed or implemented
11 any document control program?

12 A (WITNESS HUBBARD) Yes, I have.

13 Q Could you please describe that program and
14 tell us what it was?

15 A (WITNESS HUBBARD) Yes. I developed and
16 participated in the development of a document control
17 program in compliance with Criterion 5 and 6 of Appendix
18 B for General Electric's manufacturing operation in San
19 Jose.

20 Q Mr. Hubbard, at pages -- well, at a number of
21 places you've been asked questions about statistics and
22 the use of statistical methods. At page 15,301 you
23 agreed that the number of design calculations at a
24 nuclear power plant is very large.

25 Does this large number render the use of

1 statistical methods inappropriate in your opinion?

2 A (WITNESS HUBBARD) No, it doesn't. The large
3 number makes it, the area of calculations, a
4 particularly good one to sample with statistical
5 methodologies.

6 Q Mr. Hubbard, in your prefiled testimony and
7 also in response to questions at pages 15,305 and
8 15,306, you discuss how you came to the conclusion that
9 the LILCO FSAR, the manual and the procedures relating
10 to special processes were deficient. Now, that was in
11 the time frame prior to the filing of the testimony and
12 it was with a different manual.

13 You now have a new manual and procedures
14 relating to special processes. Do you still believe
15 that the manual and procedures relating to special
16 processes are inadequate?

17 A (WITNESS HUBBARD) Yes, I do. I reviewed the
18 section 9 of the new LILCO QA manual and the quality
19 assurance procedures related to special processes, as
20 well as the FSAR description, and I think that the three
21 documents, the FSAR, the LILCO QA manual, and the
22 procedure, the OQA procedures, still fail to define who
23 does what, when and how explicitly.

24 It is still much too vague and doesn't meet
25 the standards of a well-defined and well-disciplined

1 quality program.

2 Q Mr. Hubbard, I would like to follow up now on
3 another question from the Board in the area of the OQA
4 staffing or the line of reporting. I guess you would
5 call it the independence issue, and I think it was Judge
6 Brenner who commented that the Board cannot decide that
7 issue based on the personality of the OQA engineer or
8 another other person, since people come and go.

9 Do you agree, and if so does this affect the
10 view of the propriety of the present organizational
11 scheme for reporting?

12 A (WITNESS HUBBARD) I agree that you can't base
13 an organization on certain people because they do
14 change. So therefore I think the organization's
15 structure should have the operating QA function as
16 insulated as possible from the stress of cost and
17 schedule.

18 I think that the organization proposed of
19 having the OQA function report to the QA department
20 manager would achieve that necessarily insulation
21 regardless of who it is that is the OQA engineer. I
22 also believe that with an insulated organization there
23 is still no difficulty in coordination with the rest of
24 the plant staff.

25 MR. LANPHER: Judge Brenner, that completes

1 the questioning I wanted to pursue this afternoon.

2 JUDGE BRENNER: Mr. Hubbard, just on this very
3 last one. Under that organization with the OQAE, the
4 OQA engineer, would he still basically be on site even
5 though reporting to the QA manager offsite?

6 WITNESS HUBBARD: Yes, sir.

7 JUDGE BRENNER: Incidentally, Mr. Lanpher, you
8 didn't fully accurately reflect everything I said on the
9 subject of an individual, but it didn't matter for the
10 purpose of your question. I added, when there was
11 somebody in place who presented a qualification problem
12 something could be done about that immediate potential
13 concern. But it still didn't help you in the long run.

14 (Board conferring.)

15 JUDGE BRENNER: We are going to hold our
16 questions in this instance and go back to any follow-up
17 questions, unless there are none, and then we will ask
18 ours.

19 MR. ELLIS: Judge Brenner, I do have follow-up
20 questions.

21 RE-CROSS-EXAMINATION

22 ON BEHALF OF APPLICANT

23 BY MR. ELLIS:

24 Q Mr. Hubbard, in your responses to Mr. Lanpher
25 you indicated that a great deal of judgment was used in

1 the design of the audit program, and you used statistics
2 to support the selection of samples and extrapolation to
3 population. Even in taking samples, you have to use
4 judgment, don't you?

5 A (WITNESS HUBBARD) That is hard to answer, Mr.
6 Ellis. I think I would answer no and then explain that
7 by saying that once you decide what it is you are going
8 to sample, then that should be done on a random basis.

9 Q All right, let me see if I can be more
10 explicit. You say once you decide what you're going to
11 sample. When you say that that particular decision,
12 which you've indicated is a judgmental decision, does
13 that include deciding whether the whatever it is you're
14 going to look at is homogeneous enough to look at or
15 not?

