ORIGINAL

# UNITED STATES
# NUCLEAR REGULATORY COMMISSION

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**IN THE MATTER OF:** **DOCKET NO:** 50-322-OL

LONG ISLAND LIGHTING COMPANY

(Shoreham Nuclear Power Station,
Unit No. 1)

**LOCATION:** BETHESDA, MARYLAND **PAGES:** 27634 - 27832

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In the matter of: :

LONG ISLAND LIGHTING COMPANY : Docket No. 50-322-1 (OL)

(Shoreham Nuclear Power Station): :

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Nuclear Regulatory Commission

Fifth Floor Hearing Room

4350 East-West Highway

Bethesda, Maryland

Tuesday, February 19, 1985.

The hearing in the above-entitled matter was reconvened, pursuant to adjournment, at 9:00 a.m.

BEFORE:

JUDGE LAWRENCE BRENNER, Chairman,
Atomic Safety and Licensing Board.

JUDGE PETER A. MORRIS, Member,
Atomic Safety and Licensing Board.

JUDGE GEORGE A. FERGUSON, Member,
Atomic Safety and Licensing Board.

(Not present.)

APPEARANCES:

On behalf of the Applicant:

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C O N T E N T S



E X H I B I T S

P R O C E E D I N G S

JUDGE BRENNER: Good morning.

A preliminary matter. We have just received this moment answers by the Staff and the County to LILCO's motion to strike portions of the Staff's testimony; and with respect to the testimony of Mr. Knox this was certainly a little later. We haven't looked at it. I can see it wasn't beyond the time we set, which was in our office as early as possible this morning and no later than nine o'clock. But it would have been helpful if somebody had brought them down there at eight-thirty, especially since we shifted the time in accordance with the unanimous desires of the parties to start at nine.

So we haven't read the answers other than LILCO's which we did receive earlier this morning.

We'll take a break after this and read them. That's all we can do.

We've thought about the motion. Obviously we want to think about the answers also. Beyond that, any answers to LILCO's motion to strike, and to the County's motion to strike which deals with Staff testimony which we are not hearing today -- that is, everything except the load contention, what I define as the load contention and not the way the Staff labeled the testimony -- those answers should be in Judge Ferguson's hands today also.

So if the parties haven't made arrangements to get them to Judge Ferguson's office, please do so. Just the answers to the motion to strike; it's not necessary to do that with respect to the cross plan or the subject of Mr. Knox's testimony, because we'll be ruling on that this morning.

Are there any other preliminary matters before we go back to LILCO's witnesses on the subject of the sequencing of loads during the integrated electrical test?

MR. ELLIS: Yes, sir; if I may, a brief matter.

Judge Brenner, you'll recall your exchange with Mr. Early concerning the schedule and the predictions, perhaps in a fit of unwarranted optimism, to the Appeal Board.

Given what has happened this past week and what the Board now anticipates for this week, and given that we have, I think, generally agreed that the crankshaft testimony will be taken in New York on March 5th, I wanted to inquire whether the Board desired us to write the Appeal Board and apprise them of the state of the hearing here.

JUDGE BRENNER: I think it would be helpful, but I don't know; again, this repeats the dialogue we had earlier. I don't know why the asked the questions they asked about the schedule, or what their time frame is.

We may know more the end of this week than today.

But I think in this time frame it would be time -- you might want to wait a few days: we might be able to discuss something this week that might or might not add some information with respect to the schedule.

On that same subject of the schedule, I purposely didn't react. For one thing, it was the first time I heard the information, but it certainly surprised me to hear the Staff say it would take them six months, starting from some day in the future, to review the Colt diesels. I don't know if they're going to tear them down and review them part by part or some other methodology.

Given the fact that everybody has known about these diesels for some time, it made it sound as if Staff had not done anything with respect to them.

I didn't react for a number of reasons. And I'm waiting with great interest the Staff's letter to the Appeal Board, which presumably will be sent anytime, if not already.

Mr. Reis, has that been sent?

MR. REIS: We have not received an FSAR amendment.

JUDGE BRENNER: No; I had a question as to-- Mr. Perlis said he is going to write the Appeal Board to supply that information in light of the oral argument before the Appeal Board where the topic was discussed. But the Staff had not mentioned that point. And in my own mind

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I assumed that that letter would go to the Appeal Board rather quickly, and would have some explanation.

MR. REIS: Well, yes.

JUDGE BRENNER: Has it been sent?

MR. REIS: No, it hasn't been set yet. We haven't gotten to it. Mr. Perlis is working downtown with General Counsel.

JUDGE BRENNER: I think that letter should certainly be sent rather quickly--

MR. REIS: I agree.

JUDGE BRENNER: --and we would like to get copies delivered here.

I would think if you're beyond even tomorrow you're starting to run into a problem.

I don't know what the Appeal Board is going to do with the case before them, and neither does anybody else. We've seen some indications in the ruling on the stay request -- or, more precisely, a ruling on the request for reconsideration of the stay decision. And that might affect thinking on the part of LILCO and on the part of Boards in terms of schedule, also.

Six months sounds like a long time. Maybe there's a good explanation.

MR. ELLIS: The only other thing, Judge Brenner, is that we are in the habit of reporting particularly

significant events that occur and have in the past, some bitter, some sweet. And so I simply wanted to point out that the reactor went critical this past week, as another event.

JUDGE BRENNER: All right.

Do you have anything else, Mr. Ellis?

MR. ELLIS: No, sir.

JUDGE BRENNER: Did you plan to ask any questions, Mr. Ellis, or did you just want the Board to proceed?

MR. ELLIS: I'm prepared to ask the question that the Board had; I had prepared that. Relating to sequencing. If the Board wishes.

JUDGE BRENNER: All right. Why don't you go ahead?

Whereupon,

GEORGE F. DAWE

EDWARD J. YOUNGLING

and

JACK A. NOTARO

resumed the stand and, having been previously duly sworn, were examined and testified further as follows:

FURTHER DIRECT EXAMINATION

BY MR. ELLIS:

Q Mr. Dawe, in the testimony that you have given you have referred to load sequencing and conservatisms in the

remaining nameplates as the principal reasons for the difference between the IET aggregate loads and the MESLs; am I correct in that connection?

A (Witness Dawe) Yes, Mr. Ellis.

Q Would you explain, please, what you mean by sequencing, and how that contributes to the difference as you see it?

A (Witness Dawe) Yes. When we mentioned load sequencing as a factor in the IET in the actual post-LOCA loads on the diesels, as opposed to the MESL which is a straight summation, I was referring, as was Mr. Youngling, to two components of load sequencing. One component is the bus programming and load sequencer which brings the loads in in a stepped fashion. That is not the major contributor to differences between the IET and the MESL, although it can have some contribution.

The other aspect of load sequencing which I may not have been clear on is the dynamic load development, or the system response. In other words, not all of the components react as an on-off type of effect on the diesel; that is, when they're connected they will not develop their maximum load immediately, it depends upon the dynamic response of the plant to the event. And there are a number of items in the MESL that fit into that category.

Q Can you give some examples?

A (Witness Dawe) Well, the most significant in terms of kilowatt load on the diesel would be the reactor building standby ventilation system and control room air conditioning chillers. There will just not be sufficient heat load early in the accident to load all four available chillers to their maximum design capabilities.

Although in the IET we simulate the heat load, it's just impossible to simulate sufficient heat load to run four chillers at maximum load. And, in fact, in the IET the chillers come on and stay on very short periods of time, reduce the chill water temperature, and then trip back off waiting for the chill water temperature to reheat to a set point.

Q In the MESL, what is assumed with respect to the four chiller?

A (Witness Dawe) The MESL for each machine assumes that the associated chillers are at full capacity. So diesels 101 and 102 have 235 Kw in their MESL for one chiller at full load, and 103 has 470 Kw in its MESL for two chillers at full load.

Q Now, can you contrast that that is assumed by the MESL with what you would expect on a LOOP/LOCA and with what was simulated at the IET?

A (Witness Dawe) Well, on a LOOP/LOCA all four chillers would start. There would not initially be load

available to them for them to assure a duty anywhere near approximating 235 Kw. You would have to wait for the heat loads to built up, and even then it's not possible by design to load four chillers to a full maximum 100 percent capacity, because they are redundant components.

Q What load, kilowatt load, is attributable to this dynamic load development phenomenon of the four chillers, in your opinion?

A (Witness Dawe) Probably on the order of 150 Kw or more per chiller early in the LOCA.

Q And how do you arrive at that?

A (Witness Dawe) We arrived at that number by looking at the performance of the chiller during the IET.

And then there are other examples, although the Kw load is not as great as it is in the example of the chiller. There are certainly other components in the MESL that either duplicate each other or are assumed at a nameplate value. But the load would not develop in that fashions.

For example, the battery chargers are sized to charge a fully exhausted battery and carry all the DC loads associated with that battery simultaneously.

Q Would you expect that to happen on a LOOP/LOCA?

A (Witness Dawe) No; the battery is maintained, charged by trickle charge throughout operation. And so the

battery charger should not have to charge an exhausted battery. In fact, the battery condition is a technical specification requirement.

As far as carrying DC loads, a large part of the DC loads that are in the MESL because they're in the nameplate value of the battery charger are DC valves.

Q While you don't expect on an accident to have the battery chargers recharging a fully exhausted battery and running the DC load simultaneously, nonetheless what does the MESL calculation assume in that connection?

A (Witness Dawe) Well, it assumes the simultaneous operation because the number in the MESL is the nameplate rating of the battery charger. And that just wouldn't happen after a LOCA. And it certainly doesn't happen during the IET. The IET and the LOCA are much more alike in that regard than the MESL.

Q All right.

And what kilowatt load saving or difference would you attribute to that?

A (Witness Dawe) Well, conservatively allowing for DC control power which would remain on the battery charger, we believe it's on the order of 10 Kw out of the value stated in the MESL numbers.

Q All right.

You said that the IET and the LOOP/LOCA were much

closer together on the battery chargers. Is that true of the four chillers that you described earlier, as well?

A (Witness Dawe) The performance of the four chillers is representative, we believe, in the IET of what we would see in the period after a LOCA for the same duration of time, twenty minutes or so, that the IET represents. And it's a more accurate representation of what the chillers will do than the assumption of full design capacity that's in the MESL.

Q Do you have any other examples that illustrate the dynamic load development sequencing phenomenon that you've described?

A (Witness Dawe) Yes, sir. Another example would be one that we mentioned in testimony last week, which is the loop level pumps. They will return to a minimum flow bypass condition as soon as the large ECCS pumps are injecting into their injection lines which the loop level pumps are designed to keep filled.

When they go back into the -- when "they," the loop level pumps, go back into the minimum recirc condition, then their load would be at least dropped in half from that shown in the MESL, which is a loop level pump at nameplate. So that would represent maybe 6 kilowatts reduction when the loop level pumps go to recirc.

JUDGE BRENNER: Mr. Ellis, could I interject?

MR. ELLIS: Yes, sir.

JUDGE BRENNER: I have some confusion.

Mr. Dawe, are these the same pumps that we were discussing last week in the context of at full run-out they would have a certain load, and then as they adjusted to what their expected usage would be they would have a different electrical load?

WITNESS DAWE: No, Judge Brenner; the pumps we were discussing at run-out and reducing their electrical load, being brought back to lower flows, were the major ECCS low pressure pumps, which are AC pumps driven off the diesel.

These pumps we're discussing are small pumps which are used to keep the injection lines of those large pumps full during normal operation, so that, when they start, they start injecting into a full line.

JUDGE BRENNER: During the IET are they at some point at their full injection, or close to it?

WITNESS DAWE: During the IET, Judge Brenner, they will operate just as they do in a post-LOCA situation. They were running, maintaining level in the ECCS injection lines prior to the initation of the IET. And then following the initiation of the IET with the LOOP/LOCA signal, when the ECCS pumps start injecting then the loop level pumps would go back to a recirc mode at greatly reduced flow. They're

no longer needed to keep the ECCS injection lines full because the ECCS pumps themselves are doing that.

JUDGE BRENNER: So when the maximum load is reported for the IET in your testimony, that maximum load, taking the example of the loop level pumps, does not report the maximum load on those pumps right at the point of starting the IET but, rather, reports it as it would be after the transient begins to be simulated?

WITNESS DAWE: That's the dynamics that we're talking about.

Early in the IET those pumps could be running at their normal capacity, waiting for the ECCS injection valves to open. Later in the IET when the injection valves are open, then through the normal control logic of the plant those pumps are run back.

But these effects are taking place within the main trace, but are individually shown. So there are pluses and minuses going on in the main trace as these loads develop and sequence themselves. And it's not just the sequencing of when they are added to the bus by the load sequencer and bus program, its also the way the load is developed by the component and the dynamic response of the plant.

And the same kind of dynamicism also is involved in the nameplate ratings. For example, the reactor building closed loop cooling water pumps in the MESL are rated at

80 kilowatts. But that pump is designed to service many reactor building components for cooling during normal operation.

In a post-LOCA situation, automatically through the plant logic, most of the loads on the closed loop cooling water system are stripped as non-safety, non-required loads, and we're left only with seal cooling injection to the recirculation pumps, seal cooling injection to the RHR pumps, and injection to the spent fuel pool cooling water heat exchangers, which represents maybe about one-third of the total flow capacity of the RBCLCW system per train in normal operation.

So those pumps would not be operating at 80 kilowatts per pump nameplate in a post-LOCA situation, there's just not sufficient flow being generated. With two-thirds of the flow demand reduced, probably half of the Kw load would be reduced in the IET and in the post-LOCA situation, as opposed to the full 80.

JUDGE BRENNER: All right.

I wonder if I could -- as long as I've interrupted -- turn back to the example of a chiller.

As you said, there are four of them. I'm trying to figure out roughly what difference just the chillers -- in the mode they operate during the IET as you describe -- what difference for each diesel could be accounted for by

the example of the chillers. Am I correct that two of them are connected to the EDG-103 pump?

WITNESS DAWE: That's correct, Judge Brenner; it would be between 0 and 235 Kw contribution, depending upon the time into the accident. In the early time of the accident, certainly that covered by the IET, the reduction in load, or the saving in load that you'd see from the nameplate rating is much closer to the full 235 than to the zero, because we just can't generate the in the buildings fast enough to load those chillers up in the early part.

In fact, by the time you do need the chillers, you would be reducing the number of chillers. Our experience in the plant is that even in a post-LOCA situation one chiller would handle the heat load. Two chillers would be the norm left running by the operators procedurally. So the two chillers would not carry full heat load.

JUDGE BRENNER: I'm trying quickly, and mathematics is not my strong point, among many other points that are not my strong points, to account for the difference between the IET load reported for each diesel by LILCO and the MESL load. While I see a greater difference between those two values for EDG-103 after adjusting for the reactor building service water pump, I don't see a delta of anything approaching 200 Kw for the 103 pump; it looks, quickly, like around 100, maybe even a little less.

That is, the difference between the MESL and the IET value is about 100 kw greater for the 103 diesel than that same difference for the 101 and 102 diesel. I am just using it as an example to try to apply the information you are giving us.

WITNESS DAWE: Two chillers operating during the IET on the 103 engine would probably represent 300 kw less than the MESL in the short period of time that they are running, and of course when they're not running they alone would contribute significantly more than that.

MR. ELLIS: Judge Brenner, could we also-- When he mentions the IET may I ask, does he also mean that that would be what he would expect on a LOOP/LOCA as well?

JUDGE BRENNER: Yes, I think you have asked him that. You can ask him that again.

I think he was about to tell me what the difference would be for the 101 and 102 pumps for one chiller each to the extent he could, recognizing that he's talking about a dynamic situation and he cannot just pick a particular individual load for an individual component.

WITNESS DAWE: I don't think, Judge Brenner, that you can account for every bit of the IET and say this is exactly attributable to this factor. Certainly there are many things you can look at.

For example, there are other conservatisms. One

would be the RBCLCW pump, but that was not running on the 103 engine. It has a ten-minute locked-out device, but of course that contribution is in the 101 and 102 IET results.

The core spray number that is in the table for run-out of 998 kw is a run-out number for that pump developing 6900 gpm. In Shoreham, the core spray pump cannot develop in a run-out condition more than 6400 gpm because of the hydraulics of the system, the core spray system. That alone is a 10 kw difference between 998 and 988 on the core spray pump.

During the IET, the core spray pumps were taken to and recorded at 6,000 gpm, just shy of the 6400 plant run-out number. That is to avoid flow instabilities across the valve which is being throttled to maintain that condition on the pump in its test mode. That represented or represents in the IET from the MESL to the IET number another -- I believe it is on the order of 30 kw or so.

But then the RHR pumps were also taken to run-out condition during the IET so in the IET we have two ECCS injections on one diesel at run-out whereas that could not happen in a LOCA because the run-out assumes or requires that the LOCA be in the injection line.

So what seems to be non-conservative about the IET is compensated for by having the other one, the ECCS RHR in this case and LPCI injection at close to run-out but

likewise the run-out injection that is assumed in the table for the MESL at 1022 kw is an RHR pump running out at 11,000 gpm. And in the IET when we run one pump, we run it at 10,000, and when we run two pumps into the same injection loop we run them at 8500 gpm each because we can't get more than 17,000 into the RHR loop.

So these kinds of differences exist in the IET versus the actual LOOP/LOCA but they tend to balance. Certainly the MESL is very conservative because it assumes both injections on one diesel at run-out at the same time, and that can't happen. It is unlikely that even one would be at run-out. That assumes the break being in the injection path which isn't necessarily where the break would be.

JUDGE BRENNER: For the equipment that would be operating at a lower load during the IET -- and I'm focusing and I think you are also on the period of automatic operation before an operator would do anything in the IET. Is that correct?

WITNESS DAWE: Well, that is correct in the-- Let me put it in my own words, Judge Brenner.

In the time of the IET, the operator is taking actions to maximize certain loads, and those loads are the ECCS systems. He takes actions to increase the ECCS flows from the conditions in which they start in their test modes

to bring them up to near the run-out condition. But those are-- And Mr. Youngling can confirm this. The predominant actions in the IET that the operator should take at this time, other than recording and checking that the equipment that is supposed to be running per the bus programs is in fact running.

In this period of time in the loss-of-coolant accident, the initial phase of the accident, the operator would only be taking actions to start things which should have started automatically, if you'll recall the immediate actions from the procedures we've reviewed here in testimony.

The next step in level restoration and level control would then be the reductions of flows not needed, which do not occur in the IET.

JUDGE BRENNER: All right. That's what I was asking, and I stated badly. I mean operator actions in terms of throttling back equipment.

WITNESS DAWE: Those do not occur in the IET. He throttles up equipment to achieve the run-out flows.

JUDGE BRENNER: So the equipment that you've begun to tell us about before I interrupted that you say in reality and during the IET operates at a lower load during periods of time such that the dynamic maximum load is effected, depending on the sequencing of other equipment

also, would be operating at that lower load because of the nature of what is occurring and not because an operator has taken any action to lower the operational load of that equipment, for example, the chillers.

WITNESS DAWE: Yes, Judge Brenner. He will take operational actions on some loads such as the ECCS pumps. He will ultimately take operator actions to turn off unneeded equipment, but the kinds of effects that I'm talking about occur without the operator taking action.

JUDGE BRENNER: All right. I will let you continue in a moment. Let me take a sentence or two and explain what my confusion was last week, just so it is in the record, and then we can match up what we have heard, and the parties can ask questions if they desire, and then we will all decide whether there is now a logical explanation.

My original confusion was as follows:

I had heard testimony that during the IET, steps were taken to maximize the operation of equipment that would be called upon for automatic operation in the event of a LCOP/LOCA such as the ECCS pumps being run at a very high condition, and so on.

And then I heard testimony that due to something described as the sequencing, the actual loads during the IET as measured as a cumulative total of what was occurring at its maximum point would be lower than the MESL. And I

couldn't understand why that would be if the IET had been run conservatively so that all automatic equipment was run at its maximum.

And I was trying to decide whether some of that could be due to a difference in nameplate and measured ratings, which measured rating were not taken credit for in the MESL, and I decided that that could not be the case. It wouldn't account for a large enough amount, putting the testimony together.

And now I think I understand at least what Mr. Dawe is trying to tell us, and that is that some equipment was operated artificially, in his view, at its maximum and not throttled back for the IET purposes if it was automatic equipment whereas other equipment, even though not throttled back, just, in his view, would not be able to operate at its maximum because of the function of that equipment and what it was being called upon to do.

So I've got the explanation now and that was why I was confused last week. I'm sorry if my confusion caused any inconvenience in terms of scheduling, but I certainly wanted to get the explanation. Now whether the explanation washes against all the other testimony we'll decide. But I understand it now, and I appreciate that much.

And that's why I interrupted, to make sure I was figuring it out.

Now another reason I've taken this time to say what I've just said is that if I'm still missing the boat somewhere, this is the time to straighten it out, Mr. Ellis.

BY MR. ELLIS:

Q Mr. Dawe, you mentioned three examples of the dynamics of load development, and then you mentioned core spray and RBCLCW circulation pumps. Are these-- These are not sequencing, are they, examples of sequencing?

A (Witness Dawe) No. As I believe I said when I mentioned them, they are examples of the nameplate conservatisms that exist in the MESL RBCLCW, because its nameplate is based on its normal operating condition when it is carrying more components to be cooled than it would be during a post-LOCA situation.