16 A (WITNESS HUBBARD) There are tests for
17 homogeneity, and that is also how stratified sampling is
18 used if you think there may be a lack of homogeneity in
19 a population. So there are techniques for addressing
20 that sort of thing. But the judgment one would do is,
21 you know, your first judgment would be, well, how large
22 a population might you take for the initial sample. For
23 example, you might sample all welds and then you might
24 get certain information back and you say, well, it looks
25 like there is a problem, as Judge Morris said, with

1 welds that are close to a ceiling or greater than 24
2 inches.

3 So your second sample then might be a
4 population with this subcategory, and you do a random
5 sampling within that. And then you might find that
6 there seem to be a lot of problems with welders who had
7 been hired after 1979, and so then you might further
8 subdivide that statistically on that category of
9 welders.

10 So yes, judgment would be used as you decide
11 how to stratify your sampling and get further and
12 further break it down.

13 (Counsel for LILCO conferring.)

14 Q It is true, isn't it, that an experienced
15 auditor could make some of those very same judgments in
16 connection with selecting the first sample to look at?

17 A (WITNESS HUBBARD) Yes, he could. So what we
18 have been talking about is that once he has made a
19 decision on what should be looked at, then to use the
20 statistical methodology so that there is a validity in
21 the extrapolation from the sample to the total
22 population being looked at.

23 Q There is also judgment involved, is there not,
24 in what you labeled as extrapolation to the population?
25 Isn't there judgment involved in what confidence levels

1 to use or accept?

2 A (WITNESS HUBBARD) I would answer no, and then
3 I would explain that by saying that there is judgment in
4 the acceptance criteria, but that is not extrapolation;
5 that before you do an experiment you would say, this is
6 what my acceptance criteria is going to be and that is
7 judgment, but the statistical techniques of what allows
8 that extrapolation to be made.

9 Q There would also be judgment involved,
10 wouldn't there, in determining what you would constitute
11 or accept as a failure and what you wouldn't accept as a
12 failure; isn't that right?

13 A (WITNESS HUBBARD) Yes. That is what I said
14 in answer to the previous question. The acceptance
15 criteria, you might have like tolerances, if it is
16 within plus or minus ten percent that meets your
17 criteria of acceptance.

18 Q But wouldn't you want to make judgments, for
19 example, as to whether the absence of a referenced
20 location on a flow diagram was something that you would
21 want to consider significant enough to count as a
22 failure or not? Don't you have to make a judgment like
23 that?

24 A (WITNESS HUBBARD) That might be a judgment
25 you would make, that you would classify things that

1 could be wrong with a drawing by major, minor,
2 critical. But again, that is something, a judgment you
3 would do before you run the experiment or do the audit
4 or the surveillance.

5 Q Do you think you can predict all the sorts of
6 things you're going to see in connection with the
7 audit?

8 A (WITNESS HUBBARD) I always get uncomfortable
9 when you use the word "all." I think you can't predict
10 all that you will find, but I think in general the
11 statistical methodology concept is valid because you can
12 set out a program to look at radiographs, whether they
13 are acceptable or not, and you could have a pretty well
14 acceptance criteria before you run the test.

15 Because remember, we are testing a QA program
16 to see if it has been implemented. So generally there
17 are some criteria that are set up in advance. So if you
18 are deciding that you are not meeting your criteria,
19 those criteria are already defined. So if, for example,
20 your previous example about a takeoff on a drawing not
21 being right, well, there are criteria that say in the
22 design checking process you'll make sure the takeoffs
23 are right. So that really had been covered elsewhere as
24 part of an acceptance criteria.

25 Q Wouldn't the type or significance of the

1 defect affect the acceptance level that you would be
2 willing to use?

3 A (WITNESS HUBBARD) I would answer yes,
4 consistent with my testimony that you have critical,
5 major and minor. So you might have a higher standard
6 for something you would call critical. But that is
7 again where the judgment would be used and it would be
8 used with the statistical methodology.

9 Q Mr. Hubbard, I think in response to Judge
10 Carpenter's questions you said that Criterion 18 had
11 historically been done by taking samples, and it is
12 true, isn't it, that Criterion 18 has historically been
13 complied with by using, selecting samples on the basis
14 of judgment rather than the statistical sampling
15 techniques?

16 A (WITNESS HUBBARD) No, I don't think that is
17 true. A lot of audit programs have not made as much use
18 of statistical techniques as they could. However, much
19 like LILCO auditing E&DCR's to see if they had a
20 problem, statistical techniques have been used in a
21 number of times to see if there is a problem or not as
22 part of an auditing technique.

23 I don't think -- I think you are correct in
24 that it hasn't been used to the extent it could have
25 been used.

1 Q Well, isn't it fair to say that Criterion 18
2 has historically been construed and consistently been
3 construed by the NRC not to require the statistical
4 sampling techniques?

5 A (WITNESS HUBBARD) I think it would be more
6 appropriate for the NRC to answer how they have
7 historically construed the regulations. The regulations
8 say what they say. I think, though, in my
9 interpretation if I were to meet the regulations that
10 the statistical methodology would be appropriate,
11 combined with the engineering judgments, in order to
12 meet Criterion 18.

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1 Q You used the word "appropriate" just then, and
2 you did in response to Judge Carpenter's question where
3 you said that statistical sampling techniques were
4 appropriate. It is true, isn't it, that it is not
5 mandatory under Criterion 18?

6 (Pause.)

7 A (WITNESS HUBBARD) I think it should be
8 mandatory under 18 if one is to make valid judgments.
9 If one wants to make a judgment about a total population
10 based on a very small sample, then I think statistical
11 methodology should be applied for that. There could be
12 other ways where one reaches a judgment about audits. I
13 mean one can go back and count very large numbers of
14 particular activities. I mean there might be some other
15 ways that one could try to meet those words to verify
16 compliance with all aspects and to determine
17 effectiveness.

18 But I think in order to use a reasonable
19 amount of manpower to do that then the most appropriate
20 way to do it is to use judgment combined with the
21 statistical methodologies for sampling.

22 Q Well, Mr. Hubbard, let me repeat the
23 question. And I understand your explanation. I simply
24 want a yes or no.

25 Is it your testimony that Criterion 18

1 mandates, requires the use of statistical sampling
2 techniques?

3 MR. LANPHER: Is that in his technical
4 judgment or his legal opinion?

5 JUDGE BRENNER: What do you think, Mr. Lanpher?

6 MR. LANPHER: I think it should be expressed
7 as in his technical judgment.

8 JUDGE BRENNER: That is the way we would have
9 taken it.

10 WITNESS HUBBARD: In my technical judgment,
11 the right way. Well, I do not think it is mandatory.
12 However, in my judgment if one is to take the small
13 samples as I have seen at Shoreham and at Stone and
14 Webster, then the only way one can meet Criterion 18 is
15 to have complemented the small sample with the use of
16 proper statistical methodology.

17 JUDGE BRENNER: If it had been your legal
18 view, Mr. Hubbard, given your answer you might have said
19 that you don't think it is mandatory per se in the
20 abstract, but it might be mandatory as applied depending
21 upon the circumstances.

22 (Laughter.)

23 WITNESS HUBBARD: I'm not going to touch that.

24 BY MR. ELLIS: (Resuming)

25 Q Mr. Hubbard, you indicated in your opinion

1 that there was not a systematic program at Shoreham for
2 items important to safety for quality assurance in the
3 QA Manuals or the FSAR. Did you look anywhere else
4 beyond the QA Manuals or the rSAR for information
5 relating to quality assurance to structures, systems and
6 components that are not safety-related?

7 A (WITNESS HUBBARD) Yes, I did, Mr. Ellis. I
8 also looked at some of the quality assurance procedures,
9 and in general those use the word "safety-related" in
10 the title in each case.

11 JUDGE BRENNER: Did you say in the title?

12 WITNESS HUBBARD: In the descriptive block at
13 the top where it says what it was applicable to. So the
14 FSAR uses the word "safety-related," that the LILCO QA
15 Manual in general applies to safety-related. And then
16 when one goes and looks at the quality assurance
17 procedures, again the applicability is in general stated
18 to safety-related items.

19 BY MR. ELLIS: (Resuming)

20 Q Are you aware that the General Electric design
21 quality assurance procedures apply to both
22 safety-related and nonsafety-related?

23 MR. LANPHER: I object. This wasn't brought
24 up in my redirect as to GE manuals.

25 JUDGE BRENNER: Well, you asked him as to what

1 the QA program was applied to, and you started out with
2 the questions that I said were repetitive and then
3 launched into the area. I think it is close enough to
4 allow the question. It is true you may not have asked
5 particularly about that manual.