The core spray is also a nameplate conservatism effect because of the 6900 kw run-out condition for which the 998 -- 6900 gpm condition for which the 998 kw is stated whereas in the Shoreham configuration it can only develop or generate 6400 gpm, which means the conservative -- the nameplate is already conservative by 10 or a little more kilowatts.

The other conservatism that I mentioned in nameplates is the fact that the nameplates assume core spray and RHR at run-out conditions at the same time. Basically

there are two injections for core spray and two injections for RHR which gives me four injection points independent of each other.

If I am going to get run-out it is because I'm taking a guillotine full-displacement break in an injection line which gives me zero back pressure in that injection line which itself is conservative, but that will only occur in one of those four conditions. If that happens then all of the others should be assumed to go back to their design flows as opposed to their run-out flows, and that can represent or does represent 100 to 135 kw further reduction from the MESL in the case of core spray, depending upon the back pressure at the time it's injecting, and it represents between 30 to 90 kw, depending upon pump combinations for RHR pumps.

So the MESL, assuming everything at run-out at the same time, contains those conservatisms in the nameplate.

Q The 6900 gpm that you mentioned corresponding to the 998 in the table, is that the figure that was used for the MESL?

A (Witness Dawe) Yes, it is.

Q And that's the figure you indicated cannot be achieved for the reasons you've described at Shoreham?

A (Witness Dawe) That's correct.

Q And then you mentioned that 6,000 is what was used during the IET. Is that a figure you would expect to see during a LOOP/LOCA as well?

A (Witness Dawe) It is close to the predicted run-out number if the break were in the core spray injection line. It is several hundred gpm above design flows initially for reflood with the vessel at 20 psig. That number would be around 5700 gpm, and the sustained long-term flow for a core spray pump is 4725 gpm on a core spray pump with the vessel fully depressurized, so the 6,000 is well above the design flows, the design injection flows. It is slightly below the design run-out for Shoreham.

Q And if you were in actuality in a LOOP/LOCA, if you had a break in that particular line and you were at 6,000 gpm, would you expect to be at run-out on any of the other three RHR pumps?

A (Witness Dawe) Well, it is not the other three RHR pumps. As I testified a few minutes ago if I'm at run-out on one of the four low pressure injection paths, that would be because the break is there.

Those injection paths are independent of the others-- The four are totally independent of each other, so with one at run-out, the other three can't be at run-out.

Q Does the MESL assume all four at run-out?

A (Witness Dawe) Yes, it does, Mr. Ellis.

MR. ELLIS: Judge Brenner, I believe that that clarifies. Perhaps the parties have other questions that they might want to pursue.

(The Board conferring.)

JUDGE BRENNER: Does the County have questions on this subject?

MR. DYNNER: Yes, sir.

CROSS-EXAMINATION

BY MR. DYNNER:

Q Gentlemen, I am going to refer you and the parties to the transcript page 27,466, which was the transcript of your testimony last Thursday on February 14th--

A (Witness Dawe) We don't have that transcript, Mr. Dunner.

Q Your counsel will help you out.

JUDGE BRENNER: Let's go off the record for a minute.

(Discussion off the record.)

JUDGE BRENNER: Back on the record.

(Document handed to the witness panel.)

MR. DYNNER: I have furnished Mr. Ellis with my transcript, and he has given it to the witnesses.

(Witness panel reviewing document.)

BY MR. DYNNER:

Q Gentlemen, I want to be sure that I have the numbers right. On page 27,466 of the transcript from last Thursday, I asked this panel what was the design flow for the core spray pumps, and Mr. Youngling answered it was 4725 gpm.

And then I asked, and I quote:

"And what was the run-out condition that you ran with the IET?"

And Mr. Youngling, you answered 6,400.

Do I understand your testimony this morning is that you are modifying that number now, that it was really 6,000 and not 6400?

A (Witness Youngling) Mr. Dynner, when I responded the 6400, that was to the best of my knowledge. I have confirmed the number over the weekend and the number was 6,000.

Q Thank you.

My next question was inquiring what the design flow was for the RHR pumps and you answered 7,700 gpm. Is that still your answer? That's in lines 17 and 18.

A (Witness Youngling) Yes, it is.

Q And then I asked you what was the run-out in the IET for the RHRs, and you answered approximately 11,000 gpm. Is that still your answer, or does your testimony now modify that number?

A I testified that the RHR run-out was approximately 11,000. I have confirmed the number that for one pump during the IET, the maximum flow condition was 10,000 gpm, and for two pumps in a loop it was 17,000 gpm.

Q When you say 17,000 for two pumps, does that mean 10,000 for one and 7,000 for the other, or were they split evenly with the two?

A (Witness Youngling) When that configuration is run, both pumps are pumping into the same loop and they tend to split the load evenly.

Q So it would be 8500 per pump? Is that correct?

A (Witness Youngling) Yes, that's a fair approximation, yes.

A (Witness Dawe) Mr. Dynner, if I might add to that, the two pump, as Mr. Youngling said, is run at 17,000. Two pumps injecting into a broken loop in Shoreham, because of hydraulics and orificing, cannot generate more than 18,000 as confirmed during the pre-operational test. So that is very close to run-out for two pumps.

Likewise, the 10,000 is very close to run-out for one pump, and the reason why it is brought back slightly from run-out is the same as I gave for the core spray condition, namely that we don't want to get into a valve instability condition at the throttle point.

Q What is the difference in kilowatts output

approximately between the 11,000 per pump or a 22,000 gpm for two pumps and the 17,000 that you used actually in the IET?

A (Witness Dawe) As I just explained, there is no way to get 22,000 per pump or per loop in the Shoreham plant. That cannot be done.

The difference in kilowatts between 11,000 and 10,000 gpm on a single pump would be about 30 kw -- about 35 kw -- about 30 to 35 kw. It depends which pump you're looking at. We have measured all of the pumps and it varies about that much for the different pumps.

But taking the lowest valued pump at 10,000 and the highest valued pump at 11,000, it would be 35 kw. For any given pump between its lowest and highest, it would be closer to 28 or 30 kw.

Q What's the difference between 11,000 and 8500 gpm, approximately, in kilowatts?

A (Witness Dawe) It's a little less than 90 kw, again depending on which pump you look at.

Q Is it your testimony, gentlemen, that the 17,000 gpm run-out is the worst case that could possibly be seen in a LOOP/LOCA for the LPCI system?

A (Witness Dawe) In an actual LOOP/LOCA with a break in the injection line or a double-ended full displacement rupture of the recirc line with the two pumps

injecting into the line, it could get to 18,000 by calculated values and by measurement during the pre-op against zero back pressure, but it couldn't go above 18,000.

Q And is it my understanding that the extra thousand GMP would add maybe an additional 30 Kw?

A (Witness Dawe) Yes. But recall, as I said, at the same time on the same diesel we are also running the core spray at very close to run-out, and if the RHR is there the core spray can't be. It would be 100 or more KW lower.

If the RHR is at run-out then the -- pardon me. If the core spray is at run-out then the RHR can't be. It depends on a break in the injection line, and the injection lines are independent of each other between core spray and RHR.

Q But you used in the IET a run-out for the core spray pump of 6000 GMP, isn't that right?

A (Witness Dawe) That is correct. But that's still significantly higher load than the -- the design reflood rate on a core spray pump with vessel pressure at 20 psig is 5460 GPM, which represents about 900 Kw. We achieved 6000 at a little over 950 Kw in the IET, so there is a 50 Kw difference there.

And certainly it is 100 Kw if you compare it to the design flow at zero psig in the vessel for long term maintenance with core spray. So there is a conservatism in the IET of running both RHR and core spray at close to run-out.

Q Gentlemen, in the worst case LOOP/LOCA how long

would the build-up of load take for the chillers that you've talked about before; that is to bring them to the maximum load they would need to see at the highest temperatures possible?

A (Witness Dawe) We do not know exactly, but we're convinced it's longer than the 20-minute period for the IET or a comparable period for the IET.

In fact, the chillers are not sized in terms of maximum load for the LOCA condition. The LOCA condition is not the most severe or anywhere near as severe a condition as other design conditions on the chiller.

Q What's your basis for being convinced that it would take longer than 20 minutes?

A (Witness Dawe) The basic characteristics of the plant.

It takes time for the running equipment to start to cause space heating and for that space heating to be picked up in the unit coolers and to be transmitted back functionally to the chillers by the chilled water system. And in the early stages of the loss of coolant accident the heat from the primary containment is seeing a big heat sink and not immediately going to radiate to the secondary containment.

And even it's not, we don't believe, as big a contribution ultimately as circulating water through the

ECCS systems. But that water is not very hot either because it's -- the heat increases is taken up by the suppression pool, and suppression pool temperature rise in a LOCA is roughly a degree per minute and starts at about 90 degrees.

So we just don't have a high heat source in the secondary containment early on. It takes time for the equipment to heat up the space and feed back to the chillers.

Q Have you performed any specific analyses or calculations to determine that in fact postulating certain heat or temperature values, that in fact it would take at least 20 minutes for these chillers to operate at full required load?

A (Witness Dawe) I have not performed specific calculations. That statement is based on my knowledge of the plant systems and my engineering judgment at this point in time.

Q Has anyone else on the panel performed such calculations or analyses or knows of any?

(Witness panel conferring.)

A (Witness Youngling) I have not performed any analyses in conjunction with that observation at this time. That's based on my engineering judgment.

A (Witness Notaro) The same is true for me.

Q Did the chillers that we are discussing run at

peak load or near peak load through the majority of the IET, or didn't they?

A (Witness Dawe) They ran not at peak load, but they did run during the IET as a result of the preheating of the chilled water system. But, as I explained earlier, they were sharing the load as they would in a post-LOCA situation. So there was just not enough heating being generated to run them all to design condition.

We did run them in the IET earlier and with more heat load I believe than they would see in a post-LOCA situation because of the test that was established on the chillers in certain portions of the IET for preheating the chilled water. That water would not be at that temperature at the start of an actual LOCA because it is maintained lower during normal operation by chiller operation.

Q What I am getting at is after the first 20 minutes did you bring all the chillers up to near their peak load and run them at that level for any significant portion during the IET?

A (Witness Dawe) What I am trying to say, Mr. Dynner, is what we actually did.

It would be impossible to do what you just said, either in a test condition or in a LOCA. There is not that much heat in the building.

There are four redundant chillers. As I have

already stated, our experience with the chillers is that following an accident we will have to reduce to two, or we will reduce to two chillers once we see which of the redundant chillers have started; and we really only need one.

The chillers are sized not for the LOCA. That is not the major heat load on the chillers. So in a LOCA condition they are greatly over-sized. And you just cannot generate design conditions on them.

Q And is it my -- Am I correct, from your prior testimony, that that difference was about 150 Kw?

A (Witness Dawe) That is our approximation at this time. We did not measure the chillers specifically.

Q So that's an estimate, is that right?

A (Witness Dawe) That is an estimate which we feel is a good estimate based on our engineering estimate.

MR. DYNNER: We have no further questions.

JUDGE BRENNER: Does Staff have any questions?

MR. REIS: Yes, I have a few.

CROSS-EXAMINATION

BY MR. REIS:

Q You spoke about the core spray pumps and the RHR pumps. For these pumps does the maximum power come at run-out or before run-out?

A (Witness Dawe) For these particular pumps it

comes at run-out.

Q Are there some pumps that have their maximum power requirements before run-out flows?

MR. ELLIS: Objection, unless we're referring to pumps in the plant rather than pumps in the universe generally.

MR. REIS: I am referring to pumps in the plant.

JUDGE BRENNER: I guess I'd like to limit it even more, to pumps that ran during this IET that we are discussing, if that's okay, Mr. Reis.

MR. REIS: That's fine.

JUDGE BRENNER: If it will make it any easier --

WITNESS DAWE: I am not aware of any pumps that are in the MESL for any of the three diesels that will not realize their maximum power demand at run-out. Certainly if there are they are much smaller pumps than the ones that we're talking about. But I am not aware of any.

BY MR. REIS:

Q You mentioned before that the chillers are sized for some other incidents. What incidents are you talking about?

A (Witness Dawe) Their size or their maximum duty will be experienced during pipe breaks in the secondary containment; for example, a pipe break in the reactor water cleanup system, which is the maximum duty on the chillers.

But those are not LOCAs and those types of breaks do not cause level loss in the vessel and they do not demand ECCS flows and so on. So they are not limiting in terms of the diesel. Likewise, those breaks do not cause trips of the plant and therefore do not require an assumption of loss of offsite power.

MR. REIS: That's all I have.

EXAMINATION BY THE BOARD

BY JUDGE MORRIS:

Q Mr. Dawe, I think it was Mr. Minor the other day that made the observation that he thought the signal which the Watt meter -- I mean the cumulative power trace indicated was heavily damped, or words to that effect. Do you happen to know whether it was damped or what the response time for that trace was?

A (Witness Dawe) Not specifically, Judge Morris, for the trace he was looking at. We have looked at the traces.

In the first seconds to up to a minute where the bus program is going on it is not a damped trace on any of the test runs that I have looked at except for one subset run of the IET where the GESSAR didn't operate properly which was producing the trace. But the traces do show quite clearly the start of the core spray pumps, the start of the service water pumps and so on, the start of the chillers.

Those are the only real jumps you can see, however, between those starts, which are very short. The loads level out very quickly.

And following those starts you can see clearly the increase in loads due to the operator bringing the flows on the ECCS systems up close to run out. The early parts of the traces I don't believe look damped. The later parts of the traces are very flat because the diesel is operating essentially in steady state and the Kw loads are very constant.

Q This morning you've discussed a number of sources of possible difference between the MESL and the IET numbers. Just to try to summarize what your position is, if I do my arithmetic correctly, on the diesel generator 101 the difference is 497 Kw.

In your study of the possible differences what part of that can you account for?

A (Witness Dawe) You're calling the difference of 491 between the 3253.3, I guess it is, in the MESL and the value we reported in our testimony for the IET?

Q I guess I used 3331, which included MOVs and fuel pump and air compressors and the IET number of 2834.

A (Witness Dawe) Well, that's going to give you a much bigger number -- well, not a... It's going to give you an extra 60 or 70 in that 491. I would not consider those

part of the MESL.

Q Okay. Well, let's --

A (Witness Dawe) Judge Morris, let me see if I can answer it directly.

In the nameplate conservatisms for the core spray and the having two ECCS at run out versus one on a diesel, and the RBCLCW pump and the 30 or 32 Kw that we testified to earlier that we actually measured as being below nameplate but didn't include as a reduction in the MESL, those numbers represent, depending upon what assumption you make for the core spray and RHR, between 70 and 175 Kw. And the load development or load sequencing examples that I gave with the chillers and the UPS power supplies and the battery charges and the LOOP level pumps represent about 170 Kw in our mind. So we're somewhere between 240 or -50 and 350 Kw in those examples.

But that's certainly not all-inclusive of every line item on the table. But that's the range we're talking with these examples.

Q So your conclusion is that you don't see any unknown discrepancy in the differences in these numbers, is that correct?

A (Witness Dawe) That's correct, Judge Brenner. I believe that what the IET shows is more representative of the LOOP -- the actual LOOP/LOCA than the MESL, which I

believe is conservative.

I might not be able to account for 400 exact Kw, but the vast majority, we understand where it is and believe that they are representative of the acutal post-LOCA condition.

Q Thank you.

BY JUDGE BRENNER:

Q Mr. Dawe, maybe you can refresh my recollection on one point, which I know is in your testimony but I want to piece it together in my mind now with what we have heard this morning, and I was reminded of it when you pointed out that LILCO's definition of the MESL would be the lower value not counting the -- all the cyclic and intermittent loads that has been discussed in the testimony.

My question is: During the MESL what happens with respect to those loads that we put in that category?

A (Witness Dawe) Judge Brenner, do you mean during the IET?

Q Yes, thank you.

A (Witness Dawe) They all operate, Judge Brenner. But, you see, that's part of the reason why they don't belong in the MESL.

For example, the MESL number on core spray or RHR is a run-out number. As a run-out number it requires full injection capac.., including the break. Therefore it

requires the injection valves to be open. And obviously, while the injection valves are open the pump is not developing full flow.

So you can see right in that very example that you just really can't add the valve load to the pump load simultaneously because it can't happen. My example with the battery charger, a lot of those DC loads that would be on the battery charger at that point in time are DC valves, containment isolation valves and so on. Those valves would be done stroking very early in the first minute or so, or shorter, and don't overlap with the big ECCS and certainly not with the chiller loads and so on. That's why things like valves are left as short-term intermittent loads.

Clearly -- and I don't want to confuse the issue but I will take a chance -- there are other loads in the MESL that are arguably cyclic. The chillers are a great example. They are intermittent and they are cyclic. They come on when the heat builds up and they go off when the heat has been reduced by the chiller. But they're potentially major loads when they come on.

The valves are small loads, which is part of our definition in our testimony of the intermittent and cyclic load.

Q Yes, I recall that as part of your definition.

The relatively small load of I guess it is about

12 Kw for the intermittent loads that would be attributable to the diesel operation itself -- I guess it is the fuel pump and the air compressor -- do those operate during the IET as they would in the event of a LOOP/LOCA?

A (Witness Dawe) A yes and a no, Judge Brenner. The air compressor does because the diesels automatically start and it responds to recharge the diesel air start system.

The .2 Kw fuel oil transfer pump does not operate because at the loads the diesel runs at for the length of the IET the day tank doesn't reach the set point to start that pump, which is part of the sequencing. We know that the fuel oil transfer pump can't overlap with the air compressor.

Q I think nobody will pursue .2 Kw; at least I hope not.

JUDGE BRENNER: Were there any other follow-up by LILCO questions?

MR. ELLIS: Judge Brenner, I guess proving once again I'm the lowest common denominator here, I do have a couple that I think may be clear, but they weren't entirely clear to me, if I may.

REDIRECT EXAMINATION

BY MR. ELLIS:

Q Mr. Dawe, you referred to 22,000 gpm for two low pressure pumps and the fact that that could not be achieved at Shoreham for the reasons you stated.

Is that figure assumed, though, in the MESL?

A (Dawe) No, it is not. No, it is not because we have assumed one pump at runout and one pump at less than runout on the 103 engine. If you look at the MESL, it shows the RHR on runout at 1022. The 103 number is not 2044. It is 19 -- I don't remember the exact number, but it is one at runout which is realistic and one not at runout which is realistic.

Q Well, is the number assumed, though, in the MESL nonetheless greater than the number that you would expect in a LOOP/LOCA?

A (Dawe) Yes, it is because it is based on -- it would be a cumulative higher than the 18,000 that is physically possible.

Q Is that, therefore, a conservatism in the MESL?

A (Dawe) It is a conservatism, yes.

Q You mentioned the four chillers. Were all four chillers run during the IET?

A (Dawe) Yes.

Q And I think you indicated that during a

LOOP/LOCA you would expect one or two to be running, is that correct?

A (Dawe) We do not need more than one. Ultimately, the operator would drop to two and then to one.

Q Does the MESL assume that all four operate at maximum loads?

A (Dawe) Well, you can't really say it that way, Mr. Ellis. The MESL for each diesel assumes its chiller is running at fu' ' load, or associated chillers.

MR. ELLIS: That is all I have, Judge Brenner.

JUDGE BRENNER: Mr. Dynner, do you have something else?

MR. DYNNER: Just a couple.

RECROSS-EXAMINATION

BY MR. DYNNER:

Q In response just then to Mr. Ellis' question about the RHR pumps, you said that the number in the MESL in kilowatts was greater than in the IET but not quite as great as his question presumed.

How much larger was the kilowatt number, if you know in kilowatts?

A (Dawe) I am not sure that you characterized that correctly. The factual matter is that the IET which ran two RHR pumps on diesel generator 103....

(Witness panel conferring.)

....would have had the two pumps at about somewhere between 1880 and 1900 KW -- 1870 and 1900, I believe.

(Witness panel conferring.)

Q I am just trying to get the difference, Mr. Dawe, in kilowatts.

A (Dawe) Have I not answered your question, Mr. Dynner? If I haven't, I am afraid you are going to have to reask it.

Q Okay, what I am trying to get at is Mr. Ellis raised the issue as to the difference in kilowatts between the numbers you gave in the -- the numbers used in the IET and the numbers used on your MESL for the RHR pumps in kilowatts, and I wonder if you might give us the difference in kilowatts for each one of those RHR pumps on the MESL so we can see what they account for.

A (Dawe) On each diesel, Mr. Dynner?

Q Yes, sir.

A (Dawe) On the 101 and 102 engines, when the pumps were run at 10,000 gpm, it would represent about 30 KW less than the number that is on the MESL table, as I have testified earlier, and when it is run at 8500 gpm, it would be 89 KW, and that is for the 101 and 102 engine.

For the 103 engine, where two pumps are run together, it represents about 120 KW.

Just a moment, Mr. Dynner.

(Pause.)

It is 89 KW on the 103 engine as well, not 120 as I said. I was looking at the wrong piece of data.

Q Mr. Dawe, correct me if I am wrong. I understood you to say in answer to a question by Judge Morris that during the IET the operators adjusted the flow to runout after the start of the test, is that correct?

A (Dawe) As soon as the pumps start during the IET, on start signal and the test mode they are on min flow bypass, which we discussed earlier. At that point in time, as soon as we start the operators bring them up to the flow that the IET requires, which is 6000 gpm for the core spray and 17,000 gpm for the RHR.