6 WITNESS HUBBARD: No, I am not aware of that,
7 and I have stayed away from talking about the GE QA
8 Manual and the Stone and Webster QA Manual because I
9 have in general been addressing FSARs and manuals as it
10 relates to operation. I did make some comments about
11 the LILCO construction QA Manual and how it dealt solely
12 with safety-related items.

13 BY MR. ELLIS: (Resuming)

14 Q So your testimony then with respect to QA, you
15 did not mean to include the construction portion of the
16 QA in your criticism concerning the omission of
17 important to safety but not safety-related?

18 A (WITNESS HUBBARD) I do mean that in terms of
19 how it applies to the LILCO QA Manual.

20 Q Well there are substantial portions of the
21 construction phase at Shoreham that are covered by GE
22 and Stone and Webster manuals, isn't that correct?

23 A (WITNESS HUBBARD) That is correct.

24 Q And isn't it true that there is a substantial
25 amount of the LILCO -- I mean the Stone and Webster and

1 General Electric manuals that pertain to QA for
2 nonsafety-related structures, systems and components?

3 A (WITNESS HUBBARD) I don't know that to be a
4 fact, and in any case for Shoreham the applicant
5 establishes the overall QA program in the hierarchy and
6 then the GE and the Stone and Webster ones key off of
7 the Shoreham manual.

8 Q Well, when you were at General Electric did
9 the manuals and the programs you developed relate only
10 to safety-related?

11 A (WITNESS HUBBARD) In general they did, that
12 is correct.

13 Q And is it your testimony that in connection
14 with the design functions that General Electric
15 performed that they have one manual or set of procedures
16 for design control that apply to safety-related and
17 another that apply to nonsafety-related, or do you know?

18 A (WITNESS HUBBARD) I don't know at this point
19 in time.

20 Q Well, do you know what it was when you were
21 there?

22 A (WITNESS HUBBARD) I have a recollection.

23 Q What is that recollection?

24 A (WITNESS HUBBARD) The recollection is there
25 was one set of engineering practices and procedures that

1 applied to all engineering activities. However, the
2 emphasis on those EP&Ps was for safety-related
3 activities, and it wasn't really what I would call a
4 systematic program for things that were
5 nonsafety-related.

6 Q Well, would you accept the characterization of
7 a graded program then that was applied at GE?

8 A (WITNESS HUBBARD) No. I would more
9 characterize it as a go/no go program.

10 JUDGE BRENNER: I guess I don't understand
11 what you mean by that, Mr. Hubbard. Maybe everybody
12 else does, but I don't.

13 WITNESS HUBBARD: A judgment would be made of
14 whether something was safety-related or wasn't, and if
15 it wasn't, then certain things didn't apply. And so it
16 wasn't graded in the sense that you had nine categories
17 or nine increments one might use. It was either yes or
18 nay. That is why I said go/no go. It was binary.
19 There were two.

20 JUDGE BRENNER: Well, if it was go/no go,
21 using your language, did that mean that nothing was
22 applied out of the QA procedures? That is what I'm not
23 understanding in your testimony.

24 WITNESS HUBBARD: Well, some might be applied,
25 like, you know, you use the same sheet of paper for

1 drawings and a lot of other things. But you get to
2 certain things and it would be, if it is a nonsafety
3 item. For example, in the manufacturing end I would not
4 have to qualify a vendor. I wouldn't have to keep
5 certain records of things like that. But it wasn't
6 graded in the sense of three or four categories. It was
7 graded in the sense of two, for safety-related here's
8 what you do, and if it is not safety-related you don't
9 have to do some of these activities.

10 JUDGE BRENNER: And once it was not
11 safety-related, the same QA requirements would be
12 applied the same way to all of those things that were
13 not safety-related without regard to their relative
14 importance?

15 WITNESS HUBBARD: That is correct. I tried to
16 give an example of Criterion 7. For example, the QA
17 Manual would say for safety-related equipment you have
18 to qualify it, buy it from a qualified vendor, and that
19 you have to review that at least once a year and
20 re-audit the vendor at least maybe once every two or
21 three years. And then there would be another paragraph
22 underneath it, and it would say for nonsafety-related
23 this does not apply.

24 Another example like that would be on
25 procurement document control. That would say for a

1 safety-related procurement it has to be approved by the
2 QA engineer. The QA engineer has to put QA requirements
3 in, and he has to approve the purchase order. And for
4 nonsafety-related items those requirements would not be
5 in place.