Q It is true, isn't it, that in a LOOP/LOCA that is not what would happen? They would be at runout immediately; you wouldn't have them brought up by the operator, isn't that right?

A (Dawe) If the line break, which is the LOCA, is in an ECCS injection line, that injection line will go to its Condition 1. The valves are fully opened. So it takes time for the valve to open, and then they will be able to achieve their flow without operator action. But recall, that will happen on one injection line only if the break is in an injection line; it won't happen on four injection

lines as the MESL's assume.

Q One more question -- and this is a detail, but maybe you can set it right. The numbers given in the IET and that you have given today for the IET as to the core spray pumps and the RHR pumps were approximately 6000 gpm and approximately 17,000 gpm. At least that is what the IET procedure says. It uses the word "approximately."

Do you know what the precise numbers were?

A (Dawe) At this point in time I don't know what the precise number was. It would have to be at or about each of those numbers because the IET requires it and that step is signed off, and if my recollection is correct, it is also signed off by a quality assurance observer as well as the operator who completes the step.

Q I guess what I am getting at is maybe one of you can tell me who determines what the word "approximately" means in the context of the IET requirements.

(Witness panel conferring.)

A (Youngling) Mr. Dynner, we don't have the data in front of us here, but I am sure that the loads were brought to a reasonably close number to 10,000 and 6000 for the -- I am sorry, let me correct that -- that the numbers were brought reasonably close to 6000 for core spray and 17,000 for RHR.

Q Okay. What do you mean by "reasonably close"?

A (Notaro) "Reasonably close" would mean bringing it up to 6000, as indicated on the meter, or bringing it up to 17,000, as indicated on the meter.

Q And were you sure that it was brought up to 6000, as indicated on the meter? Have you looked at the data over the weekend or otherwise ascertained with precision what these numbers are?

A (Notaro) The IET step was signed off, and that is why I believe it was signed off to 6000, as indicated on the meter.

Q And the part that is verified and signed off is the part that says -- and I quote in 8.2.16, for example -- "bring core spray flow to approximately 6000 gpm per LOOP, using..." -- and then there is a long number.

Is that what you are relying on for your statement that it was signed off on?

A (Notaro) Yes, sir, that is what I am relying on.

Q So you don't know what "approximately" means, do you?

A (Notaro) I believe I just answered that. In my opinion, I believe that means that the individual took that flow to 6000, as indicated on the meter. That is my opinion.

MR. DYNNER: Nothing further, Judge.

RECROSS-EXAMINATION BY BOARD

BY JUDGE BRENNER:

Q Mr. Dawe, I got confused on what I am sure is also just a detail, but just to make sure I have it straight, why was the load difference of 89 KW for the RHR pumps as comparing, as I understand the answer you gave, the IET operation to the MESL assumption? Why was that difference the same for each of the diesels?

I thought there were two pumps that would have operated on the 103 diesel during the IET and that they would have tended to equalize at their output.

A (Dawe) Because on the 103 engine we are looking at the MESL, and the MESL number on the 103 engine does not assume two RHR pumps in runout at the same time. It only assumes one because the 103 is feedi to two different RHR injection paths.

JUDGE BRENNER: Anything further, Staff?

MR. REIS: No.

JUDGE BRENNER: Mr. Ellis?

MR. ELLIS: No.

JUDGE BRENNER: All right.

Well, we were premature in our farewells to you last week, but we will say that again, and thank you again.

(Witness panel excused.)

JUDGE BRENNER: Mr. Dynner, as I believe I had

commented on Thursday, the reason we had to bring the LILCO witnesses back was because I was confused on a point and had the witnesses all been together we would have been able to develop it while they were on the stand; that is, the witnesses for the County and LILCO together, but they were not.

Because of that and because we have proceeded in this fashion, I think it is only fair to give you the option as well. If you want to adduce any information from your witnesses on this particular point, we will let you, and you might want to think about it over a break.

I am going to take a slightly longer break in order so that we can read the answers to the motion to strike. Again, although we set time limits, people have to be cognizant of the pace of the proceeding and make adjustments so that we can avoid this.

I recognize a few things happened, including the fact that we changed the starting time this morning. We had better take about 25 minutes, until 10:50.

(Recess.)

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

Mr. Dynner, did you want to do anything further on that subject?

MR. DYNNER: No, sir.

JUDGE BRENNER: All right. We are up to the Staff witnesses. I have been confused, and I'm sure it is my faulty memory because I am sure the Staff told us at least once.

Could you please tell me again which witnesses you plan to put on together at this point?

MR. REIS: At this point we will put on Mr. Clifford, Mr. Eckenrode, Mr. Buzy, Mr. Knox, Mr. Hodges and Mr. Berlinger. I'm not sure that you knew about Mr. Berlinger prior to last Thursday.

JUDGE BRENNER: I didn't know about him until this moment--

MR. REIS: We gave you--

JUDGE BRENNER: Go ahead. I'm sorry. I knew about him and I knew he had a one-page piece of testimony, and I knew the one page was changed with another one page, and I had always thought he was coming on with your other panel.

MR. REIS: The SER which deals with the loads in contrast to the capability of the diesels, he has also

supervised that SER, and in order to-- We think he is appropriate for both panels.

JUDGE BRENNER: I also didn't know that the Staff was going to move the SER into evidence until I read Mr. Berlinger's new one-page piece of testimony. I drew an inference from that.

We have some procedures established in this hearing for notification in advance of what testimony is going to be put into evidence, and they are important for a number of reasons, due process and notice to other parties and the Board, and other parties can do what they wish, if anything, with respect to prehearing motions for which we have also established schedules.

And in fact the Staff had the benefit of filing last on that schedule, rather closer to the time of starting the hearing than ideally might be desired. Although the parties agreed on the schedule and the trade-off made senseand we approved it, it put us in the position of getting answers to motions relatively late in the day, one as late as the time the witnesses are going to take the stand.

And now we hear that the SERs are going to be put in. Don't read the section on SERs because we've discussed it many times in this hearing, Mr. Reis. I don't know what the parties have to say about it. My comment so far goes

only to the timeliness of notice.

Through a snafu, Mr. Reis, and I realize I was in a hurry to leave Thursday, you did not give me Mr. Berlinger's testimony. You gave me two copies of another piece of testimony, so although I had three pieces they were not three different pieces, and I did not--

MR. REIS: I aplogize.

JUDGE BRENNER: -- get the other one until this morning. That's far from my main point. It didn't take long to read.

I am trying to find the SER that you have referenced--

MR. REIS: If you would like additional copies we have them.

JUDGE BRENNER: Do you plan to put both Safety Evaluations into evidence as part of this panel, or are they divisible by subject? What did you have in mind?

MR. REIS: Certainly the one of the 3rd should go into this panel. I think both of them should go in at this point. We believe both of them have relevance to this panel also.

JUDGE BRENNER: I have to find my copy of the 18th Safety Evaluation. Will you excuse me?

MR. REIS: It is a rather bulky document.

JUDGE BRENNER: Yes, I have it now. It has never

been bound, has it? I've just gotten loose papers.

MR. REIS: Yes.

(The Board conferring.)

JUDGE BRENNER: I will hear from the parties, but my preliminary reaction is that the Staff is going to have to segregate what portion they think is relevant to the contention we are hearing now, and what portion they think is relevant to the other part, and which portions are not being moved into evidence.

We have had a similar problem before. I won't belabor it, but it leads to problems both of notice to parties of what witnesses they should be asking what questions to, and also problems of information being in the record which are not pertinent to the contentions.

All right, let's deal with the motion to strike first.

Mr. Ellis, did you have something that needed to be done before that?

MR. ELLIS: No, sir.

JUDGE BRENNER: We only want to take up the subject of LILCO's motion to strike a portion of Mr. Knox's testimony at this time, and we'll get to the other motions to strike in a timely fashion, but not today.

We have read LILCO's motion dated February 11th, 1985, the portion of the Staff's response that deals with

the motion to strike a portion of Mr. Knox's testimony, which we received this morning, February 19th, and the opposition of Suffolk County and New York State in a joint written opposition to LILCO's motion to strike those portions.

The portion we're speaking of -- and I'm seeing if the pagination changed from the revised testimony -- It is still the first two full paragraphs on page 6.

We agree with the opposition to the motions in terms of subject matter, that it doesn't appear to deal with short-term loads which could fit within the definition of a cyclic or intermittent load, and we'll hear more about it, but we are not going to strike it on that basis.

We do have a concern as to the expertise of Mr. Knox which was also-- That question is also part of LILCO's motion to strike, and the Staff in its answer-- The particular portion of testimony that concerns us with respect to Mr. Knox's expertise is the portion of testimony that deals with the effect on BMEP of the diesel generator operating with the fuel racks open at the moment it is called on to operate.

The Staff's answer at page 2 indicates:

> "Other Staff witnesses can speak to the question of the effect that adding additional loads would have on the diesel generator BMEPs."

Could the Staff amplify what it meant by that, please?

MR. REIS: Mr. Knox essentially did not look at the capabilities of the engine but just what loads they would see at the various times, and that is what he is testifying to here. The capabilities of the engine of course are with the panel from Pacific Northwest Laboratories.

JUDGE BRENNER: But is it then the Staff's position that Mr. Knox has the expertise to testify that the BMEP may be greater than that corresponding to a continuous electrical load of 3300 kw for the condition discussed at page 6 of his testimony?

MR. REIS: Yes.

JUDGE BRENNER: Can you tell me what in his written qualifications at least would support that? Or if you want to supply information as a statement of counsel that he has other qualifications although not covered in the written qualifications, we will hear you on that also.

MR. REIS: Well, it certainly is within his review functions within the NRC Staff. It is the course of his regular job to look at what these loads are and what loads are sustained and what equipment -- what the loads are when equipment is initiated onto the system. And this is part of his regular review function. And I think it is

indicated in his professional qualifications.

JUDGE BRENNER: When you say loads, you mean electrical loads or mechanical loads as an operational function of a diesel engine?

I can't tell from--

MR. DYNNER: In looking at the loads--

JUDGE BRENNER: Let me be more precise.

MR. REIS: -- he considers--

JUDGE BRENNER: Let me be more precise. Maybe that will help you.

I can't tell from his written qualifications, the Board can't tell, what he knows about the operation, the mechanical operation of the engines, and there is an arguable distinction between electrical loadings and effect on BMEP.

MR. REIS: I think this best could have been gone-- We could best go into this in voir dire in order to elucidate the nature of his usual review. My understanding of his usual review is that he looks at whether, given the ratings of the diesels, whether they could take the loads. And I believe that includes the amount of incidental loads that may be put in by the diesels themselves, caused by the diesels themselves.

JUDGE BRENNER: Mr. Reis, am I correct that Mr. Knox's qualifications are contained in the testimony

rather than in addition having an attachment tc the testimony?

MR. REIS: That is correct, sir.

JUDGE BRENNER: All right. We won't strike the testimony at this time, and we will allow it to develop on cross-examination as you suggested.

Mr. Reis, we thought that the sentence that I quoted from in the Staff's answer to the motion to strike had something else in mind than what you have now explained was intended by it.

Before we put the witnesses up there, since we now know what the Staff proposes to put into evidence, I would like to hear from the parties on the Staff's proposal.

County-- Well, I'll ask LILCO first.

MR. ELLIS: Judge Brenner, our position, put succinctly, is that we have no objection to introductions in evidence of those portions of the SER that are relevant to this hearing.

I might as well state the reverse. We do not see any purpose served in introducing or admitting into evidence large portions of the SER which are not at issue in this hearing. There may be some mechanical difficulty with the xeroxing and the putting together, but that could easily be solved I would think by specifying -- if the xeroxing and putting together has already been done, by specifying those

portions of the SER that the Staff wishes to introduce.

We would have no objection to those that are relevant to this hearing.

JUDGE BRENNER: We could solve that easily. We could have the whole document as an exhibit for identification and specify which portions are in evidence.

As applied, Mr. Ellis, what would your view be on the December 3rd Safety Evaluation? Are there large portions of that, in your view, that would not be relevant? That's a relatively small document of five pages.

MR. ELLIS: Yes, sir. We would not consider the portion of the December 3rd SER beginning on page 3 and concerning in-rush current to be pertinent to this hearing. The Board has already ruled on that.

JUDGE BRENNER: That's identical to the subject of the motion to strike that we just took up. Is that correct?

MR. ELLIS: That may be the case, but I don't believe that is the case. It is not my understanding that that's the case, but I am not a technical witness so I could be mistaken. I don't think I am. I think they are different subjects.

JUDGE BRENNER: Remind me. We already ruled on in-rush current? I'm sorry, I don't remember.

MR. ELLIS: In-rush currents were ruled on in

connection with the motion to strike portions of the contention-- No, I'm sorry, Judge Brenner. I'm sorry, I am incorrect in that connection.

I think in-rush current was not, in our view, within the scope of the contention. The intermittent and cyclic loads as referred to in the contention did not, in LILCO's view, cover in-rush current.

JUDGE BRENNER: I want the Staff to know this is a problem that this causes. Hearing time is precious and to waste it discussing matters that should be handled on a prehearing basis with documents that have been around for enough time for that to have occurred is not a very good use of the resources of anyone sitting here in this room. And this is the short document so far.

(The Board conferring.)

JUDGE BRENNER: I have a suggestion, but let me hear from the County first on its view.

MR. DYNNER: Let's see if I know which issue. Are we talking in-rush current or are we talking about the global issue?

JUDGE BRENNER: Global.

MR. DYNNER: Yes, we object to this entire procedure of suddenly deciding that the SERs are something that the Staff is going to talk about. The SERs were not, nor were portions of the SERs, attached as exhibits to the

prefiled testimony by the Staff witnesses. I can't find any place in which they are relied upon. I can't find any place in which Dr. Berlinger's testimony says anything other than the fact that he managed and coordinated the SERs and was responsible for their preparation.

Last week I raised the issue of the SERs and the appropriateness of having them put in this record and nobody from the Staff said a word in response. And suddenly on Thursday we are handed a whole package of revised testimony which all of a sudden contains Dr. Berlinger's new -- not revised but brand new testimony to the effect that he had an input in the SERs.

And I don't think that there is anything here for us to cross-examine Dr. Berlinger on. I am just at a loss as to why if the Staff was going to rely at all on the SERs, they didn't say so at some point so that we could have prepared our cross-examination to take the SERs into consideration, or the specific portions of the SERs that the Staff intended to rely upon.

And as I read what the Staff's testimony, and now its revised testimony said, aside from Dr. Berlinger's new testimony, it seems to me from my familiarity with the SER that the points which are raised in the SER and are relevant to these contentions are in fact handled by the specific witnesses that the Staff chose to put on, and for which we

did have notice.

So that I think that this constitutes not only surprise but I don't think it is consistent with this practice berore this Board of having appropriate prefiled testimony that says something and that forms some basis for the parties to conduct their cross-examination upon, and that just isn't there with respect to Dr. Berlinger's testimony.

JUDGE BRENNER: Do you object to having Dr. Berlinger as part of the panel, if we were just admitting the testimony of the witnesses other than Dr. Berlinger and not the SERs?

MR. DYNNER: I object to having Dr. Berlinger on this panel because the only thing that he is testifying to that we know about is in accordance with this new package of documents that we got, that he was responsible for the management and coordination of the Staff and consultant review which were the bases for both these reports, and they were prepared under his supervision and direction.

And I don't think that the issue of who managed and coordinated the reviews and who supervised and directed their preparation is an issue in this trial. And I certainly don't have any concern with that.

I would like to ascertain from the witnesses that the Staff previously chose to represent their point of view

that in fact they were involved in and responsible for and represent the Staff's position.

But I would object to having Dr. Berlinger up there simply because he hasn't told us -- the Staff hasn't told us what he is going to testify to, and if he is just going to sit there and make wholesale comments upon the testimony and the cross-examination of other witnesses, I don't think that is helpful.

MR. ELLIS: Judge Brenner, may I address that? I think there were some important points that were omitted.

JUDGE BRENNER: Just focus on two things. Let me tell you which things to focus on.

MR. ELLIS: May I focus first on surprise?

I am surprised by Mr. Dynner's surprise. Mr. Dynner--

JUDGE BRENNER: That wasn't one of the two things I wanted you to focus on. My judgment has been proven by your comment.

MR. ELLIS: I'm sorry, may I just finish the surprise point, or--

JUDGE BRENNER: Why don't you just discuss two different things? Number one, your overall comment that you would not object to that which is relevant but would object to that which is not relevant sounds to me pretty close -- putting aside the issue of Mr. Berlinger, sounds to me

pretty close to Mr. Dynner's point of due notice at the time the testimony was filed.

The other point is I would like you to address what your position would be with respect to Mr. Berlinger being part of the panel if we only admitted the supplemental testimony of the other witnesses.

MR. ELLIS: First let me address notice.

I'm surprised at Mr. Dynners surprise.

(Laughter)

Mr. Dynner deposed Dr. Berlinger, and in that deposition the SER was a principal tool. He knew then, as he has always known, that Mr. Berlinger was in charge of the SER procedure, and, indeed, he requested to depose Mr Berlinger on the load issue.

I must admit that I was surprised when the Staff did not have Dr. Berlinger up there initially. I would want Dr. Berlinger on that panel because I know from the deposition, and I know from the memorandum that forwards the SER, that he did play a substantial role in the qualified load SER and in the determination that 3300 was appropriate as enveloping the MESLs; and he has always played that role. And I think he is of significance.

So if anyone is surprised, I'm surprised that he's not on the panel. And I would certainly want to take whatever steps are necessary to ensure that he is.

JUDGE BRENNER: The point is, I think, why should it be left up to surprise one way or the other, or in opposite ways, as opposed to having prefiled testimony so that the Board and the parties knew.

MR. ELLIS: Well, I think the prefiled testimony is, in essence, the SER which Dr. Berlinger--

JUDGE BRENNER: That wasn't prefiled testimony. You're talking about the testimony that was received on Thursday.

MR. ELLIS: Yes, sir, I understand. But I'm talking about it in terms--

JUDGE BRENNER: That was post-filed testimony.

MR. ELLIS: I'm talking about it in terms of surprise and notice.

Certainly there has been all kinds of notice that that was the essence of the Staff's position. I'm sure Mr. Dynner is not trying to tell the Board that he hasn't reviewed the SERs in preparation for cross-examination; that would--

JUDGE BRENNER: He didn't say that.

MR. ELLIS: No, I'm sure he wouldn't.

So I don't think that there isn't-- I'm sorry; I don't think that there is any question or doubt about notice here.

In his deposition of Dr. Berlinger it was clear that Dr. Berlinger had played a substantial role in the development of these SERs.

JUDGE BRENNER: Okay; you want him on the panel.

Let me back up to the other question.

MR. ELLIS: Yes, sir.

JUDGE BRENNER: Let's assume that the Board would

like to accommodate you and admit only those portions of the safety evaluations that are relevant, and not admit those portions that are not relevant.

Should we sit here and hear everybody's view, which might be disparate, on which portions fall into which category at this time?

MR. ELLIS: I think that could be done fairly promptly. There are going to be some that are tied to the motion to strike. For example, on the December 3rd SER--

JUDGE BRENNER: Don't give me examples yet. I'm just trying to think about the procedure.

MR. ELLIS: I certainly think I could reach agreement with the Staff on what portions are relevant. And there might be some--

JUDGE BRENNER: That's two.

MR. ELLIS: That's two; I agree.

And I think wonders will never cease, we might even be able to reach agreement with the County on what is relevant. And, to the extent we couldn't, we could pinpoint those specific portions as to which there is a disagreement.

For example, the bit about the higher BMEPs, there might be a dispute on that. That appears on page 4 of the December 3 SER. You've already ruled that you're going to wait until--

JUDGE BRENNER: It happens, as I recall, that that

one paragraph is almost word-for-word what's in the testimony anyway.

MR. ELLIS: Right; I think that's correct.

And I think in fairness, Judge Brenner, I should point out that I would plan in my cross-examination of the Staff to make use of certain portions of the SER that I think are pertinent to the hearing.

JUDGE BRENNER: Fine. That's got nothing to do with the question we're discussing, or at least-- Maybe that was an exaggeration on my part. It is separable from the question we're discussing.

MR. ELLIS: Yes, sir.

In short, I think we could resolve, or at least narrow the areas that -- as to which there might be disagreement.

Perhaps another way to do it is just to permit the Staff to use those portions of it specifically in their testimony.

(The Board conferring.)

MR. REIS: Judge Brenner, can I get a clarification? I know I should be completely familiar with the transcript, but I'm not.

I believe you're earlier--

JUDGE BRENNER: I wouldn't assign that burden to any one individual.

(Laughter.)

MR. REIS: I believe your earlier ruling on the SERs was on the TDI Owners Group SER and on the SER on the diesels generally. I don't believe it went to Shoreham-specific SERs.

JUDGE BRENNER: Well, no; you have to go back a lot earlier in time than that in the proceeding. Some of our rulings were with respect to Shoreham-specific SERs and FSARs. The percept, as I understand it, of administrative procedure is to attempt -- not always successfully on my part, I'm sure; in fact I know -- to admit into evidence that which is relevant to the issues in controversy to be decided, and not burden the record with that material which is not relevant. That is one problem. There are other problems of sponsoring witnesses, and there are other problems of notice, the question we're discussing here. And this is how we're going to resolve it.

MR. REIS: I agree with that.

On the--

JUDGE BRENNER: I'm ready to make a ruling, but if you want to say anything--

MR. REIS: I just wanted to indicate which parts of the December 18th SER we seek to introduce, and it's very limited. --if you wish to hear that before your ruling.

JUDGE BRENNER: All right; go ahead.

MR. REIS: It 's only paragraph 3.7 of the SER--

JUDGE BRENNER: Could you give me that number again, please?

MR. REIS: 3.7. And Action No. 3 of paragraph 4.0.

3.7 appears on page 12, and the one paragraph on the recommended action is paragraph 3 on page 13.

JUDGE BRENNER: I'm sorry; I was looking at the wrong SER.

MR. REIS: December 18th, 3.7--

JUDGE BRENNER: I did have that one. But that's not paginated the way you indicated, that's why I was--

MR. REIS: The very beginning. Look at the very beginning. What is attached to it and is an integral part of it is the technical evaluation report of the Pacific Northwest Laboratories. The first part of it was the part prepared by the Staff itself to go into the first thirteen pages. And it is within those thirteen pages that we're just pointing to two paragraphs right now. --actually to three paragraphs, Section 3.7 on page 12 at the beginning, and paragraph 3 on page 13.

JUDGE BRENNER: This is the problem when we're focussing on something without notice.

The information in these paragraphs is not already in the testimony; is that what you're telling me?

MR. REIS: The information--

JUDGE BRENNER: You don't know either, offhand. And I certainly don't.

MR. REIS: Yes, I believe it is. I was just verifying--

JUDGE BRENNER: Then why do we need it?

MR. REIS: It's just that it's the official statement of the Staff position in a required document of the Staff; that's all.

JUDGE BRENNER: Absent a very narrow category of evidence which may be officially noticed, as you know, we don't deal with official statement of bodies, we deal with testimony of witnesses under oath who can respond to cross-examination based on that testimony.

All right; I think we have a ruling that will accommodate the competing interests of all the parties and still maintain the importance of orderly procedure, which is important -- not as an end in itself but to avoid prejudice to other parties.

I can imagine what the Staff's position would be if somebody suggested at the last moment moving in new information, whether it be many pages or a few pages with important information.

I took a moment, Mr. Reis, before making the ruling, because you pointed out just a small portion of it.

But as you can see, just pointing out that small portion leads to things we have to consider at the last moment. And if there is any error in what we are admitting or not admitting at this point, in my mind it falls clearly at the doorstep of the Staff. Because our ruling could be that we are not going to admit anything beyond what was prefiled and identified in a timely fashion. And even the testimony of Dr. Berlinger on Thursday did not clear say the SERs were being proposed for evidence, although one could draw the inference. But even if we draw the inference, Thursday was very late in the day, then, to hear about it.

We will admit only the direct testimony of the witnesses into evidence. And if I heard you right at the outset, besides the two safety evaluations that we've been discussing, that is all that the Staff seeks to put into evidence.

Am I correct on that, Mr. Reis?

MR. REIS: Yes. Well, it was the December 3rd in its entirety and the two paragraphs of the December 18th.

JUDGE BRENNER: Right. But we're not admitting them into evidence.

MR. REIS: We understand your ruling.

JUDGE BRENNER: Wait. I'm not going to cut it off that easily.

We'll mark them for identification so that they

will accompany the record, because I'm not going to sit here and try to separate paragraphs out. And, again, I'm not talking just about the time we have already taken to identify the paragraphs, but the problem in seeing -- hearing the views of the parties as to why those paragraphs are relevant, and trying to determine the extent to which those paragraphs might already be in the testimony, et cetera.

The witnesses, to the extent they have relied on these safety evaluations by repeating the essence of the information, will have the Staff's testimony already in the record on that point.

Presumably the Staff prepared its testimony with a view toward supplying the information it thought pertinent to the contention, and the Staff has now had enough further opportunity to modify some of that testimony. So we certainly don't feel as if the Staff hasn't had more than fair opportunity already to put into its testimony and/or identify in advance by way of accompanying exhibits what it would put into evidence.

We will permit revisions to the testimony of the witnesses other than Dr. Berlinger, and I haven't heard any objection from the other parties on that, although I will inquire when we are finished with this.

The parties may use the safety evaluation for

cross-examination. If there is a particular part asked about, the Staff on redirect can use these portions. And in that fashion we should already have in the record everything that the parties believe need be in the record and which we think is relevant.

The witnesses should know that if they're going to use a portion of the safety evaluation to answer a question, which portion is not already in substance set forth in their testimony, they should include the substance of it in their answer and not just a reference.

If, at the end of all that, there is some valuable piece in the safety evaluation that was referred to but, for some reason or another, was not laid out on the transcript, the parties can move that a particular portion be moved in to conform to the evidence that has already occurred, and not to re-argue that certain additional portions should be in.

But I would even like to keep that category to a minimum, ideally even non-existent, if we get it into evidence the first time through the words of the witnesses and their testimony is written.

With respect to Dr. Berlinger's written testimony, it contains no substance, and we're not going to admit it.

On the point of whether he should be part of the panel or not, we have earlier in this proceeding permitted

witnesses to take the stand who did not have testimony if they were part of the review, and if it was deemed important, so that the Board could be sure that we were getting full information.

But I don't know what part he played in this analysis of the procedures. We know something of the part Dr. Berlinger played in the subject, at least, of the testimony that we will be hearing later, because he testified earlier in this proceeding on related subjects, the effect on the components of the diesel engine.

Can the Staff enlighten us as to what he might have to contribute on this subject, what his involvement was?

MR. REIS: Yes. It is not so much procedures as the loads that will be seen in the event of a LOOP/LOCA and generally by the diesel.

In other words, he was involved not only in the testing to qualify the -- or the review and supervision of testing to qualify the diesels, but also to what loads they would have to be qualified. And it is in that sense that we're adding him -- or asking that he be added to this panel.

JUDGE BRENNER: All right; we'll let him be part of the panel limited to the subjects of the testimony covered by the other witnesses.

I'm sorry; I said that wrong; to subjects covered in the testimony by the other witnesses. Strictly limited. I don't want to hear things that are not related.

MR. REIS: I understand, your Honor.

MR. DYNNER: Excuse me; I don't understand.

We don't know what he's going to say, of course. Is he up there to contradict the other Staff witnesses if his view differs? Is he up there to confirm what they say in their testimony is correct?

I have no basis for knowing how to cross-examine him. He didn't file any testimony. And I'm puzzled, frankly, as to how this kind of thing is alloted for in this kind of procedure. Because we just don't have any basis to cross-examine him on anything. And if he's up there to just say yes, what they're saying is true, we don't need him; if he's up there to contradict them, then I'd like to know what he's going to say, so that we can prepare to cross-examine him.

JUDGE BRENNER: Life is not black and white, and those are the two extremes you gave, Mr. Dynner.

If he's up there for either of those two extremes, then there is a problem.

What he's up there for, in our view, is to fill in any details in answer to questions addressed to the panel, or to other witnesses on the panel. We don't expect parties

to have to address questions to Dr. Berlinger, and it might be he'll be up there the whole time with nothing to say.

But previously in this hearing when we've dealt with complex subjects that cut across several disciplines we've allowed witnesses to be added who could potentially supply further details to clarify answers that are supplied. Very often, in fact, witnesses were people who were coordinated in their review but not necessarily expert in some of the other areas represented by other witnesses. And it worked out well.

I don't recall if the County took advantage of that at all. I know the Staff and LILCO did.

We'll put him up there for that purpose. But if we suddenly get new information we'll try to be alert to it on our own. And you can help us out also.

MR. DYNNER: Well, I don't know if there's any precedent for cases in which a witness has not sponsored any testimony to be up there commenting on what other witnesses say.

It seems to me that if he is going to add anything at all, that's new testimony that hasn't been prefiled in the appropriate fashion.

I understand the Board's ruling, and we continue to object to this procedure.

JUDGE BRENNER: All right. I think you're drawing

the line too extremely, even in your last comment. There is always some residue of new information supplied by cross-examination, at least hopefully; otherwise the witnesses are just up there repeating verbatim what their direct written testimony has been.

So you have to distinguish information that clarifies or amplifies the bases and the conclusions already specified in the testimony as distinguished from totally brand new information.

So there is new in the sense of amplification and clarification, and that is what oral questioning is all about, as distinguished from really new information not previously addressed or considered, and I think we will be capable of reacting.

I will state for the record that we could have excluded Dr. Berlinger from the stand, particularly based on a lack of notice. On the other hand, in trying to draw a balance, if the Staff had done it right the first time and had merely said in addition to the named witnesses Dr. Berlinger will be part of the panel, and they would have had a paragraph or two explaining his role, but has no particular additional, substantive testimony, we would have let him testify, I believe. I know we would have.

So I am bringing the situation late, I will concede, but trying to bring the situation back to what it should have been if it had been done that way.

MR. DYNNER: I want to add that our position obviously is not taken in terms of having anything personal or otherwise against Dr. Berlinger. I will say that for the record.

I will add that I think what distinguishes your last statement from the ordinary case is, while additional information obviously is adduced on cross-examination, it is within the confines of cross-examination prepared for by attorneys with the prefiled testimony at hand, so you know where to go, where to grow from, and what you might expect in the old adage of trying to ask questions that you know the answers to.

While not as true in these proceedings, as normally in trial proceedings --

JUDGE BRENNER: You educated me on that score last time we were in session --

MR. DYNNER: But I understand your ruling, and I have nothing further to add.

JUDGE BRENNER: Yes. The gist of it is we have balanced strict adherence to procedures, which we could have enforced, as against not wanting to be deprived of potentially useful information.

But to be sure, there is a continuum, and if it, ironically enough, gets to the point where information is totally new and well beyond the scope of that covered by the testimony, we will have the opposite problem, and we will deal with it if that comes up.

If it was strictly a two-party litigation, you could obviously solve the problem by not asking

Dr. Berlinger any questions, or at least limit the problem. He still might have something to add. But you can't do that because LILCO might have questions of him or questions of the other witnesses that he has gone and supplied some information on, and the Board might also.

Let me ask for the record, are there any objections to the modifications that have been made in the testimony of the witnesses?

I didn't ask because in the past -- and it seems to me in accordance with the rule of law -- parties are entitled unilaterally to modify their testimony unless another party can claim surprise due to the extent that the new information presented.

My own reading of the testimony was that I would not put the modifications in that category. There are some revisions, but they are not such that major new information is supplied, and many of the modifications are in fact deletions.

MR. ELLIS: Yes, Judge Brenner. LILCO has no objection to the revisions. We think that they are more closely in line with the SER's, which we understood to be the Staff position, and with the depositions taken of Dr. Berlinger and Mr. Knox. Those depositions were taken at the request of the County on the load issue. So they have deposed Dr. Berlinger --

JUDGE BRENNER: That is what I wanted to ascertain.

Mr. Dynner.

MR. DYNNER: I am not going to say a word about those depositions.

I will add that we don't have any objection to the Staff having filed the revisions when they did. We believe we will have the opportunity to fully explore the changes and the reasons for the changes during cross-examination.

JUDGE BRENNER: All right.

Is there anything further, Mr. Reis, before calling the witnesses up?

MR. REIS: Yes, one further thing.

In line with your earlier rulings, I just want to make sure that we are clear where we are.

We earlier supplied -- we referred to in the testimony filed, and we earlier supplied a letter going to LILCO dealing with procedures. It was referred to in the testimony of Clifford Buzy and Ecklenrode.

I would like that letter eventually to be put into evidence. I don't see it falling within the objections you have said before. We supplied that. We timely made reference to it and timely supplied it.

JUDGE BRENNER: That is why I asked you precisely

before so we could discuss everything at once.

MR. REIS: That is why I am adding it now. I tried to get a word in before when I started, and then it did not become appropriate before.

JUDGE BRENNER: All right.

MR. REIS: And that is why I am trying to make sure --

JUDGE BRENNER: Mr. Perlis mentioned last week that the Staff would like to move that into evidence.

MR. REIS: Yes.

JUDGE BRENNER: It was not apparent from the written testimony -- at least the written testimony that I had at that time -- that the Staff so desired, although I believe it is correct it was referred to in the testimony.

MR. DYNNER: Yes, Judge, if I could help out -- I don't know whether you want my help -- it is referred to specifically in the revised testimony of Messrs. Clifford, et al., on page 9, where I believe that that February 5th letter states that it is incorporated into his testimony, and when we said we didn't object -- and nobody objected -- it was with that in mind at least that that was being brought into the record.

JUDGE BRENNER: Well, although the testimony has been -- all right, I see. They have now added the phrase "which is hereby incorporated into this testimony."

MR. ELLIS: Yes, Judge Brenner, that might be my one exception, and the reason for that is that obviously we are preparing a response to that, and while I think some of the subjects will be explored in the hearing, I think it would unduly prolong the hearing if we were to explore all of these subjects and then also to have into evidence, as we should, LILCO's response to the request for additional information.

I think clearly what is going to happen ultimately is that with very defined exceptions, if there are any exceptions at all, the Staff has to find ultimately that reasonable assurance exists with respect to the procedures, and what the hearing should focus on is those areas where there will not be agreement, if there are any -- and there may not be any -- rather than on a mass of material as to which our testimony was there had already been some revisions made to the procedures.

I am not sure whether those revisions cover all, some, or most of these comments. But in any event, the record would not have LILCO's response.

I think what the hearing should focus on is whether there are any disagreements between the Staff and LILCO on the request for additional information and whether those are required for reasonable assurance.

In other words, I would propose that this be

handled in much the same way as the SER's, that if they want to mark it for identification and refer to specific portions of it in their testimony then I would agree to that.

But to put the whole thing in is going to result in unnecessarily prolonging the proceeding, and unless they are willing today to tell us in what respects this letter of February 5th is already outdated -- because the letter of February 5th was written with respect to the procedures as they existed before. You remember the testimony was they were submitted -- revised procedures were submitted something like four or five days before their testimony but were not taken account of in the testimony.

JUDGE BRENNER: I recall some differences of opinion, but let me try to shorten it up.

We had a more fundamental problem with admitting this letter into evidence, Mr. Reis, and I alluded to it last week, and I haven't heard the Staff address it. So I will tell you again what the problem was at that time, and it still exists.

Aside from any notice problem, which may or may not exist, and aside from a relevance problem of the entire document, which may or may not exist, this letter essentially -- maybe not every sentence -- but essentially asks questions to obtain information. It is not the kind of document that supplies substantive information to a record

on issues in controversy.

It was, and still is, my view that the testimony itself supplies precious little substantive support for the conclusions.

So when I read the testimony, even the first time before you added the phrase "incorporated by reference," I naturally went to the letter to see if maybe that would enlighten me as to what the Staff's analysis is, as of that point in time at least, of the procedures, and it certainly was not very helpful in enlightening me.

I can draw certain inferences from the fact that the Staff asked certain questions, but we do not draw inferences from questions as to substantive information. Even something as fundamental as the drafting itself, while I am sure fine and perfectly adequately for the purpose for which the letter was used, is such that it is very difficult, unless you have the procedures in front of you, to walk through each and every question, and even when you do that as to some of it. I did not, but I suspect that when you even do that as to some of it you are still left only with inferences.

So it really is not developed as testimony.

I think it would be much more efficient and also fairer to just hear what the witnesses have to say about these procedures directly. We can mark the letter for

identification if the Staff sees any purpose in doing that, but unlike the safety evaluation, I predict that reliance by a witness on the fact that a certain question was asked in that letter is not going to be very helpful. What we will need to hear about is particularly what the witness' problem is.

And my statement is a general one. I recognize that some of the questions in the letter have a preamble of a sentence or two which explains why the question or series of questions are then being asked, but still it does not rise to the level of substantive information of a safety evaluation and certainly not testimony that is prepared for that purpose.

MR. REIS: Your Honor, if I may be heard?

I think the letter, when taken with the testimony, supplies much more than what is usually given in testimony, in that it refers to the specific points and procedures, and the very asking of questions indicates when you read it with the testimony that the Staff is not concerned -- not happy with whether it is Procedure SP 29.015.04 or Procedure SP 29.010.01, Rev. 4.

There is a wealth of information in here, and it is a wealth of information as to the specific reasons why we were not happy with this at the time that the testimony was prepared, which is the time we filed it.

We attempted to finish our review in time for this proceeding, as I think has been amply borne out before. We were unable to do so because even though we sent people up there the work could not be finished. It was not finished at that time. We don't think it has been finished now or that a substantive change has been made in providing answers to these questions, but we do think there is a wealth of information in there, and we do feel that the letter and the testimony taken together show specifically the faults we find with the procedures.

JUDGE BRENNER: I am sorry, I have to disagree with you. Reading that letter does not give me that information.

As I say, I can draw certain inferences from questions, but I think I stated last week, to the extent the review wasn't finished, only in the sense that the Staff believed LILCO should do certain things. It was certainly finished in the sense that Staff had certain conclusions at that point in time, and the direct testimony should have contained specifically what the Staff found lacking with the procedures and described in narrative form in testimony.

While there may be a wealth of information in this letter, I don't think it is proper to ask a Board sitting in a hearing to have to pull out by inference and

rather obscure reference information throughout a document that was intended for another purpose.

I am not criticizing the letter. It was fine for the purpose, but it is not substantive testimony, and I am not going to worry, speaking for myself, of deciding whether the criticism of Step 4, Point 4 on page 6 of the letter and a certain procedure is a substantive criticism as distinguished from a desire to obtain further information and then trying to match that up to one of the global conclusions in the testimony to try to figure out whether that relates to the part of the testimony that is concerned with too many procedures at once or whether that is related to the part of the testimony that is concerned with something else.

We are not here to conduct that kind of detailed assimilation of raw information.

I could, you know, get off this bench and maybe conduct a review myself with procedures, with expert help, but that is not what I am supposed to be doing.

In all this, my message that procedures are a particularly ripe area for prompt resolution outside the hearing room still stands.

(Board conferring.)

JUDGE BRENNER: Well, it doesn't supply helpful substantive information to Judge Morris either, which

assists me in reaffirming the ruling that we will not admit it into evidence, since I know that it is not solely my lack of being schooled in the discipline that makes it difficult to ascertain substantive information in the letter.

We will mark it for identification, and before this is over we are going to have to find out from the witnesses particularly what is on their mind in any event, and I think by the time we are done we will be sure of getting the substantive facts. Even if the substantive information could be pulled out of that letter, it would be a very inefficient way of doing it.

But the main reason for our ruling is that the Staff has not performed its obligation properly of putting detailed information in useful testimonial form or even in a useful narrative technical document that could be referenced in the testimony that this letter is neither.

And I don't think the point needs any reiteration, but it would have been better for the Staff -- not only better but required -- for the Staff to have identified at the time it filed its testimony that it wished to put this letter into evidence, and we could have heard from the parties, and we would have had a chance to think about it, also, because we have been here for over an hour discussing things that could have been handled off the record on a prehearing basis, and to the extent we needed

clarification we could have gotten that efficiently on the record and then ruled.

All right. I think we are probably at the point of taking the lunch break, and then when we come back the Staff witnesses could be on the stand, and we will admit their testimony into evidence.

Please have the exhibits all premarked with the proper numbers, and so on and so forth, so we don't have to worry about any mechanical procedural things.

Is there anything else before we adjourn for lunch?

(No response.)

JUDGE BRENNER: All right, we will adjourn until 1:30.

(Whereupon, at 11:55 a.m., the hearing was recessed, to reconvene at 1:30 p.m., this same day.)

AFTERNOON SESSION

(1:35 p.m.)

JUDGE BRENNER: We are back on the record.

It occurred to me, Mr. Dynner, after you made your comment about there being nothing personal in your objections, we should have asked Dr. Berlinger what his own view was, and he might have agreed with you on the bottom line. But in any event, thanks to his counsel's persuasive argument, he is on the panel with the other witnesses.

Mr. Reis.

MR. REIS: Your Honor, as the first order of business I would like to mark the documents we were talking about earlier for identification, just in case they should be referred to again. They are referred to in the testimony.

I would like to mark as Staff Exhibit D-11 a memorandum of December 3rd, 1984, from Mr. Thomas Novak -- for Mr. Thomas Novak from Mr. Crutchfield, and the subject is the Safety Evaluation Report.

As Staff Exhibit D-12 for identification I would like to mark a memorandum for Mr. Thomas Novak from Mr. Dennis Crutchfield, a Safety Evaluation Report dated December 18th, 1984.

And as Staff Exhibit D-13--

JUDGE BRENNER: I'm sorry, Mr. Reis. Could you

enlighten me? Are you making the thick attachment as part of the exhibit to that Staff Exhibit D-12, or just the memorandum and the Safety Evaluation Report through page 13?

MR. REIS: As the Safety Evaluation Report itself incorporated by reference the technical evaluation report and it may become material in later parts of this case, I am marking the whole thing.

JUDGE BRENNER: Go ahead. I'm sorry for the interruption.

MR. REIS: As Staff Exhibit D-13 for identification, I will mark a letter from Mr. A. Schwencer to Mr. John Leonard dated February 5th, 1985, dealing with emergency diesel generator loading, Shoreham Nuclear Power Plant, and attached thereto is a request for additional information particularly dealing with emergency diesel generator loading procedures and training.

JUDGE BRENNER: All right. Why don't we just admit those as exhibits for identification into the record at this time, since we don't need a sponsoring witness. And they are just for identification. And of course the Reporter will need three copies.