6 Is that clear?

7 JUDGE BRENNER: Yes. I understand what you
8 mean now.

9 WITNESS HUBBARD: So it is all in one document.

10 BY MR. ELLIS: (Resuming)

11 Q Would you agree with me that the same design
12 control procedures are applied at GE for both
13 safety-related and nonsafety-related designs?

14 A (WITNESS HUBBARD) No, I would not.

15 Q And is it your testimony that, for example,
16 for calculations at GE there is one set of procedures
17 relating to nonsafety-related and another set relating
18 to safety-related?

19 A (WITNESS HUBBARD) Mr. Ellis, that is a very
20 difficult question because we would have to get down to
21 what time period we are talking about calculations.

22 Q Well, do you -- excuse me.

23 A (WITNESS HUBBARD) Well, let me say I don't
24 have knowledge of what has been done since 1976 in terms
25 of calculations.

1 Q Well, then tell me what the answer to my
2 question is as of 1976.

3 A (WITNESS HUBBARD) Could we go back to what
4 the question was?

5 Q Yes. Is it your testimony that there is one
6 set of procedures that control the calculations relating
7 to safety-related items and another set of procedures to
8 govern how calculations relating to nonsafety-related
9 items are controlled?

10 A (WITNESS HUBBARD) My recollection is, Mr.
11 Ellis, that there was one procedure. However, as I
12 testified before, within that one procedure in a number
13 of cases -- and I'm not sure calculations was one of
14 them -- there were different requirements for
15 safety-related activities versus nonsafety-related
16 activities.

17 (Counsel for LILCO conferring.)

18 Q Well, let me be clear. Is it your testimony
19 that no safety -- I'm sorry. Strike that.

20 Is it your testimony that no let's say
21 calculations relating to nonsafety-related matters were
22 controlled by the safety-related procedures while you
23 were at General Electric?

24 A (WITNESS HUBBARD) That would not be my
25 testimony. I do not recall the details of that, Mr.

1 Ellis, so I can't testify one way or the other.

2 Q There was one question I omitted to ask while
3 we were on the General Electric relating to samples. It
4 is true, isn't it, Mr. Hubbard, that in doing auditing
5 at General Electric, General Electric typically did not
6 use sampling techniques, statistical sampling techniques
7 in selecting samples for their audits?

8 A (WITNESS HUBBARD) That is true in some cases
9 and not true in others. In hindsight I think more use
10 could have been made of statistics. However, we did
11 make a good use of statistical techniques in a number of
12 areas.

13 (Counsel for LILCO conferring.)

14 Q I take it in connection with quality assurance
15 and quality control standards applied to
16 nonsafety-related items you have never reviewed the
17 Unico construction site inspection program or
18 procedures, have you?

19 A (WITNESS HUBBARD) I am really not sure
20 whether I have or not. I did receive the LILCO QA
21 Manual and its procedures. Now, if there is another
22 manual and set of procedures called Unico, I don't
23 recall ever reading a procedure or a manual that had the
24 name Unico on it.

25 Q Well, how about a manual or procedures that

1 bear the label or title CSI or construction site
2 inspection?

3 A (WITNESS HUBBARD) To the best of my knowledge
4 during discovery I was not provided with CSI
5 instructions.

6 Q So you are not familiar with the construction
7 site inspection program for nonsafety-related
8 structures, systems and components at Shoreham?

9 A (WITNESS HUBBARD) That is correct. And I
10 don't think that is important because supposedly the
11 LILCO QA Manual describes the program, and I did review
12 that, and it is devoted to safety-related items. It has
13 the -- not the president but the management of the
14 company in the front with the corporate QA policy, and
15 the corporate QA policy in the front of the LILCO manual
16 talks about safety-related items.

17 Q Well, you keep saying that it is not mentioned
18 in the manual which is the Appendix B safety-related
19 manual. Did you ever consider it possible that there
20 was another program for nonsafety-related which was not
21 in an Appendix B program but was still a quality
22 assurance program but for nonsafety-related items?

23 A (WITNESS HUBBARD) If there is a systematic
24 program for those, I haven't seen the manual and the
25 implementing procedures for that program at LILCO.

1 Q Are you familiar with any quality assurance --
2 well, you were present for --

3 (Counsel for LILCO conferring.)

4 Q Strike that.

5 Mr. Hubbard, in response to Mr. Lanpher's
6 questions you said that -- on the Dircks memorandum you
7 said that the recommendations were not -- from the
8 Dircks speech, I'm sorry -- you said that the
9 recommendations were not broad enough, and you mentioned
10 the additional items, I believe; that it was not used
11 with statistical methods, as you discussed, nor did it
12 go to the set of not safety-related but important to
13 safety as you have defined that. Mr. Dircks didn't
14 state that those were problems, did he?

15 A (WITNESS HUBBARD) Mr. Dircks didn't say they
16 were problems or not problems. He is totally silent in
17 that area. My testimony in response to Mr. Lanpher's
18 question is that Mr. Dircks' comments were narrow, in my
19 opinion, and didn't address all of the areas that needed
20 to be addressed for comprehensive review of the
21 implementation of the QA programs.

22 Q Mr. Lanpher referred you in connection with
23 the OQA structure to the utility assessment which is
24 Attachment 7 to your testimony, 7-5.

25 (Counsel for LILCO conferring.)

1 Q I believe in response to Mr. Lanpher's
2 question you indicated that or implied that the
3 reporting structure reporting to an offsite --

4 (Counsel for LILCO conferring.)

5 Q Strike that.

6 Let me make one point clear while we are
7 looking here. You will agree with me, won't you, Mr.
8 Hubbard, that the utility audit does not recommend
9 changing the organization; it simply says that LILCO
10 should reassess it, isn't that right?

11 A (WITNESS HUBBARD) Yes. The audit uses the
12 word "reassess," and the audit -- I think the audit
13 report says what it says.

14 JUDGE BRENNER: Mr. Hubbard, as long as we
15 focused back on that page of your attachment and since
16 Mr. Ellis asked you -- this is probably a minor thing.
17 As you know, we get our xeroxed copies when you serve
18 your testimony. One of the particular portions of that
19 key phrase in Roman II on page 7-5 in assessment, which
20 you very closely paraphrased in your answer to Mr.
21 Lanpher, looks like it was pasted over as compared to
22 the rest of the type on the page and the xerox.

23 Do you have an original true and correct copy
24 so as to ascertain that this reflects it?

25 WITNESS HUBBARD: No, I don't, and I probably

1 am guilty of some of my yellowing. It turns out that
2 way on reproduction.

3 JUDGE BRENNER: Is that what it is?

4 WITNESS HUBBARD: Well, it is highly likely if
5 one wanted to establish blame that it is my yellowing.

6 JUDGE BRENNER: I just wanted to make sure
7 that this is the original report.

8 MR. ELLIS: That is what we assumed it was was
9 just highlighting.

10 MR. LANPHER: Mr. Hubbard has a long history
11 of yellowing things.

12 JUDGE BRENNER: I know that, and I don't
13 care. It just looked like in the xerox copy that it
14 could have been a pasteover, too.

15 WITNESS HUBBARD: I apologize again.

16 JUDGE BRENNER: That is okay.

17 BY MR. ELLIS: (Resuming)

18 Q Mr. Hubbard, did you testify that 0731 stated
19 that the preferred structure was reporting offsite? Was
20 that your testimony?

21 A (WITNESS HUBBARD) I didn't testify on 0731 at
22 all.

23 Q In response, though, to Mr. Lanpher's question
24 relating to page 7-5 of your Attachment 7, my notes
25 indicate that you said that 0731 -- you said something

1 about 0731. My notes indicate something about a
2 preferred, and I just wanted to clarify your testimony.

3 You didn't testify that 0731 says it is
4 preferred to report offsite, did you?

5 A (WITNESS HUBBARD) I don't believe I said that.

6 Q Well, Mr. Lanpher I believe asked you whether
7 this report supported your view that the LILCO
8 organization was not the preferred method. Isn't it
9 fair to say given the action areas to be considered
10 given what the utility says that the utility audit
11 report says that they are not taking a position one way
12 or another; they are simply saying to LILCO that it
13 should be reassessed. That is all.

14 A (WITNESS HUBBARD) One could read it the way
15 you suggested, Mr. Ellis. However, in my judgment they
16 are saying more than reassess. They are saying that
17 there is some amount of activity going on that would
18 indicate that they question the independence of the OQA
19 function. That would be my reading of it.

20 Q By "they questioned it" are you referring to
21 the utility audit group?

22 A (WITNESS HUBBARD) Yes, I am referring to the
23 utility audit group.

24

25

1 JUDGE BRENNER: Mr. Ellis, how much more do
2 you have on follow-up?

3 MR. ELLIS: I can't finish today if we quit at
4 5:00.

5 JUDGE BRENNER: How much more do you have?

6 MR. ELLIS: Probably a half an hour to 45
7 minutes at the most. Judge Brenner, I was not able to
8 check -- or I did check at the last break but I was not
9 able to ascertain whether or not that joint report --

10 JUDGE BRENNER: We won't be discussing it
11 today anymore, given the time. But we want it about
12 8:00 o'clock tomorrow morning, as we said, so we can
13 look at it. And we will start at 8:30 tomorrow. I want
14 to finish with this witness this week.