(Staff D-11 - D-13 were identified.)

JUDGE BRENNER: Did you desire to have an offer of proof of Dr. Berlinger's testimony?

MR. REIS: Yes.

JUDGE BRENNER: We can mark that as a rejected exhibit if you would like.

MR. REIS: Let me just-- No, I don't think it is necessary.

JUDGE BRENNER: All right.

MR. REIS: Next I would like to start getting the prefiled testimony identified by the witnesses and asking them individually questions on it, and I will start with Mr. Hodges.

JUDGE BRENNER: All right. I can swear them in after you've introduced them them if you'd like.

MR. REIS: Why don't we swear them in first?

JUDGE BRENNER: All right.

If you will all please stand? Some of you have previously been sworn, but we will do it as a group rather than separating it out.

Whereupon,

RICHARD J. ECKENRODE,

CARL H. BERLINGER,

M. WAYNE HODGES,

JOHN L. KNOX,

JAMES W. CLIFFORD,

and

JOSEPH J. BUZY

were called as witnesses and, having been first duly sworn,

were examined and testified as follows:

JUDGE BRENNER: Be seated.

We will say welcome back to Mr. Hodges and Dr. Berlinger, and welcome to the other gentlemen.

Mr. Reis.

DIRECT EXAMINATION

BY MR. REIS:

Q Mr. Hodges, do you have before you a copy of a document labeled "Testimony of Wayne Hodges," consisting of some six pages?

A (Witness Hodges) Yes, I do.

Q Do you have any corrections that you wish to make to that testimony?

A (Witness Hodges) No.

Q Who prepared that testimony?

A (Witness Hodges) I prepared the testimony.

Q And is it true and correct to the best of your knowledge?

A (Witness Hodges) Yes, it is.

MR. REIS: I ask that the testimony of Wayne Hodges be accepted into the record.

JUDGE BRENNER: All right. In the absence of any objections which we have not previously discussed and ruled upon, we will admit it into evidence and bind it into the transcript at this point as if read.

(The document follows:)

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

| | | |
|---|---|---|
| In the Matter of | : | |
| LONG ISLAND LIGHTING COMPANY | : | |
| | : | Docket No. 50-322 |
| (Shoreham Nuclear Power Station, Unit 1) | : | |

# TESTIMONY OF WAYNE HODGES

Q. What is your name?

A. My name is Marvin Wayne Hodges

Q. What is your position at the NRC?

A. I am employed as a Section Leader in Section B of the Reactor Systems Branch in the Division of Systems Integration.

Q. What are your technical qualifications?

A. I graduated from Auburn University with a Mechanical Engineering

Degree in 1965. I received a Master of Science Degree in Mechanical Engineering from Auburn University in 1967. I am a registered professional engineer in the State of Maryland (No. 13446).

In my present work assignment at the NRC, I supervise the work of five graduate engineers. My section is responsible for the review of primary and safety systems for boiling water reactors. I have served as principal reviewer in the area of boiling water reactor systems. I have also participated in the review of analytical models used in the licensing evaluations of boiling water reactors and I have the technical review responsibility for many of the modifications and analyses being implemented on boiling water reactors post Three Mile Island Unit 2 accident.

As a member of the Bulletins and Orders Task Force, which was formed after the TMI-2 accident, I was responsible for the review of the capability of BWR systems to cope with loss of feedwater transients and small-break-loss-of-coolant accidents.

I have also served at the NRC as a reviewer in the Analysis Branch of the NRC in the area of thermal-hydraulic performance of the reactor core. I served as a consultant to the RES representative to the Program Management Group for the BWR blowdown emergency core cooling program.

Prior to joining the NRC staff in March 1974, I was employed by E.I. DuPont at the Savannah River Laboratory as a research engineer. At SRL I conducted hydraulic and heat transfer testing to support operation of the reactors at the Savannah River Plant. I also performed safety limit calculations and participated in the development of analytical models for use in transient analyses at Savannah River. My tenure at SRL was from June 1967 to March 1974.

From September 1965 to June 1967, while in graduate school, I taught courses in thermodynamics, statics, mechanical engineering measurements, computer programming, and assisted in a course in the history of engineering. During the summer of 1966, I worked at the Savannah River Laboratory doing hydraulic testing.

Q. What is the purpose of your testimony?

A. The purpose of this testimony is to describe NRC practice in applying the single failure criterion and to discuss the applicability, or lack thereof, of the single failure criterion to Suffolk County and the State of New York emergency diesel generator load contention a(iv). That part of the contention states:

"Contrary to the requirements of 10 CFR 50, Appendix A, Generic Design Criterion 17 ... Electric Power Systems, the emergency diesel generators at Shoreham ("EDGs") with a maximum "qualified load," of 3300 kW do not provide sufficient capacity to assure that the requirements of clauses (1) and (2) of the first paragraph of GDC-17 will be met in that:

(a) LILCo's proposed "qualified load" of 3300 kW is the maximum load at which the EDG may be operated, but is inadequate to handle the maximum load that may be imposed on the EDGs because:

(iv) Operators may erroneously start additional equipment;"

Q. What is meant by a single failure?

A. Single failure is defined in 10 CFR Appendix A as follows:

"A single failure means an occurrence which results in the loss of capability of a component to perform its intended safety function. Multiple failures resulting from a single occurrence are considered to be a single failure. Fluid and electric systems are considered to be designed against an assumed single failure if neither (1) a

single failure of any active component (assuming passive components function properly) nor (2) a single failure of a passive component (assuming active components work properly), results in a loss of capability of the system to perform its safety functions."

Q. How is the single failure criterion used?

A. Application of the single failure criterion involves a systematic search for potential single failure points. The objective is to search for design weakness which could be overcome by increased redundancy or use of alternate systems. The single failure criterion is used to ensure the reliability of those systems which are essential to the safety of the plant.

Q. Are operator errors included in the single failure analysis?

A. No, operator errors are not included in the single failure analysis. Single failures are postulated to occur only in components, consistent with the definition of single failures in Appendix A to 10 CFR 50.

Q. How are operator errors accounted for in the design of the plant?

A. Operator errors are accounted for in the design of the plant in a number of ways. First, for actions that must be accomplished on a relatively short time scale and are necessary to mitigate transients and accidents, the staff policy has been to eliminate the need for operator action by automating the action. By not challenging the operator with an action on a relatively short time frame, the potential for operator error is greatly reduced so it is not considered in the context of the design. Second, for situations in which operator actions are relied upon for event mitigation, the staff ensures that procedures and guidelines provide the necessary guidance to the operator to take the correct actions, and that the operators have been properly trained in the action. Third, in the event the staff determines that reasonable assurance does not exist that an operator would not make an error, then the

staff would require that (1) the postulated operator error be considered in the design, (2) the design be modified in order to acceptably accommodate the postulated operator error, (3) that procedures and training be instituted such that the potential for operator error is reduced to a acceptable level, or (4) that assurance be provided that the operator could take the necessary corrective actions to remedy the original error in a reasonable time frame without unacceptable consequences resulting. Finally, a spectrum of operator errors are inherently considered as part of the single failure assumption. That is, because the staff does not require the cause of single failures to be specified, it is obvious that many single failures could be considered to be caused by operator error as well as other causes.

Q. Are operator errors considered in addition to another failure in a single failure analysis?

A. No. The purpose of the single failure analysis is to gain greater assurance of system reliability through redundancy. Operator reliability would not be assured by such an analysis. Operator reliability depends first on having well designed equipment. Then good procedures and training will assure operator reliability. The systems analysis must assume that good procedures exist for the operator to follow and that the operator is trained on those procedures.

Q. Are cognitive operator errors considered in single failure analyses?

A. Not directly. As stated before, the purpose of the single failure analysis is to assure system reliability through redundancy. Cognitive operator errors must be addressed through training and procedures. The operator must understand the system well enough to understand the effects of actions he/she is taking and to recognize symptoms which indicate problems; he/she must also have good procedures to aid in carrying out his/her mission.

Q. Does Suffolk County and New York State emergency diesel generator load contention a(iv) raise an impermissible challenge to the single failure criterion?

A. No. The single failure criterion is not applicable to the treatment of operator errors. Operator errors would normally be considered in the design of a system so that the system is tolerant of operator errors through either procedures or design or both. An example of this is the design of low pressure systems which interface with high pressure systems. Interlocks are provided to prevent opening valves between the systems when the pressure in the high pressure system is above the design pressure of the low pressure system. The interlocks are generally single failure proof and will protect against many operator errors as well as system failures. However, the systems may still be susceptible to common mode maintenance errors. Proper training and procedures are needed to protect against such errors.

Q. Are there interlocks or permissives which prevent operators from loading the emergency diesels at Shoreham to more than 3300 kW?

A. No.

Q Messrs. Clifford, Buzy and Eckenrode, do you have before you copies of testimony which is labeled "NRC Testimony of James W. Clifford, Joseph J. Buzy, and Richard J. Eckenrode," consisting of ten pages and professional qualifications following thereafter for each of you?

A (Witness Clifford) Yes, we do.

Q And does that testimony indicate that certain corrections were made in that testimony?

A (Witness Buzy) That's correct.

Q And how is that indicated in the pages before you?

A (Witness Clifford) The portions of the testimony that we hav deleted have a line through them, and the additions have a vertical line in the right-hand margin indicating the additions.

Q Who prepared that testimony?

A (Witness Clifford) We did.

A (Witness Buzy) We did.

Q Are there any changes or additions you wish to make to that testimony?

A (Witness Clifford) I have one change I need to make.

I was informed over lunch that my job title has changed.

(Laughter.)

I am now a safety engineer for nuclear power plant operations.

Q And can you tell us what your job title was before?

A (Witness Clifford) I was previously an operational safety engineer, nuclear.

JUDGE BRENNER: They didn't take away your office while you were gone, did they?

WITNESS CLIFFORD: I am almost afraid not to go back now.

JUDGE BRENNER: Well, we'll keep you here for the rest of the day anyway.

BY MR. REIS:

Q Is this testimony true and correct to the best of your knowledge?

A (Witness Eckenrode) Yes, it is.

A (Witness Clifford) It is with the changes I have indicated.

MR. REIS: I ask that the testimony of James W. Clifford, Joseph J. Buzy, and Richard Eckenrode be accepted into the record.

JUDGE BRENNER: All right. I assume, of course, -- I'm not checking -- that the only handwritten changes are the ones that are consistent with the copies you've handed out to us yesterday, Mr. Reis.

MR. REIS: Let me make sure by asking the witnesses.

BY MR. REIS:

Q Was there a previous set of testimony submitted by you people, by you gentlemen?

A (Witness Clifford) Yes, there was.

Q Are the only changes that you know of those indicated by the marginal notations and by the lining out of certain sentences and words?

(Pause.)

A (Witness Clifford) On page 5 at the bottom there is a typographical error. There is a number that reads 333000 kw. That number should be 3300.

JUDGE BRENNER: All right. That was noted on the copy you gave us earlier.

WITNESS CLIFFORD: There are no other changes.

JUDGE BRENNER: All right.

We will admit the testimony of Messrs. Clifford, Buzy and Eckenrode into evidence and bind it into the transcript at this point as if read.

(The document follows:)

NRC STAFF TESTIMONY OF JAMES W. CLIFFORD, JOSEPH J. BUZY,
AND RICHARD J. ECKENRODE

Q.1. What is your name and occupation?

A.1. (Clifford) My name is James W. Clifford. I am employed as an Operational Safety Engineer (Nuclear) in the Procedures and Systems Review Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

Q.2. What are your qualifications and experience relevant to your testimony?

A.2. (Clifford) I have a Bachelor of Science degree in Systems Engineering. I have experience in the operation, maintenance, event analysis, and testing of naval nuclear propulsion plants and prototypes. During my employment with the U.S. NRC, I have been involved in numerous evaluations of licensee and applicant emergency operating procedures and procedure programs, including evaluations for licensing and for actual operating events. A further statement of my professional qualifications is attached to this testimony.

Q.3. What is your name and occupation?

A.3. (Eckenrode) My name is Richard J. Eckenrode. I am employed as a Human Factors Engineer in the Human Factors Engineering Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

Q.4. What are your qualifications and experience relevant to your testimony?

A.4. (Eckenrode) I have a Bachelor of Science degree in Aeronautical Engineering. I have been active in the application of the Human Factors discipline to manned systems since 1960. During my employment by the U.S. NRC, I have participated in numerous evaluations of control room designs and design reviews for applicant and operating reactors. A further statement of my professional qualifications is attached to this testimony.

Q.5. What is your name and occupation?

A.5. (Buzy) My name is Joseph J. Buzy. I am employed as a Senior Reactor Engineer (Training and Assessment) in the Licensee Qualifications Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

Q.6. What are your qualifications and experience relevant to your testimony?

A.6. (Buzy) I have a Bachelor of Science degree in Marine Engineering. I have over 28 years experience in the design, operation, maintenance,

event analysis, and training for military and commercial nuclear power plants, including 17 years as an Operator License Examiner for the U.S. NRC. My current responsibilities include evaluation of training and requalification programs for licensed operators and Shift Advisors. A further statement of my professional qualifications is attached to this testimony.

Q.7. What is the nature of your testimony?

A.7. (All) We are providing testimony to address the question of whether the procedures and training proposed by the licensee will provide additional assurance that the TDI emergency diesel generators (EDGs) will be operated within the specified loading capacity.

Q.8. What part do the procedures and training play in the TDI EDG design issue at Shoreham?

A.8. (All) In response to an NRC staff question, the licensee stated in November 1984, that they were relying on procedures and training (i.e., the operators) to keep from overloading the EDGs above a level identified as a "qualified load" during specified conditions. This qualified load we understood to be 3300KW. The specified conditions were a Loss of Offsite Power (LOOP) or a Loss of Offsite Power in

conjunction with a Loss of Coolant Accident (LOOP/LOCA). Without the assurance that operators would keep EDG loading less than 3300KW, the NRC staff ~~could not certify the reliability of the EDGs~~ would not, at the time of the December 18, 1984 SER, make the determination that the EDGs met GDC-17.

~~In evaluating the EDGs, the design review resulted in a finding that the EDGs were capable of operating at 3500KW, as indicated in the portion of the testimony provided by the consultants to the NRC staff. Assuming the loads and associated loadings that are identified in the FSAR (Table 8.3.1-1) are accurate, and the reliability of the EDGs is acceptable to at least 3500KW, as determined by the NRC staff and its consultants, the operators are no longer required to keep EDG loading less than 3300KW, and the procedures and training are acceptable to be used, as at other plants, to provide additional assurance that the EDGs will be operated within the loading capacity of the machines.~~

This position, previously taken by the NRC staff, did not, however, specifically address the relationship between the 3300KW "qualified load," GDC 17, and operator action. The staff has conducted a further technical evaluation of the EDGs.

This technical evaluation is discussed in other parts of the testimony.

In evaluating the role of procedures and training, we started with the assumption that the EDGs meet, or would meet, the design criteria of GDC 17, which assumes that the EDG design at Shoreham was adequate. With this assumption, we evaluated the procedures and training to address three specific questions.

Old Question 9 moved to be Question 12.

Q.9. What were these specific questions?

A.9. The first question was whether or not the procedures and training call for an operator action that would cause the EDG load to exceed 3300KW.

The second question was if a situation were to occur that would, for some unspecified failure, cause the EDG to exceed 3300KW, do the procedures and training provide the necessary guidance to reduce the load below 3300KW within one hour?

The third question was whether or not the training program adequately addressed the technical concerns associated with the 3300KW load limit on the EDGs.

These specific questions were documented by a memo from Carl Berlinger to Dennis L. Ziemann dated February 14, 1985.

Q.10. Describe the review performed to date.

A.10. (All) In early December 1984, we were asked by our Division of Licensing to evaluate the procedures related to EDG operation. We evaluated the following letters to determine the role the licensee intended for the procedures and training.

a. J. D. Leonard to H. R. Denton, dated July 3, 1984
b. J. D. Leonard to H. R. Denton, dated August 22, 1984
c. J. D. Leonard to H. R. Denton, dated September 11, 1984
d. J. D. Leonard to H. R. Denton, dated November 19, 1984 (SNRC-1104)
e. J. D. Leonard to H. R. Denton, dated November 29, 1984

We received the following procedures during the first week of January 1985:

| | | |
|---|---|---|
| a. | Level Control | SP29.023.01, Rev. 4, dated 12/20/84 |
| b. | Loss of Offsite Power | SP29.015.01, Rev. 7, dated 12/20/84 |
| c. | Loss of Coolant Accident Coincident with a Loss of Offsite Power | SP29.015.04, Rev. 0, dated 12/20/84 |

d. Emergency Diesel Generators — SP23.307.01, Rev. 12, dated 12/14/84

e. Main Control Room - Conduct of Personnel — SP21.004.01, Rev. 7, dated 9/27/84

We conducted a review of these procedures for useability and technical accuracy. We had numerous comments on the procedures.

In addition to these procedures, we visited the site January 16-17 to evaluate the location and adequacy of the instrumentation and controls to be used during the execution of the procedures, to obtain information on the training program necessary to complete our evaluation, and to obtain additional procedures that would be used during the assumed LOOP or LOOP/LOCA conditions. The following additional procedures were obtained:

f. Emergency Shutdown — SP29.010.01, Rev. 4, dated 8/16/84

g. Loss of Instrument Air — SP29.016.01, Rev. 4, dated 10/7/83

Q.11. Describe how the information evaluated has led to your current position.

A.11. (Buzy) The most significant finding was that at the time of our site visit, the training department had not yet started to develop a

training program to address the integration of the numerous issues that would have to be addressed to operate the plant with the limitation on EDG loading. We therefore had no basis for evaluating the adequacy of the training, or the bases for the training program.

(Clifford) There were a number of concerns regarding the procedures. In several instances, the procedures would have either directed the operators to take actions that would have overloaded the EDGs, or required the operator to decide between various options, without either specifying the options themselves or providing the criteria for choosing between the options.

(Clifford) The number of procedures that were required to be used by the operators simultaneously raised a concern regarding the manageability of the procedures, and the large number of interrelated actions during their execution.

(Eckenrode and Clifford) There was also a concern that the actions that would have to take place outside the control room to determine if a number of non-safety loads were operating may add an unacceptable level of confusion and delay while the operators were trying to mitigate a LOOP/LOCA event. In addition, no means had been provided to keep track of the loads that were being manipulated.

(All) The specific concerns are addressed in a Request for Additional Information from A. L. Schwencer to J. D. Leonard, dated February 5, 1985, which is hereby incorporated into this testimony.

~~We are requiring that the specific concerns identified during our review by acceptably addressed by the licensee before we complete our evaluation. These specific concerns are addressed in a Request for Additional Information transmitted from A. L. Schwencer to J. D. Leonard dated February 5, 1985.~~

Q.12. ~~Is there reasonable assurance that the EDGs will be operated within their load capacity?~~ Based on these concerns, is there reasonable assurance that the procedures and training adequately address the questions posed in Question 9?

A.12. (All) Based on the information we have reviewed to date, we have not found reasonable assurance that the EDGs will be operated within their load capacity. Based on the information we have reviewed to date and the concerns identified, we have not found reasonable assurance that (1) the procedures and training would not lead the operators to load the EDGs to over 3300KW, (2) the procedures and training provide the necessary guidance to have the EDG load reduced to less than 3300KW within one hour, and (3) the training program adequately addressed the technical concerns associated with the 3300KW load limit associated

with the EDGs. We believe that if the specific concerns identified in our February 5, 1985 Request for Additional Information are adequately addressed by the licensee, reasonable assurance could be found that these three questions would be satisfied.

# PROFESSIONAL QUALIFICATIONS

## JAMES WILLIAM CLIFFORD

My name is James William Clifford. I am employed as an Operational Safety Engineer in the Procedures and Systems Review Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, Washington, D. C. I have held this position since October 1980. I have also been assigned as Acting Section Leader, Section A (Procedures) of the Procedures and Systems Review Branch for the period of March 28, 1983 to September 11, 1983. The Procedures and Systems Review Branch reviews and evaluates licensee programs for the technical, human factors, and operational aspects of nuclear power plant operating and maintenance procedures. I was involved in the pre-licensing audit of emergency operating procedures at five (5) applicants' sites, and have review the emergency operating procedure development programs for eight (8) applicants and operating reactors. These reviews included the evaluation of technical guidelines, operational concerns, and the human factors guidelines to be used in the development and implementation of the emergency operating procedures. I was involved as one of the principal staff reviewers for the human factors aspects of emergency operating procedure generic technical guidelines for B&W and Combustion Engineering Owners Group guidelines, and, through the reviews of procedures for three (3) BWR applicants, assisted in the evaluation of the adequacy of the BWR Owners Group guidelines. I was the principal reviewer for the operational and human factors concerns for the Pressurized Thermal Shock generic issue, including audits of emergency operating procedures for six plants.

From July 1978 to October 1980, I was a naval officer qualified to the equivalent of a shift supervisor at the naval nuclear power prototype at Windsor, CT, where my responsibilities included supervision of plant operations, training of new personnel, and ensuring the continued expertise of experienced personnel. From March 1976 to July 1978 I was a naval officer assigned to a nuclear powered ship, where my responsibilities included safe operation of the ship's nuclear power plant.

I earned a BS degree in Systems Engineering from the U. S. Naval Academy in 1974. During my naval service and my employment with the NRC, I have attended several courses, varying from one week to six months in duration, on plant engineering, human factors, and plant operations. I am previously qualified as Chief Engineer Officer for Naval Nuclear Propulsion Plants.

JOSEPH J. BUZY

Professional qualifications

Current Position: Systems Engineer (Training & Assessment)
Personnel Qualifications Branch
Division of Human Factors Safety
U.S. Nuclear Regulatory Commission

Education: B.S. Marine Engineering - 1954
U.S. Merchant Marine Academy
Kings Point, N.Y.

Experience:

- Military Service - 1954 - 1956 Served as Damage Control Officer and later Engineering Officer on U.S.S. Hollis APD-86.

- Nuclear - 1956 - 1960: Employed by Bettis Laboratories under contract to the Naval Reactors Program as an operating engineer for the Large Ship Prototype, AIW. I was trained and qualified as Chief Operator on the submarine prototype SIW and assisted in training Navy personnel for SIW and later AIW. I later qualified as Chief Operator on AIW and was assigned as test coordinator during the AIW power escalation program. I was later transferred to Newport News Shipyard as a Bettis Laboratory representative during the construction and start-up testing of the U.S.S. Enterprise. I assisted in initial start-up of two reactor plants on the Enterprise.

1960 - 1963: Employed by the Martin-Marietta Corporation as an operations test engineer for the PM-1 plant. The plant was built for the AEC and Airforce in Baltimore, Maryland, and transported to Sundance, Wyoming. At the site I qualified as Shift Supervisor and was in charge of a combined military crew during the start-up and demonstration phases of the PM-1 plant. I trained and qualified a majority of the military crew who later operated the PM-1 plant.

1963 - 1978: Employed by the AEC as Nuclear Engineer in the Operator Licensing Branch. I was trained and qualified as an operator licensing examiner and responsible for developing and administering written and operating examinations under 10 CFR Part 55 for all types of reactor licensed under 10 CFR 55 and 115. I occasionally directed AEC consultants in development and administration of examinations. In 1970, I was appointed as Section Leader for Power and Research Reactors (P&RR). I trained and supervised several OLB examiners in addition to a group of six to eight consultant examiners. The P&RR section administered examinations at all research and test reactors, Babcock and Wilcox, Combustion Engineering, General Atomics (HTGRs at Peach Bottom and Fort St. Vrain) and the sodium cooled reactors, Fermi 1 and SEFOR.

Examinations also included use of simulators. The P&RR section occasionally provided personnel to conduct examinations at the Westinghouse and General Electric plants. The P&RR section also reviewed Section 13.2, Training, in the FSAR and developed safety evaluation reports in this area.

1978 - 1979: I was assigned to Region II, Atlanta, Georgia and participated in a Pilot Test Program for regionalization of OLB functions. I was responsible for all licensed operator and senior operator renewals as well as changes to requalification programs in Region II. I developed and conducted examinations on all types of reactors, including the use of simulators, in the Region. Shortly after the Three Mile Island, Unit 2, accident, I was detailed as part of the NRC team at TMI for several weeks. Due to large demands on the OLB staff at Headquarters, the Pilot Test Program was suspended in the fall of 1979 and I returned to Headquarters as the PWR (Westinghouse) Section Leader. I was employed in this capacity until February of 1982.

1982 - Present: I am currently assigned as a Systems Engineer (Training and Assessment). This position requires: review of licensee's applications in Chapter 13.2 of the FSAR and preparation of Safety Evaluation Reports, review of changes to the licensee's requalification programs, response to Regional reports to provide resolution on the interpretation of training requirements. I have been recently assigned as a reviewer of Shift Advisor training programs. I have also participated in review of the ATWS event at Salem and the review of PTS training at H.B. Robinson and Calvert Cliffs. In addition, I have participated in the review of training programs at TMI.

Publications: I have contributed to several NUREGs published by the NRC.

RICHARD J. ECKENRODE
PROFESSIONAL QUALIFICATIONS
HUMAN FACTORS ENGINEERING BRANCH
DIVISION OF HUMAN FACTORS SAFETY

Since December 1980 when I was hired by the U.S. NRC, I have been assigned to the Human Factors Engineering Branch, Division of Human Factors Safety, Office of Nuclear Reactor Regulation. My initial responsibilities included: (1) participation in the development of NUREG-0700, "Guidelines for Control Room Design Reviews," and (2) participation in the onsite control room design reviews required for operating licenses. Subsequently, I have participated in over 20 control room design reviews, 12 of which I directed. I was a member of the NRC Task Forces which reviewed the steam generator tube rupture event at R. E. Ginna Nuclear Power Plant and the ATWS event at Salem Generating Station.

I have been active in the application of the human factors discipline to manned systems since 1960 and have directed or participated in more than 30 major human factors projects. I am a member of the Human Factors Society.

I hold a Bachelor of Science degree in Aeronautical Engineering from St. Louis University and have completed five NRC sponsored courses in Nuclear Reactor Concepts, Radiation/Contamination Protection, Pressurized Water Reactor Fundamentals, BWR Technology, and PWR Simulation.

From 1963 until joining the U.S. NRC in 1980, I was a Principal Associate with Dunlap and Associates, Inc., of Norwalk, Connecticut. Dunlap and Associates, Inc. is a research and consulting firm in the areas of systems and operations analyses and the behavioral sciences including human factors.

Some of my major projects included:

- Development of human factors guidelines for designing CRT color display formats for a large electrical power distribution control room. Subsequently designed a major portion of the displays.

- Development of a task analysis methodology for determining training requirements and training device requirements and characteristics, as applied to Infantry and Cavalry Fighting Vehicles.

- Conducted human factors and systems analyses resulting in man/machine interface design recommendations, procedures development and training requirements recommendations for the following systems and programs:

  - Optical lens manufacturing facility
  - Hemotology laboratory
  - Navy AEGIS combat system program
  - Trident submarine missile system
  - Remotely piloted aircraft
  - UTTAS and research helicopters
  - Antisubmarine Warfare attack team trainer
  - Landing helicopter assault ship

- Chemical/biological warfare protective clothing
- Manned orbital laboratory
- Apollo/Saturn prelaunch checkout system

From 1960 to 1963 I was with the Life Sciences Department of McDonnell Aircraft Corporation. During that time I participated in the human factors analysis and design work on projects Mercury and Gemini and on mechanical ground support equipment for the F4 Tactical Fighter aircraft. I also participated in the Mercury astronaut acceleration training program and gathered human performance data to assist in verifying mission reliability estimates.

BY MR. REIS:

Q Mr. John Knox, do you have before you a set of testimony entitled "NRC Testimony of John L. Knox on Suffolk County and the State of New York Emergency Diesel Generator Load Contention, A (i) and A (iv)"?

A (Witness Knox) Yes, I do.

Q And is that testimony 12 pages long?

A (Witness Knox) Yes, it is.

Q And who prepared that testimony?

A (Witness Knox) I did.

Q And is it true and correct to the best of your knowledge and belief?

A (Witness Knox) Yes, it is.

Q And does that testimony-- Are there any corrections indicated on that testimony?

A (Witness Knox) Yes, there are.

Q Can you tell me how they appear in that testimony?

A (Witness Knox) The deletion lines have been drawn through them. Any additions, a vertical bar has been put in the right-hand margin.

Q And are those all the additions and deletions that were made?

A (Witness Knox) I have one more correction.

Q And what is that?

A (Witness Knox) On page 9, the second answer, the third sentence where it says "As indicated above...." should be stricken.

Q With that correction is this testimony correct to the best of your knowledge?

A (Witness Knox) Yes, it is.

Q Mr. Berlinger, will you please identify yourself for the record, and tell us your job title?

A (Witness Berlinger) My name is Carl Berlinger. I am presently the TDI Project Group chief. And my responsibilities are associated with resolving both the generic and the plant-specific issues relative to TDI diesel generators.

Q Have your qualifications formally been submitted for the record in this proceeding?

A (Witness Berlinger) Yes, they have.

MR. REIS: That is all I have on direct examination, your Honor.

JUDGE BRENNER: Would you like to move Mr. Knox's testimony into evidence?

MR. REIS: I would like to move Mr. Knox's testimony into the record. Thank you.

JUDGE BRENNER: All right.

In the absence of any objection which we have not previously ruled upon, we will admit Mr. Knox's evidence

into the evidence, and bind it into the transcript at this point.

(The document follows:)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

| | | |
|---|---|---|
| In the Matter of | ) | |
| | ) | |
| LONG ISLAND LIGHTING COMPANY | ) | Docket No. 50-322-OL-4 |
| | ) | |
| (Shoreham Nuclear Power Station, Unit 1) | ) | |

NRC STAFF TESTIMONY OF JOHN L. KNOX ON SUFFOLK COUNTY AND THE STATE OF NEW YORK EMERGENCY DIESEL GENERATOR LOAD CONTENTION A (i) AND A (iv)

Q. What is your name?

A. My name is John L. Knox.

Q. What is your position?

A. I am a Senior Electrical Engineer (Reactor Systems) in the Power Systems Branch in the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission. In this position I perform technical reviews, analyses, and evaluations of reactor plant features pursuant to the construction and safe operation of reactors.

Q. What are your qualifications?

A. In 1962, I received an Associate of Arts degree in Electrical Power System Technology from Montgomery College. In 1971, I received a Bachelor of Science degree in Electronic Systems Engineering from the University of

Maryland. Since 1974, I have taken a number of courses on PWR and BWR system operation, equipment qualification, and reactor safety.

From 1971-1974, I worked for Potomac Electric Company in Washington, D. C. I was assigned to the underground power Transmission Engineering Group and my duties included relocation and restoration of underground power and transmission cables due to the subway construction project. (Prior to this, I spent four years in the Air Force working on the F4 aircraft electronic weapons control systems.)

From 1974 to the present, I have worked for the Nuclear Regulatory Commission involved in the technical review of electrical systems (onsite and offsite power, instrumentation and control). Through 1976, I was a member of the Electrical Instrumentation and Control Systems Branch. This branch was split in January 1977 into an I&C branch and a power branch. Since this split, I have been a member of the Power Systems Branch. My present responsibilities include review and evaluation of onsite and offsite electric power systems.

Q. What is the purpose of your testimony?

A. The purpose of this testimony is to respond to Suffolk County and the State of New York emergency diesel generator load contention a (i) and a (iv), which are as follows:

Contrary to the requirements of 10 CFR Part 50, Appendix A, General Design Criterion 17 -- Electric Power Systems, the emergency diesel generators at Shoreham ("EDGs") with a maximum "qualified load" of 3300 kW do not provide sufficient capacity and capability to assure that the requirements of clauses (1) and (2) of the first paragraph of GDC 17 will be met, in that

(a) LILCO's proposed "qualified load" of 3300 kW is the maximum load at which the EDG may be operated, but is inadequate to handle the maximum load that may be imposed on the EDGs because:

(i) intermittent and cyclic loads are excluded;

(iv) operators may erroneously start additional equipment;

Q. Define the safety function of the emergency diesel generators at Shoreham.

A. The emergency diesel generators are part of the onsite electric power system and as such their safety function was derived from the first paragraph of criterion 17 of Appendix A to 10 CFR 50. The onsite emergency diesel generators "shall be provided to permit functioning of structures, systems, and components important to safety. ...[and] shall...provide sufficient capacity and capability to assure..." this function.

Q. How does the staff determine that the emergency diesel generators have sufficient capacity and capability to perform their safety function?

A. The staff reviews the plant's design loads to ensure that they do not exceed the capacity and capability of the diesel generators.

Q. Define the plant's design load.

A. The plant's design load, as defined in Section 3.4 of IEEE Standard 387-1977, consists of a combination of electric loads, having the most severe power demand characteristic, which is provided with electric energy from a diesel generator unit for the operation of engineered safety features and other systems required during and following shutdown of the reactor.

Q. How can one ensure that the emergency diesel generators have sufficient capacity and capability to perform their safety function?

A. Diesel generator capacity and capability is verified through qualification, preoperational, and periodic testing.

Q. Describe industry recommended practice with respect to load capability qualification testing of diesel generators?

A. Load capability qualification testing as described in IEEE Standard 387-1977 includes, in part, operation of one diesel generator for 22 hours at its continuous rating followed by 2 hours of operation at its short time rating.

Q. Describe the load capability qualification testing performed at Shoreham?

A. Testing at Shoreham included operation of the diesel generator at a 3300 kW load for 750 hours.

Q. Is the 3300 kW load used during the load capability qualification test greater than the plant's design load?

A. Yes, except for intermittent and cyclic loads as indicated on Table 8.3.1-1 and 8.3.1-1A of the FSAR.

Q. What has been estimated to be the worst case kW magnitude and time duration loading for these intermittent and cyclic loads?

A. By letter dated November 19, 1984, the applicant identified the following loads that are automatically actuated, are intermittent/noncontinous, and are not considered to be part of the 3300 kW load used during qualification testing.

a. diesel generator air compressor (12 kW)
b. diesel generator fuel oil transfer pump (0.4 kW)
c. motor operated valves (65.7 kW)

Based on information presented in Table 8.3.1-1 of revision 34 to the FSAR, the staff concludes that the worst case maximum coincident demand of these loads will be 78.1 kW, which, when added to the total maximum emergency service loads tabulated in Table 8.3.1-1A of revision 34 to the FSAR, results in a maximum load of 3331.4 kW. Because the majority of

those loads are automatically actuated motor operated valves, they are short duration loads on the order of one to three minutes. Also, automatic actuated valves do not operate simultaneously; therefore, the actual diesel generator loading should be less than the aggregate value of 3331.4 kW but may be greater than 3300 kW for one to three minutes.

In order for each diesel generator to reach its required design basis voltage and frequency limits within the required time of ten seconds, the diesel engine's fuel rack position or fuel setting will move to the wide open position. This wide open fuel setting is greater than the fuel setting which would exist when the diesel generator is delivering steady state power at 3300 kW load. Thus, during this ten econd plus time period, the diesel engine may be loaded such that its BMEP may be greater than that corresponding to a continuous electrical load of 3300 kW. Similarly, when individual loads or a block of loads are connected to the generator, the diesel engine's fuel setting will move towards the wide open position. This fuel setting movement maintains the frequency of the generator within the required limits specified in R.G. 1.9. Even though the output of the generator is less than 3300 kW, the diesel engine will be loaded for a short time such that its BMEP may be greater than that corresponding to a continuous electrical load of 3300 kW.

Based on the above, the worst case loading has been estimated to be 3900 kW for less than 60 seconds. The ability of the engines to handle all of the above loads is treated elsewhere in the staff testimony.

Q. It was stated above that diesel generator capacity and capability is verified through qualification, preoperational, and periodic testing. Is the 3300 kW load capability of the diesel generators verified as part of preoperational and periodic testing?

A. Yes.

Q. Describe these tests.

A. As part of the preoperational and 18 month periodic surveillance testing each diesel generator will be operated at 3300 kW for 24 hours. In addition, as part of 30 day periodic surveillance testing, each diesel generator will be loaded to 3300 kW for one hour.

Q. Will the diesel generator's capability to supply intermittent and cyclic loads be verified as part of preoperational and periodic testing?

A. Yes.

Q. Describe these tests.

A. As part of the preoperational and 18 month periodic surveillance testing, each diesel generator will be subject to a load acceptance test. The load acceptance test should demonstrate the capability of each diesel generator to accept the individual loads that make up the plant's design load in the required sequence and time duration. Because intermittent and cyclic loads are part of the plant's design load, the diesel generator's capability to supply these loads should be verified by this test. In addition, as part of six month periodic surveillance testing, each diesel

generator will be started within 10 seconds and loaded to 3300 kW within 60 seconds. For this test, the design loads are unavailable for connection to the diesel generator due to the operating mode of the plant. However, this test has been designed to simulate, as close as is practical, the plant's design load. Because the majority of intermittent and cyclic loads will be simulated, the diesel generator's capability to supply these loads will, in part, be verified.

Q. How can this 3300 kW loading, for which the diesel generator has been qualified and is to be periodically tested, be exceeded?

A. The total load that is connectable to the diesel generator exceeds this 3300 kW test loading. Table 8.3.1-1 of the Shoreham FSAR indicates that the total connectable loads are 4381.3 kW for diesel generator number 101, 4147.8 kW for diesel generator number 102, and 4493.7 for diesel generator number 103. These loads could be connected manually or by equipment failure.

In LILCO testimony of G. F. Dawe, J. A. Notaro, and E. J. Youngling on pages 32 through 35, it was indicated ~~stated~~ that the single worst case load that could be connected ~~started erroneously as a result of an operator error~~ following a LOOP/LOCA would result in the following loads on the diesel generators:

1. 3459.4 kW on DG 101
2. 3414.8 kW on DG 102
3. 3583.5 kW on DG 103

The single worst case load that could be connected ~~started erroneously as a result of an operator error~~ following a LOOP would result in the following loads on the diesel generator:

1. 3839.2 kW on DG 101
2. 3627.6 kW on DG 102
3. 3867.3 kW on DG 103

Q. How does the staff normally ensure that diesel generators have sufficient capacity and capability to handle intermittent/cyclic loads and additional loads that may be inadvertently connected to the diesel generator by operator error or equipment failure?

A. The staff normally ensures that the diesel generator has a two-hour short-term overload capability which encompasses these loads.

Q. Do the Shoreham diesel generators have such an overload rating?

A. No. The 3300 kW qualified load rating is the only rating. As indicated above, this 3300 kW rating includes the capability to handle intermittent and cyclic loads. The ability of the diesel generator to handle loads above 3300 kW is addressed elsewhere.

~~Q. Should diesel generators used for nuclear service have an overload rating in order to meet the capacity and capability requirement of Criterion 17?~~

~~A. Yes~~

~~Q. Why?~~

~~A. To ensure that the diesel generators have sufficient capacity and capability to supply the plant's design loads which include intermittent/cyclic loads and additional loads that may be inadvertently connected to the diesel generator by operator error or equipment failure.~~

~~Q. What provisions has LILCO proposed to prevent the 3300 kW loading from being exceeded?~~

~~A. LILCO has proposed procedures and training changes with a plant technical specification limit of 3300 kW on each diesel generator. The adequacy of procedures is addressed elsewhere in the staff's testimony.~~

Q. Will the technical specifications for Shoreham have a 3300 kW load limit on the diesel generators?

A. Yes

Q. Describe what a 3300 kW technical specification limit on the diesel generator means?

A. As part of the Shoreham technical specifications, a 3300 kW maximum limit on each diesel generator will be imposed as a condition to the Shoreham license. If 3300 kW is exceeded at any time by any amount, the associated technical specification action will require ~~the plant to be shut down with~~ a subsequent analysis and inspection performed to demonstrate the capability of the diesel generator before continued plant operation would be allowed. In addition, the calibration of the instrumentation used to monitor kW output of each diesel generator will be included in the Shoreham technical specifications.

Q. With these provisions proposed by LILCO, could one have reasonable assurance that disabling overloading of the diesel generators will be prevented during transient and accident conditions?

A. Yes, provided the diesel generator is qualified for the expected overloading during transient and accident conditions and for expected operation at 3300 kW following overloading. The qualification of the diesel generator is addressed elsewhere in the staff's testimony.

Q. In addition to these administrative provisions proposed by LILCO, what else would LILCO have to do to provide reasonable assurance that the diesel generators have sufficient capacity and capability to perform their safety function and meet the requirements of criterion 17 of Appendix A to 10 CFR 50.

A. LILCO must demonstrate that their diesel generators are qualified for an acceptable short-term overload capability as part of preoperational and 18-month periodic surveillance testing.

Q. What would be the magnitude and duration of loads for which the diesel generator would need to be qualified and periodically tested?

A. Design load analyzed for the Shoreham plant plus the sum of the following overloads:

1. A load equal to the worst case loading that could be connected to any one diesel generator by a single operator error or event, plus
2. A load or sum of loads that are to be added or connected to the diesel generator intentionally according to the plant procedures.

Q. Is there reasonable assurance that the diesel generators have sufficient capacity and capability to perform their safety function and meet the requirements of criterion 17 of Appendix A to 10 CFR 50?

A. Yes, because:

1. The diesel generators are qualified to the plant's design load,

2. The diesel generators have sufficient overload capability for cyclic and intermittent loads,

3. The onsite power system can withstand any single failure, and

4. The diesel generators required capacity and capability is periodically verified through testing.

Q. What is meant by the technical specification action requirement for analysis and inspection?

A. For any overload an engineering assessment must be performed. For major overloads a diesel generator inspection may be required. These action requirements are to be developed with our PNL consultants.

Q. What is meant by the 3300 kW maximum limit.

A. The 3300 kW maximum limit is a mean indicated value. During periodic testing the indicated load could swing from 3200 to 3400 kW.

JUDGE BRENNER: Mr. Reis?

MR. REIS: Nothing further.

JUDGE BRENNER: LILCO.

VOIR-DIRE EXAMINATION

BY MR. ELLIS:

Q Mr. Knox and Dr. Berlinger, am I correct that both of you gentlemen participated in the preparation of and review of the December 3 SER which has been marked for identification as Staff Exhibit D-11?

A (Witness Berlinger) Yes, that's true.

Q Is that true as well--

A (Witness Knox) Yes, I participated also.

Q And Mr. Berlinger, am I correct that they were prepared or this SER as well as the December 18th SER was prepared under your direction and supervision?