15 MR. ELLIS: Yes, sir. I have done my best
16 toward that end.

17 JUDGE BRENNER: Well, the whole redirect took
18 about the same length of time as you are going to take
19 on the follow-up, I think, pretty close to it. And I am
20 not sure we are getting anything new. So you think
21 about that overnight.

22 Mr. Bordenick, do you have follow-up?

23 MR. BORDENICK: One question.

24 JUDGE BRENNER: I exaggerated. I don't think
25 everything we are getting is new. At least a lot of it

1 sounds awfully familiar to me.

2 All right, why don't you just keep going until
3 about 5:00 o'clock, Mr. Ellis, unless you think it would
4 be more efficient to stop now and have you put it
5 altogether. I will leave it up to you.

6 MR. ELLIS: I think that it would be just a
7 few more minutes. I might eliminate some minor things.
8 But I will use the evening to eliminate some things, I
9 am sure.

10 JUDGE BRENNER. Okay. We have got to finish
11 the testimony by about 12:30 tomorrow so as to allow
12 time at the end to go over scheduling.

13 MR. ELLIS: Well, I think my estimate of a
14 half an hour is fairly accurate.

15 JUDGE BRENNER: I heard up to an hour a minute
16 ago. Maybe we will just chop half an hour off in the
17 last few minutes.

18 MR. ELLIS: Well, even so, that would only
19 take us up till 9:30 or 10:00.

20 JUDGE BRENNER: Well, I don't want to walk you
21 through everything else that has to happen, but between
22 10:00 and 1:00 there is a lot that has to happen. But I
23 will leave it at that. Let's go ahead.

24 I am telling you that if you take until 10:00
25 o'clock tomorrow morning, which you might, it is going

1 to be very difficult to finish this witness, in my
2 judgment, or at least it could be potentially, because
3 we have got some Board questions. And then we are going
4 to go to the CAT inspection redirect, and then we will
5 have a follow-up to that redirect. And before you know
6 it, the difference between 10:00 and 12:30 -- and the
7 fact that we would like to take a break here and there
8 -- will evaporate. That is my concern.

9 And I would really like to start next week
10 with the Staff witnesses, very strongly because I want
11 to finish the Staff witnesses before the Christmas
12 break, if possible. That is my hope. It is not a Board
13 order, but it is my strong hope. And I think the best
14 way to ensure that is to be able to start them on
15 Tuesday.

16 MR. ELLIS: Yes, sir. Well, I think it would
17 be useful for me to make use of the last few minutes
18 then.

19 JUDGE BRENNER: Okay.

20 BY MR. ELLIS: (Resuming)

21 Q Mr. Hubbard, you indicated you were a prime
22 author of some IEEE standards. There was more than one
23 prime author on those; is that right?

24 A (WITNESS HUBBARD) That is true, yes.

25 Q How many prime authors were there?

1 A (WITNESS HUBBARD) On our committee there has
2 been various number of people, in the order of six to
3 ht, usually.

4 Q And in that group of six to eight, it is fair
5 to say, isn't it, that that group included people with
6 firsthand experience at operating nuclear power plants?

7 A (WITNESS HUBBARD) Yes, it did.

8 Q Now, you indicated that you considered storage
9 problems at construction sites to be the same as those
10 you dealt with at a manufacturing site.

11 MR. LANPHER: I am just getting ready to
12 object, don't use the word "same," because I think that
13 is a mischaracterization.

14 BY MR. ELLIS: (Resuming)

15 Q Well, Mr. Hubbard, to be fair to you, I
16 thought you said that the storage problems at
17 manufacturing sites with which you were familiar were
18 the same as those at construction sites.

19 Now, it is fair to say, isn't it, that there
20 are substantial differences in these circumstances
21 between a construction site and a manufacturing plant in
22 terms of storage facilities?

23 A (WITNESS HUBBARD) Mr. Ellis, there are
24 differences and there are similarities. I think there
25 are more similarities than there are differences. But

1 when I am talking about similarities, I am thinking that
2 you need the same sorts of discipline. You have outdoor
3 storage, indoor storage at both the manufacturing
4 operation and the construction site. So it is setting
5 up procedures and then seeing that those procedures are
6 in fact implemented.