A (Witness Berlinger) That is correct.

Q This is addressed to both Mr. Knox and Dr. Berlinger:

Gentlemen, the conclusion that appears on page 5 of the December 3 SER which has been marked for identification as Staff Exhibit D-11 states in the first sentence, and I quote:

"A 'qualified load' rating of 3300 kw adequately envelopes the maximum continuous emergency load requirements associated with

LOOP/LOCA events. Although transient and intermittent non-continuous loads could briefly increase engine loadings slightly above 3300, these loads are of such a limited duration that they are not considered as a credible cause of fatigue failure of the crankshafts during LOOP/LOCA events."

Was that the conclusion of both of you gentlemen on or about December 3rd, the date of the SER? they are just for identification.

MR. DYNNER: Objection. The second part of the question relating to the second sentence appears to me at least to go to the issue of the crankshafts and not the issue of the adequacy of the loads which is the subject of the present hearing.

MR. ELLIS: I think Mr. Dynner's remark is well-taken, and I will restrict my remarks or my question to the-- Let me restate the question to accommodate his objection.

BY MR. ELLIS:

Q Gentlemen, the conclusion on page 5 states in the first sentence -- quote:

"A 'qualified load' rating of 3300 kw adequately envelopes the maximum continuous emergency load requirements associated with

LOOP/LOCA events."

Was that your conclusion, both of you, at or about December 3, the time of the SER?

A (Witness Knox) Yes, it was.

Q Is it still your conclusion?

A (Witness Knox) Yes, it is.

Q And am I correct-- Do you have your deposition of December 13th, by the way, Mr. Knox, Mr. Berlinger? You may want to have that in front of you.

A (Witness Berlinger) Mr. Ellis, I don't have a copy. We can use a single copy. I think it is all bound together-- I stand corrected.

(Document handed to the witness panel.)

Q I am only going to refer right now to Mr. Knox's deposition.

Am I correct, Mr. Knox and Dr. Berlimger, that that sentence that I read from page 5 of the December 3 SER is still your conclusion and the Staff's conclusion? Is that correct?

A (Witness Berlinger) Yes, that is correct, Mr. Ellis.

Q Now in the use of the term "maximum continuous emergency load requirements," am I also correct that term is synonymous with the "maximum emergency service load" term as used by LILCO and defined in Revision 34 of the FSAR?

MR. REIS: I object to the question unless they first establish that the witness knows how that term is used in the FSAR.

MR. ELLIS: The reason I asked them to pull out -- I was trying to save time -- pull out the deposition is that this was an area that was covered in the deposition and I think if we were familiar with it, why I think it would go fairly quickly.

Let me refer to the specific--

JUDGE BRENNER: I think Mr. Reis' point is well-taken. Let's make sure you are both on the same wavelength before you proceed beyond that, at least at this point in time.

MR. ELLIS: Yes, sir. What I was saying to the Board is that it was covered in the deposition.

BY MR. ELLIS:

Q But in any event, Mr. Knox, the term "maximum continuous emergency service" -- or "maximum continuous emergency load requirements" as used in the first sentence on page 5, the first sentence of the conclusion, is the term that you used. Am I correct?

A (Witness Knox) I believe so, yes.

Q All right.

Look if you would, please, at pages 63 and 64 of your deposition.

Look at the bottom of page 63 and the top of page 64 and tell me whether I am correct that the term "maximum continuous emergency load requirements," as you have used it on page five, the first sentence of the December 3rd SER, is synonomous with the term "maximum emergency service load" as used by LILCO in the FSAR, Revision 34.

MR. DYNNER: I object because the question, I must say, Judge Brenner, without having the deposition portions read into the record, is incomprehensible for purposes of establishing this record and for the witness answering the question.

JUDGE BRENNER: All right. I agreed the first time I ruled on the objection. However -- and still agree.

But as a practical matter, depending on their answer, we may get it anyway. Let's for the moment see what answer we get on the record. And depending on the answer, Mr. Ellis, you may have to back up and establish what the witness believes is being compared. But it may be the answer will provide that as part of the explanation, I don't know.

Do you recall the question, Mr. Knox?

WITNESS KNOX: Could we have the question again?

MR. ELLIS: Yes, certainly.

JUDGE BRENNER: He wanted to know whether your

term that he's read four times now in the Safety Evaluation is the same as what LILCO means when it says MESL.

WITNESS KNOX: Yes, it is.

JUDGE BRENNER: Now you're going to have to back up.

MR. ELLIS: I beg your pardon?

JUDGE BRENNER: Now you're going to have to back up and see if he knows what MESL is.

MR. ELLIS: Yes.

BY MR. ELLIS:

Q You understand, I take it, that the term "maximum emergency service load," as defined by LILCO excludes the intermittent and non-continuous loads that are listed in the LILCO testimony in this proceeding?

A (Witness Knox) Yes, I understand that.

Q And they are also excluded from the term "maximum continuous emergency load requirements" as that term is used in page five, the first sentence of the conclusion?

A (Witness Knox) That's correct.

Q And did you in connection with your duties review the FSAR Revision 34 where the maximum emergency service load is defined by LILCO?

A (Witness Knox) Yes, I did.

Q And you are familiar with that?

A (Witness Knox) Yes.

Q Am I correct, Mr. Knox and Dr. Berlinger, that the December 3rd SER concludes that it is appropriate to exclude the intermittent and non-continuous loads from the MESL for Shoreham in the determination of the qualified load?

A (Witness Berlinger) Yes, it is, Mr. Ellis, that's correct.

Q That was the -- That's still the position of the Staff today, am I correct?

A (Witness Knox) I'd like to try to clarify. If we take the emergency -- the continous load plus the intermittent and cyclic loads that we have, we would expect the diesel generator to be qualified for both cases; in other words, the continuous maximum emergency service load, as well as the cyclic and intermittent loads.

Q Do you have something to add, Dr. Berlinger?

A (Witness Berlinger) Just one thing, and that is: If I understood your question correctly, you were asking whether or not the -- within the qualified load whether or not it was necessary to also be able to support the non-continuous or intermittent and cyclical loads.

Q That was my question. I understood you to say that it was the Staff position that it did not need to be added in there.

A (Witness Berlinger) That is correct. However I

would like to go on the record in support of Mr. Knox, that in fact the engines would have to be qualified to support the particular loads. And if they're -- Let me back up just a hair, because I think we're using language which is sometimes identical and it's not intended to mean the same thing.

When I say that the diesel should be qualified I mean it should be capable of supporting that lead, whether it be a cyclical load or an intermittent load. So from the definition of qualified load, there is agreement with the definition used by LILCO in their FSAR, the MESL, in that the cyclical and intermittent loads are not required to be included in the MESL or in what we have defined as a qualified load.

Q Mr. Knox, look again, if you would, please, at page 96 of your deposition.

I'm correct, am I not, Mr. Knox, that it was the Staff's position at the time of the December 3rd SER and at the time of your deposition on December 13th, and again at this time, that no overload rating or short term rating is required for the Shoreham diesel generators by regulation or otherwise, is that correct?

A (Witness Knox) By regulation, yes.

Q Are you in agreement, Dr. Berlinger?

A (Witness Berlinger) Yes, Mr. Ellis.

MR. DYNNER: Excuse me. I would like to interrupt for a minute just to get a clarification. The second witness answered yes, he agreed.

It's not clear whether he agreed to Mr. Ellis's question or to the other witness's answer; and they were different.

JUDGE BRENNER: I assume he's agreeing to the answer, not the question. But we'll get the clarification.

Dr. Berlinger.

WITNESS BERLINGER: Could you have the question and the answer read back?

JUDGE BRENNER: All right.

WITNESS BERLINGER: I didn't see the distinction.

(Whereupon, the Reporter read from the record, as requested.)

BY MR. ELLIS:

Q So were you agreeing with the question or the answer, or none or both?

A (Witness Berlinger) I'm agreeing with the answer that Mr. Knox gave.

The only difference that I could see, your Honor, between the question and the answer was "or any other." And we only reviewed these issues in accordance with the regulations, not with "any other."

JUDGE BRENNER: It was "or otherwise;" but we know what you mean.

Go ahead, Mr. Ellis.

MR. ELLIS: I think that's what Mr. Dynner had in mind, and I regret the inclusion of it.

JUDGE BRENNER: That's okay. You are now entitled to one non-objective clarification to one of his questions, but use it wisely.

Go ahead.

BY MR. ELLIS:

Q Am I correct also, gentlemen, that a reason for your view that an overload rating is not required is that the 3300 qualified load adequately envelops the maximum continuous emergency load requirements associated with LOOP/LOCA events, as you have stated in the SER?

A (Witness Knox) Can you repeat that question?

Q Yes. And I refer you again to page 96 of your deposition, at the bottom.

The reason for your conclusion that an overload or short term rating is not required -- or a reason -- is, as you've stated in the first sentence of the SER, that the 3300 qualified load adequately envelops the maximum continuous emergency load requirements associated with LOOP/LOCA event, isn't that right?

A (Witness Knox) That's correct, except for the

intermittent and cyclic loads.

A (Witness Berlinger) Mr. Ellis, may I add something --

Q Certainly.

A (Witness Berlinger) -- to Mr. Knox's answer?

The 3300 Kw qualified load is defined by the testing that was done for 10-to-the-seven cycles. If the testing had been done at 3000 Kw the qualified load would have been defined by that test at 3000 Kw. Or if it had been done at 3500 it would be defined by the test done at 3500.

The issue, as I understood it, was that the maximum emergency service load requirement was enveloped by the load at which the engines had been tested, or by the qualified load.

Q And you understood at the time, of course, that the qualified load enveloped the maximum emergency service load with the exception of the intermittent and cyclic loads, isn't that correct?

A (Witness Berlinger) That is correct.

Q And even in that instance I am correct, am I not, Mr. Knox and Dr. Berlinger, that the qualified load envelops the maximum emergency service loads for two of the three engines, it is only the third engine -- the 101 engine -- that if one sums the intermittent and cyclic loads

arithmetically to the maximum emergency service load, one arrives at 3331.4 Kw, isn't that correct?

A (Witness Knox) I don't know.

A (Witness Berlinger) Mr. Ellis, I think that is correct, yes; and it's based on my belief that the MESLs plus the cyclical or intermittent loads would total up to either 3331 for the one engine, and for the other two engines less than 3300.

Q You recall reading that testimony -- that is the testimony from LILCO in their prepared testimony -- that if you add the cyclic loads to the MESLs you exceed 3300 only for the 101 engine, and that would be for 3331.4? You recall that, don't you, Mr. Knox?

A (Witness Knox) Yes. When you limit your question to just cyclic loads, the answer is yes. However you also included intermittent loads which may exceed 3300 for all three diesels -- may; I don't know if they will or not.

Q What intermittent loads are you referring to?

A (Witness Knox) They are referred to in my written testimony, in the answer that's on page five and goes on to page six. It would be the first full paragraph on page six.

Q Are the intermittent loads you're referring to the diesel generator air compressor, the diesel generator

fuel oil transfer pump and the motor-operated valves?

A (Witness Knox) No. The intermittent loads are referred to on page six, the first full paragraph on page six.

Q I see.

Are those the loads then that require manual operation?

A (Witness Knox) No. They are the ones that are based on the -- putting an additional load on where the fuel stops may go to wide open position which may cause an intermittent type load on the diesel generator.

Q All right. That's the one where you referred to the worst case loading could result in BMEPs equivalent to 3900?

A (Witness Knox) I understood that they could create -- It's my understanding that, because the fuel stop goes to the wide open position, they may create a BMEP that is greater than what it would be at 3300 continuous.

Q Have you made any calculations to determine what the BMEP Kw-equivalent would be?

A (Witness Knox) No, I haven't.

Q Are you, by reason of training or experience, an expert in calculation of brake mean effective pressure?

A (Witness Knox) No, I'm not.

Q Have you had any experience in the design,

manufacture, operation or maintenance of diesel engines of sort used at Shoreham?

A (Witness Knox) No, I'm not.

Q I take it, then, you would not consider yourself an expert on the subject of the calculation of brake mean effective pressure on the basis of positions of fuel racks?

A (Witness Knox) I basically made an observation which was confirmed by our PNL consultants, who confirmed that the BMEP would go above what it would be at 3300 continuous.

Q Am I correct, then, that the only basis you have for your testimony concerning the fuel racks and higher BMEPs on page six of your testimony are references in the PNL testimony?

A (Witness Knox) I believe that's true, yes.

Q All right.

Other than the higher BMEP leading to a higher Kw load that you refer to on page six as a result of fuel rack position, are there any other intermittent loads that you had in mind in your use of the term "intermittent loads?"

A (Witness Knox) I don't believe I said that this would create an intermittent Kw load on the actual diesels -- on the generator output.

Q I'm sorry. Why don't you clarify and say what you do mean?

A (Witness Knox) I guess I just don't understand the question that you asked.

Q Well, is it your testimony that the position of the fuel racks during a start will result in a higher Kw load than 3300 to the diesels at Shoreham? --if you know.

A (Witness Knox) Well, when puts an additional load on the diesel generator it will have the effect of causing the fuel racks to open to the wide-open position, which may create a higher BMEP on the diesel generator -- on the diesel engine itself. I'm not saying that that will create a Kw spike on the generator output.

Q When you say you're not saying that, is it fair to say that you don't know one way or the other whether it would, or that you don't think that it would?

A (Witness Knox) I think it will create a higher load on the engine, but it will not cause -- you will not see the load on the output of the generator.

Q Now, when you say "a higher load on the engine," I take it by that that you mean a BMEP load?

A (Witness Knox) That's correct.

Q And it is that conclusion that you are basing entirely on the PNL testimony?

A (Witness Knox) Yes.

Q Is there any intermittent load other than this particular phenomenon that we have been talking about --

that is, the higher BMEP, that you had in mind in your testimony that intermittent loads might take all three engines above 3300?

A (Witness Knox) No.

Q Mr. Knox, given your testimony and that of Dr. Berlinger that it is not your position or the Staff's position that Shoreham diesels must have an overload or short-term rating to meet the regulations, am I correct that the testimony that you have stricken on the bottom of page 9 and going over to the top of page 10 was testimony you intended to say that under typical circumstances that was the case?

A (Witness Knox) I believe the answer to that is yes. As well as on page 11. They were also stricken for the same reason.

Q I take it, then, that the striking of the testimony at the bottom of page 9 and over onto page 10, am I correct that that was done in order to clarify that it was not the Staff's position that an overload rating was required in this instance?

A (Witness Knox) An overload rating to meet the regulations is not required.

Q And was that your view also at the time that you submitted your testimony? I take it it was.

A (Witness Knox) No, it wasn't.

Q So since you have filed your testimony, that position -- you have changed your mind in that connection?

A (Witness Knox) Yes.

Q Did you do so under any pressure, coercion or duress?

A (Witness Knox) No.

JUDGE BRENNER: Mr. Ellis, I wonder if I might interject? I want to clarify something in my mind before this goes too far, so that I know exactly what the testimony is.

Mr. Knox, when you say "no overload rating is required to meet the regulations," are you simply discussing that as an abstract proposition of what the regulation says and what type of approach must be taken to meet it? Or are you more particularly saying that there is no need to have any qualification for any load over 3300 Kw as applied to Shoreham

WITNESS KNOX: The machines at Shoreham would need to be qualified for the 3300 Kw load they were tested to, as well as the intermittent and cyclic loads, in order to meet the regulations.

JUDGE BRENNER: All right.

Depending, then, on the facts of Shoreham, we could end up -- applying your view as you've just stated it, we could end up with a situation being required, in your

opinion, which would be rather analogous to the concept of having a continuous load rating and also a higher rating for shorter-term non-continuous loads; is that correct?

WITNESS KNOX: I guess that would be correct, yes.

MR. ELLIS: Judge Brenner, I'm not so sure what you mean by "we could end up." I think we have the Staff position, so I didn't quite understand the Board's question.

JUDGE BRENNER: Well, maybe it was poorly phrased. I mean the Staff's position. I was confused, but I've clarified it now in terms of what Mr. Knox means. And I'm less interested in abstract propositions than I am in getting the Staff's view on whether or not some further qualification either prior to or after operation, or both, is necessary for a load over 3300.

MR. ELLIS: Let me--

JUDGE BRENNER: As long as I interrupted, there's one other thing I'm concerned with, and I'll just make this statement and ask the witnesses to keep it in mind as they answer questions. I won't back up over any that were asked at this time.

It may be that some of you as witnesses have addressed certain subparts of the contention. For example, Mr. Knox's testimony labels which subparts that testimony is intended to address. Now, some of these questions that have

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been asked arguably could be interpreted as being asked and answered with considerations in mind other than just those subparts that were addressed. So if both the question and the answer could be a little clearer on some of those that would be a little helpful to me also.

Mr. Ellis.

MR. ELLIS: Judge Brenner, let me go directly to, I guess, the question you raised and ask Dr. Berlinger and Mr. Knox this question:

BY MR. ELLIS:

Q I'm correct, am I not, gentlemen, that at the present time it is the Staff's position based on its review of the Shoreham FSAR revision and the MESLs and the qualified load that the engines-- Strike that. --that 3300 Kw is an adequate qualified load for the operation of the Shoreham diesels?

A (Witness Berlinger) Mr. Ellis, can I ask you to please rephrase that question? It is very confusing.

Q All right. Dr. Berlinger, let me try it this way:

I am correct, am I not, as the December 3rd SER reflects, that the qualified load of 3300 in the Staff's view adequately envelopes the MESLs for all three diesel generators at Shoreham?

MR. DYNNER: Objection. That has been asked and answered about twice with explanations on the part of the

witnesses.

JUDGE BRENNER: Yes, I agree.

MR. ELLIS: I agree, too, Judge. I don't disagree that it hasn't been asked and answered, but I am trying to work up to the point so that I can have my question understood in the context.

I'll go ahead and proceed beyond it.

JUDGE BRENNER: I don't think it was a matter of context. I had a problem with the question you asked before this which Dr. Berlinger asked you to rephrase. He said it was confusing. It was ambiguous to me. And we're only going to have to back in and clarify the language anyway.

So I don't think it was context, I think it was some of these terms that are ambiguous.

I do a lot better when you talk about particular loads and particular analyses that were done or not done. And I want to find out if these witnesses are depending on matching up-- I don't know how to phrase this rightly. --supply loads with demand loads, if you would, as opposed to the extent of their reliance on testimony that we have yet to hear as to other witnesses who think that the components may be acceptable even if these loads are higher.

I think I'll do better with that than with some of these global concepts.

MR. ELLIS: All right, Judge Brenner. Let me try

the question another way. I'm not sure I'll get what you're interested in, but I'll try.

BY MR. ELLIS:

Q Dr. Berlinger and Mr. Knox, am I correct that it is the Staff's position that the NRC Staff does not believe there is any need for further testing of the diesel generators at Shoreham at loads over 3300 to provide adequate assurance that the diesel generators will perform their intended function at Shoreham?

A (Witness Berlinger) Mr. Ellis, I'll try and answer it as quickly and in as short a term as I can.

The loads which have been defined in the FSAR have been reviewed by the Staff, and we have concluded that those loads are representative, or give an accurate representation of those loads that you would anticipate -- a conservative estimate of the loads that you would anticipate that these generators might have to support in the event of a LOCA or a LOOP/LOCA event.

In a parallel effort to that, the Staff has reviewed the capability -- call it a mechanical capability of the engines to support that load. The decision with regard to the capability of the engines to support the load, call it MESL, has been addressed as part of Staff Exhibit D-12.

So I think the answer to your question is yes, but

it was not done by one individual on the Staff, it was not done by one group on the Staff, it was done by the Staff. And that evaluation -- those two evaluations are included in Exhibit D-11 from the standpoint of the load, and Exhibit D-12 which defines the Staff's review of the mechanical capability of the engine.

MR. ELLIS: Judge Brenner, did I make a more direct-- I thought I attacked the issue that you presented directly.

JUDGE BRENNER: It helped me.

BY MR. ELLIS:

Q Dr. Berlinger, let me see if I can just get a bottom line to that.

I'm correct, then, that the Staff does not consider that further testing is required at higher loads than 3300 for intermittent or cyclic load reasons, or for any other reasons?

MR. REIS: Your Honor, I object to the question. The part of it I object to is "for any other reasons." Unless we can close it in some way and have more specificity there, I feel it puts a great burden on the witness to conjure up anything that might come up.

JUDGE BRENNER: I think Mr. Ellis was trying to accommodate one of my earlier concerns. I'm going to overrule the objection because I'd sure like to hear the

answer. And if the answer creates a problem with what you raised, we had better find out about it.

WITNESS BERLINGER: My interpretation of your question is, Will the Staff require that the engine be tested in the future at a load level in excess of 3300?

Is that a correct interpretation of your question?

MR. ELLIS: Yes, sir, I think that is.

WITNESS BERLINGER: The Staff will not require that the engines be tested at a load level in excess of the mean indicated load level of 3300.

BY MR. ELLIS:

Q Mr. Knox, I had asked you a question, and I think you testified that you had changed your position with regard to the short-term or overload rating, and that you had not been coerced or pressured in that regard.

Will you please tell us why you did change your view on that?

A (Witness Knox) The use of an overload is standard practice as far as our standard review plan is concerned.