7 Q The problems of implementation of those
8 procedures may be different at a construction site,
9 don't you think, with large numbers of personnel and
10 movements of machinery and that sort of thing?

11 A (WITNESS HUBBARD) I don't think they are that
12 different.

13 Q In order to be confident about that, wouldn't
14 you want to spend some time at a construction site to
15 have some firsthand knowledge?

16 A (WITNESS HUBBARD) I have spent a lot of time
17 at construction sites, Mr. Ellis. So I do have
18 firsthand knowledge of the conditions at a construction
19 site.

20 Q Well, you said that there were some
21 differences. What are those differences?

22 A (WITNESS HUBBARD) I think there are some
23 differences in, oh, the type of item that might be
24 stored. It is obviously different to store a process
25 computer than a pressure vessel. That would be a

1 difference.

2 At a construction site you might have more
3 large pieces that have to be stored for some period of
4 time, so the actual square footage might be a little bit
5 more than that while at a manufacturing site you might
6 be storing a lot more items but of a smaller physical
7 size. You have many of the same problems of how to
8 maintain those without damage or deterioration. So that
9 is the same with both.

10 Q And so you experienced some of these problems
11 that you say are the same. Did you have surveillances
12 and audits that resulted in findings with respect to
13 storage problems at General Electric while you were
14 there?

15 A (WITNESS HUBBARD) I don't recall, but it
16 would be -- I would expect that there might have been
17 some, yes.

18 Q And would you also expect that there might
19 have been damage as a result of the same problems that
20 you say are experienced at a manufacturing site as at a
21 construction site?

22 MR. LANPHER: Could I have that question read
23 back, please, or repeated?

24 MR. ELLIS: I will restate it to save time.

25 JUDGE BRENNER: And then come to a conclusion

1 point also.

2 BY MR. ELLIS: (Resuming)

3 Q And did you also have damage as a result of
4 the sorts of problems that you say are the same as those
5 experienced at a construction site as at a manufacturing
6 site?

7 A (WITNESS HUBBARD) There might have been
8 damage, Mr. Ellis, but the key thing -- it is different,
9 I think -- at Shoreham is that we are talking about a
10 repetitive pattern of this year after year.

11 Q Well, when you say "might have been," you are
12 not really familiar with the audit findings and
13 observations relating to surveillance and auditing of
14 storage at General Electric, are you?

15 A (WITNESS HUBBARD) I don't recall the details
16 for the period 1971 to '76. But I do recall it was an
17 area that was looked into and that there were some
18 problems with outdoor storage at one time and another.
19 I can recall looking over the storage areas personally.

20 Q Mr. Hubbard, you indicated that you were
21 responsible for developing and implementing Appendix B
22 quality assurance programs at General Electric. I take
23 it you would agree that the programs you developed and
24 implemented were good and effectively implemented; is
25 that right?

1 A (WITNESS HUBBARD) In general, that would be
2 my opinion.

3 Q And Shoreham certainly benefitted from that,
4 didn't it, since Shoreham was at that time under
5 construction?

6 A (WITNESS HUBBARD) I would hope that Shoreham
7 benefitted from that, yes.

8 Q And to the extent that those programs that you
9 participated in the development and implementation of
10 have continued at GE, then you would agree that Shoreham
11 has continued to benefit from those programs?

12 A (WITNESS HUBBARD) That is correct.

13 MR. ELLIS: Judge Brenner, this might be an
14 appropriate time to break.

15 JUDGE BRENNER: We will adjourn now and start
16 at 8:30 tomorrow. The goal on starting at 8:30 is to
17 finish Mr. Hubbard by 12:30 so we can have a half an
18 hour discussion, up to a half an hour discussion on
19 scheduling for all of these other issues. And we
20 therefore want that written report at around 8:00
21 o'clock tomorrow morning in our fourth-floor offices.
22 And we will start on the record at 8:30 tomorrow morning.

23 (Thereupon, at 5:00 a.m., the hearing in the
24 above-entitled matter was adjourned, to reconvene at
25 8:30 a.m. on Friday, December 10, 1982.)

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

BEFORE THE ATOMIC SAFETY & LICENSING BOARD

in the matter of: Long Island Lighting Company (Shoreham Nuclear Power
Station)

Date of Proceeding: December 9, 1982

Docket Number: 50-322 OL

Place of Proceeding: Bethesda, Maryland

were held as herein appears, and that this is the original transcript
thereof for the file of the Commission.

Ray Heer

Official Reporter (Typed)

Ray Heer

Official Reporter (Signature)