If we go back to not having an overload, if you take the plant's design load, the 3300 Kw loading to which the diesel generator was qualified is above the plant's design load, except with the possibility of intermittent and cyclic loads.

If the machine is qualified for intermittent and

cyclic loads, the design we can conclude meets the requirements of GDC-17.

Q Would another way, then, to put it be that the 3300 Kw qualified load, because it envelops the plant design loads as you've discussed, is, in a functional sense, the equivalent of a short-term rating?

A (Witness Knox) I don't believe so in the same context that we normally consider it.

Q Well, the MESLs or the plant design loads during a LOOP/LOCA would not persist for very long in terms of time, would they?

A (Witness Knox) That's true.

Q And therefore-- Excuse me; go ahead, Dr. Berlinger.

A (Witness Berlinger) Let me add one thing at this point. I think if I waited any longer to say what I'd like to say it might be out of context.

Normal industry practice, from the standpoint of continuous rating and overload rating, is one way in which the Staff, as defined in its standard review plan, has established an acceptable basis, or a basis for finding a particular diesel engine acceptable for its intended function.

The standard review plan gives you one option. But there are other ways in which you could define an

acceptable diesel engine, or diesel generator. And this is-- One of the ways which was suggested as far back as last summer in our Staff SER with regard to TDI Owners Group program plan was a basis which was defined by our consultants at PNL, and that was to test an engine at a load level which would be defined as the qualified load. And if an engine had satisfied the testing requirement as a basis for establishing, or defining this qualified load, then that's the basis which our consultants have recommended for finding the engines acceptable.

It's an alternative approach to what approach the Staff would normally take.

In this particular case the licensee chose to test their engine at 3300 kilowatts. The FSAR modification defines what their continuous load requirements would be -- their maximum continuous load requirements would be. They defined it as the MESL.

Q They're not continuous, though, are they, Dr. Berlinger, those maximum emergency service loads?

A (Witness Berlinger) That's correct. The testing was done at 3300, and that defined the qualified load. The maximum emergency service load requirements, which do not include the intermittent and cyclical loads as defined by the licensee in the FSAR modification were either 3331 for one engine or below 3300.

The Staff's evaluation with regard to loads, as I indicated before, said that the loads that were assumed were conservatively modeled.

If you then look at the capability of the diesel and compare the two, then you can make a decision as to the adequacy of the diesel for its required function, for its required service. And that's what the Staff SER does, Exhibit D-12.

MR. DYNNER: Objection. My objection was to the portion of Dr. Berlinger's answer which, as I understood it, contradicted Mr. Knox's testimony.

Mr. Knox previously testified that the cyclic and intermittent loads were not limited to the 3331 and that the two other engines were not within the 3300 limit. He specifically testified that there was the material on page six of his testimony which was to be included in intermittent loads.

And when Dr. Berlinger gave his answer he said, as I recall, that the cyclic and intermittent loads were at worst 3331, and for the other two engines were below 3300; and that contradicted Mr. Knox. And it was the kind of thing I was concerned about when I objected to Dr. Berlinger as a witness.

JUDGE BRENNER: I'm also concerned about getting a long answer to which there was no question, particularly given the sensitivity of what we had earlier about there being no direct testimony.

MR. ELLIS: Excuse me. May I respond to the objection, because --

JUDGE BRENNER: Well, let me add that the mere fact of contradiction isn't a basis, per se, to strike. Right at the outset I said it would cause problems, and here we have one. I don't know if it's a contradiction

or not. But now we're going to have to take time to find out, whereas if we had had written testimony it would have been laid out and we would know it.

The object isn't to prevent witnesses from contradicting another witness; if there is an honest difference of opinion up there we obviously want the facts and the truth. But the way to get it would have been to direct testimony.

I'll tell you: I'm going to strike the entire answer of Dr. Berlinger, I believe; I want to check with Judge Morris for grounds beyond that. But I'll hear from you on it before we do.

MR. ELLIS: Thank you, Judge Brenner.

In the first place, there's no contradiction --

JUDGE BRENNER: Just address the fact that he made a statement to which there was no question.

MR. ELLIS: There was not a question outstanding, but it was a subject matter that was being discussed. That has happened a number of times in this hearing, where people have -- witnesses have made statements; in response to an indication that they wanted to say something they were given an opportunity to say something. Mr. Dynner has got an opportunity to cross-examine all he wants on that response.

And there was -- I think it is very important to point out, since Mr. Dynner had an opportunity to tell you

what he thought the contradiction was, I should have an opportunity to point out why I think there is no contradiction.

JUDGE BRENNER: Well, don't tell me because we're going to find out from the witnesses, if necessary.

MR. ELLIS: Well, I don't -- I think I object to his stating why there was a contradiction and my not having an opportunity to respond to that.

JUDGE BRENNER: All right. Wait a minute.

(The Board conferring.)

MR. ELLIS: Judge Brenner, there is one other item I need to point out.

JUDGE BRENNER: All right. I can give you a quid pro quo, Mr. Ellis. You understand what Mr. Dynner's objection was, all right? You clarify it with these witnesses right now and then we'll see what we're going to do.

BY MR. ELLIS:

Q Mr. Knox, I'm correct, am I not, that the cyclic loads are, as you understand it and as you use the term, are those three loads that are identified by LILCO and also stated by you on page five of your testimony? That's what you understand to be cyclic loads, isn't that correct?

A (Witness Knox) That's correct.

Q And I asked you a number of questions, as you'll

recall, about intermittent loads to ask you what you had in mind and you identified that testimony on page six of your prefiled testimony relating to the higher BMEP relating to the fuel racks, isn't that correct?

A (Witness Knox) That's correct, yes.

Q And I asked you specifically whether there were any other intermittent loads you had in mind and you said no, isn't that correct?

A (Witness Knox) That's correct.

Q And I'm also correct, am I not, that you said that you did not know whether any higher Kw loading was attributable to the higher BMEP, isn't that correct -- Strike that.

I am correct, am I not, that you testified that...

JUDGE BRENNER: Let me give it a try, Mr. Ellis.

Dr. Berlinger, did you say in your long volunteered explanation that in your opinion 3331 Kw was the maximum load that would be experienced by a diesel, counting the cyclical and intermittent loads?

WITNESS BERLINGER: The 3331, Judge Brenner, has been previously identified as the maximum load that engine 101 would experience on a basis of the MESL plus the cyclical and intermittent loads that LILCO has identified. That's the basis for that number that I stated.

JUDGE BRENNER: Now what about Mr. Knox's testimony where he talks about....

WITNESS BERLINGER: Where he talks about intermittent loads that may go above 3300?

JUDGE BRENNER: I want to be careful how I label it because that's not the way he labeled it in the written testimony.

....where he talks about the phenomenon, if you will, of a wide open fuel setting at the -- in a very short time frame which he estimates as being something less than a minute, I believe, where the fuel rack, according to him, would be wide open and would cause a load, a mechanical load on the engine BMEP of higher than the engine would experience at 3300, and, as I read his testimony, although he has changed it a little orally, as high as an electrical load of 3900 Kw.

WITNESS BERLINGER: I really don't think there's any inconsistency between my testimony and Mr. Knox's testimony.

Whether the engines are capable of supporting the loads that Mr. Knox has identified has been addressed by our PNL consultants, and it will be addressed in another part of this hearing.

JUDGE BRENNER: He did have a separate question. I understand why we may have to put different things

together later.

But you made a statement I thought -- or at least Mr. Dynner thought you did and I did too -- that 3331 Kw would be the highest load that the diesel would see, including intermittent and cyclical loads. And the question I have is did you also have in mind this phenomenon that Mr. Knox is testifying to on page six of his testimony, which he has also talked about a little bit orally here today.

WITNESS BERLINGER: I think I understand your question now, your Honor.

My statement with regard to 3331 kilowatts did not consider the load which Mr. Knox has labeled as an intermittent load caused by the fuel -- the engine going to wide open on the fuel racks. This is a load which, as he's defined it in his testimony, would last for a matter of seconds, ten to fifteen seconds.

MR. DYNNER: Objection. That's a mischaracterization of his testimony --

JUDGE BRENNER: Let him finish --

MR. DYNNER: I'm sorry.

JUDGE BRENNER: -- because there are two places, Mr. Dynner. And I think I had the same initial reaction but restrained myself, and you should restrain yourself.

(Witness panel conferring.)

JUDGE BRENNER: All right. But the long and the short of it at this point is you did not have that in mind when you gave your answer before?

WITNESS BERLINGER: That's correct.

JUDGE BRENNER: Did you have operator error in mind when you gave your answer before, possible operator error?

WITNESS BERLINGER: No.

MR. ELLIS: Which answer -- Okay.

JUDGE BRENNER: I didn't hear you, Mr. Ellis.

MR. ELLIS: I'm sorry. I'm prepared to go on. I'll clarify it through questions.

JUDGE BRENNER: All right.

Let me say something because we're going to have problems. We've taken some time now. I won't strike Dr. Berlinger's testimony. We've put some of it in context, at least the part responsive to Mr. Dynner's immediate objection.

But there may be some other parts in there which parties should not have to be ready to object to at each and every moment. And the problems are caused by a few sources, I think, that when they come together exacerbate each other.

One source is that when some of these terms are being talked about there can be -- such as qualified load,

among others -- there can be problems in interpreting that. And in fact it was because of the potential problem that Dr. Berlinger wanted to try to explain things in the first place.

I'm not questioning his motivation in any of this as to why he supplied some further information. But just as he, as a witness, was confused at least once when a question included a term like that, other persons, including myself, may have been a little confused when he used certain terms, especially when he's using them to make a statement rather than resonding to a particular question. I'm sure he knew what he had in his mind, but there are other perceptions being talked about.

I also have to control my own impatience because I have some things that I'm confused about that I'm going to get clarified with these witnesses before we're done, I assure you. But I want to let the parties develop the information first.

And I don't think it will be a very efficient gathering of the necessary information, information necessary to all the parties as well as the board, as long as we're talking about overall approaches as opposed to really getting down to questions and answers that demonstrate how those approaches have been applied in this case by the Staff since it's the Staff witnesses who are up

there.

For example -- and I'll just use this as an example, but I'm not going to ask about it right now -- the witnesses, Mr. Knox and Dr. Berlinger both, I believe, have talked about the fact that what in essence 'in my interpretation boils down to, well, if it's qualified at that load then that is the qualified load'; or the other way around, the utility would pick the load to which they wish to qualify it and then would demonstrate that the machines would run at or below that load.

And then they said that's an acceptable approach even though it's different than the approach laid out in the RegGuide of having a continuous rating and an overload rating. But they also were careful to add on at least two occasions, if the intermittent or cyclic loads are qualified, or if the machine is qualified for those loads, to state it better.

I don't know what they mean by that. And we're going to find out. And rather than having to list all these abstract propositions and then find out what they mean, I would like to find out along the way.

I understand you have to get some concept stand on the record, Mr. Ellis, but I made this speech in the hope that together you and the witnesses can move beyond concepts.

I mentioned that there are several problems which I think are exacerbating things. The other problem is the compartmentalization of the witnesses from this panel to the other panel, which is necessary and we can deal with that. And then even beyond that, compartmentalization among the witnesses on this panel.

Mr. Knox isn't thinking about operator error, he is thinking about intermittent loads. Sometimes -- I'm sorry, he's thinking about intermittent loads and he is also thinking about operator error, but I am not sure whether he is thinking about the other two parts of the contention, and whether we are talking about actual loads or perceived loads and so on.

MR. ELLIS: Well, there is a problem with -- It's too bad we can't have all of them. But let me see if I can't put a few things together I want to come back to.

JUDGE BRENNER: It's not easy for you either as a questioner. I understand that, especially since you have some points that you think they agree with you on and some points that fall in a different category.

MR. ELLIS: Well, I guess the real problem is I think it's clearer, simpler than I guess it may in fact be. But let me go back to another point and see if I can start with there.

JUDGE BRENNER: Let me back up. This question

is not awfully technical; it's really very simple to me.

You pick load X and you test the machine at load X, and then you have to demonstrate within the context of the contention whether or not it has been demonstrated that the diesel has safely and reliably operated at load X, and moreover that it won't operate at a load more than load X that will account for any significant purposes. It is really very simple.

MR. ELLIS: I think what I had gotten at was that picking load X was something they agreed with. But let me go back and see if I can do it --

JUDGE BRENNER: Okay.

MR. ELLIS: -- make it clearer. I thought that was clear.

BY MR. ELLIS:

Q Dr. Berlinger, on page 12 of the December 18th SER, marked for identification as Staff Exhibit D-12, the statement is made that:

> "The NRC Staff concludes that the TTI diesel generators at Shoreham Nuclear Power Station Unit 1 will provide a reliable standby source of onsite power in accordance with the General Design Criterion 17."

That conclusion accepts, does it not, the adequacy or appropriateness of the qualified load at 3300, am I correct?

A (Witness Berlinger) Yes, that is correct.

Q Mr. Knox, let's go back, if I may, to your testimony on page six.

MR. DYNNER: I'm going to object here because there was a portion of the SER that was read which was the first sentence and there is a large portion of it on page 13 that follows that says: "...these findings are subject to the following actions by LILCO...," which was not read, and I think it's important for the context of the record that the witnesses have an opportunity to look at what the SER says in the whole paragraph rather than be asked about one sentence and then switch to another subject.

MR. ELLIS: If Mr. Dynner thinks it's important, he can cover it in his cross-examination. I certainly should be able to ask questions and I think that the question that I asked and the answer that I got was certainly very clear and understandable based on that. If he thinks he can impeach that, he can come back on his cross-examination. I certainly did not require him to read page after page to put everything in, I don't think that's appropriate at all. He can come back on cross.

JUDGE BRENNER: All right. I'll agree with you,

Mr. Ellis, for the reasons you stated and overrule the objection. As a technical matter you are correct and the ruling is in your favor.

Now beyond this is a practical matter: that's the problem we are going to have with efficiency of this hearing if it proceeds this way. There are things in my mind just beyond the additional part of the Safety Evaluation that are raised by just that simple question and answer and, of course, we'll have to wait until all the witnesses testify. But as I understood the situation part of that sentence is supported by the views of the witnesses that we are going to have next time as to what they think about the operation at certain load levels, even if they're over 3300. And if I'm right about that and if that is part of the support for the sentence you read, then Dr. Berlinger's answer, while correct as far as it goes, is not the full story.

But go ahead.

BY MR. ELLIS:

Q Mr. Knox, let's look back at page six of your testimony, please.

Am I correct that the information you have received there concerning the fuel rack position or fuel setting moving to the wide open position is not information that is within your scope of expertise or experience?

A (Witness Knox) Well the observation that the fuel rack position will go to its full open position I think is within my expertise.

Q Do you know what a fuel rack looks like?

A (Witness Knox) Yes.

Q What does it look like?

A (Witness Knox) It's a mechanical lever that controls the, I guess the throttle on the machine.

Q Do you know what the BMEP that you are referring to -- do you know where that is experienced?

A (Witness Knox) Getting into the BMEP, I think, is beyond my expertise.

Q And would it also be true that the length of time during which the BMEP in excess of 3300 may be experienced is also beyond the scope of your expertise?

A (Witness Knox) I don't believe so, no. It's based on electrical loading of the machine, how long is an overload going to be present, which would require greater fuel rack position. I think that the length of time the diesel would be overloaded because of electrical load would be in my area.

Q Well maybe I misunderstood your earlier testimony.

Am I correct that you did not make any calculations to determine what the BMEP would be with the

fuel rack in the wide open position?

A (Witness Knox) That's correct.

Q And I also assume that you are not qualified to make such calculations, am I correct?

A That's correct.

Q And am I also correct that you have made no calculations to determine what Kw load would correspond to what particular BMEP reading?

A (Witness Knox) That's correct.

Q And am I also correct that that calculation is beyond your scope of expertise?

A (Witness Knox) Yes.

Q And to the extent that any time periods are stated in here, am I correct that these are all based on the PNL testimony?

A (Witness Knox) The effect that the fuel rack positions have on the BMEP's is within the PNL area -- scope of review.

MR. ELLIS: Judge Brenner, just as a -- in order to clarify matters, we would move at this time to renew our motion that we had made earlier in writing and which Mr. Reis said could properly be taken up on voir dire. I think we have now had that voir dire and I think, by any reasonable standard, we have established that the qualifications are not there.

I understood Mr. Reis to indicate when he argued against it that there was some expertise in the BMEP area but I think Mr. Knox has stated quite candidly and quite clearly exactly what his area of expertise is and on that basis we would contend that this testimony should be stricken.

JUDGE BRENNER: Could you tell me what portion of the testimony you mean? Do you mean the same portion that was the subject of your written motion or some lesser portion?

MR. ELLIS: I do not have the written motion before me.

JUDGE BRENNER: Okay.

In the written motion you moved to strike the two full paragraphs on page six, starting with "in order" and through the end of the page.

MR. ELLIS: Judge Brenner, I think the voir dire has demonstrated that all of it should be stricken. However, I think that it is most clear beginning with the word "thus" and extending through the end of the testimony. But I do not -- I think that the entire two paragraphs should be stricken.

JUDGE BRENNER: Mr. Reis?

MR. REIS: Judge Brenner, the importance of this, as Mr. Knox indicated, is not that he can compute these

things, I think it's very clear from his testimony if PNL's testimony does not support this, his statements of time, et cetera, will fail.

What is important in his testimony and what we think this demonstrates -- and it only goes to that, and I certainly would stipulate that if PNL cannot support this, this fails -- but what is important is that these matters have to be considered in the loads, in determining the loads.

He took the work from somebody else, it will be supported later. If it is not supported, certainly it will fail, I have no question about that. But whether it stays in the testimony now, yes, it should, it is the usual sort of thing he applies in his work in reliance on other people.

We are hindered here, as you said, by having several panels testifying to several parts of the same issue and, in that sense, yes. And I agree he doesn't have the expertise to say ten seconds or what it may be in the exact time, that will have to be supported by PNL. And it is only to the extent it is supported by PNL that it stays. As I said before, to the extent it is something he factors in when he gets it from someone he believes is reliable -- as I believe is implicit in what he said -- that's something else again and I think it should stay for that reason.

It's also, of course, in the SSER. That could be

another source for him -- it's the same source, it's PNL, in either case.

JUDGE BRENNER: That additional source doesn't help by itself.

MR. REIS: No.

JUDGE BRENNER: Mr. Dynner, did you have a position?

MR. DYNNER: Yes, if I could just be heard for a minute. I'm more concerned about consistency at this point and it seems to me --

JUDGE BRENNER: I'm sorry --

MR. DYNNER: I said I'm more concerned about consistency with respect to these witnesses and it seems to me that the issue of these particular types of intermittent loads is addressed in the SSER and I'm a little puzzled as to why Dr. Berlinger has not been asked for his view on this particular issue since he is apparently there to talk about the SSER, and I'm just curious as to why --

JUDGE BRENNER: Let me just interject and then I'll let you go back: that's not the reason we gave for putting him on the panel.

Now you can continue.

MR. DYNNER: I understand that but I am raising the issue only because we haven't heard from Dr. Berlinger on this, although we have heard from him on other issues

which are talked about in the SER, and perhaps he might, in this particular limited case, want to add something which could be relevant to the motion to strike. It's all wrapped up in one bundle, as we've all said.

(The Board conferring.)

MR. DYNNER: Judge Brenner, by my last comment, I did not -- if I could just make a statement for the record. By my last comment I'm not, of course, withdrawing or affecting my continuing objection to Dr. Berlinger appearing but I am operating within the confines of the Board's ruling.

JUDGE BRENNER: If he's going to say things that hurt your client's case, you at least want him to be given the opportunity to say things that may help your client's case, if I understand your point, especially if the information is in the supplemental testimony of other witnesses, let alone the SER, which other parties have asked him about already.

Does that summarize it?

MR. DYNNER: Yes, sir.

JUDGE BRENNER: Well as I just summarized it, at least, we agree with Mr. Dynner's point.

If it was just Mr. Knox, we would, Mr. Ellis, strike everything after "thus," although you didn't concede the first two sentences, in looking at it, we think Mr. Knox

has the expertise and the explanation that he gave you orally to withstand a motion to strike those first two sentences of that first full paragraph. If he were the only one on the stand, we would strike the rest of it; he does not have the expertise to support it or the knowledge to be able to answer cross-examination, even if he derived the information from other experts, as experts are entitled to do within reason.

But Dr. Berlinger, for all I know, will know everything there is to know about this subject and since he was put on the panel to be able to clarify matters in the testimony, at least, we won't strike it unless and until we find out that he can't answer the questions either.

In terms of a practical approach for you, Mr. Ellis, I think you have some options: you could leave it alone, if nobody else goes back to Dr. Berlinger on it, your motion to strike will succeed, or you could endeavor to develop it yourself, but that would be up to you, but it's not necessary that you have to supply the rope and everything else in order to defeat your own motion if you don't want to.

(Laughter.)

MR. ELLIS: Thank you, Judge Brenner.

Let me see if I can get at it fairly directly with Dr. Berlinger and Mr. Knox.

CROSS-EXAMINATION

BY MR. ELLIS:

Q Dr. Berlinger, Mr. Knox, I am correct, am I not, that you both consider that it is appropriate that the BMEP effect referred to on page six of Mr. Knox's testimony not be taken into account by LILCO in setting the qualified load of 3300?

MR. REIS: Mr. Chairman, I object to the question in that I don't understand what the question means by "not taken into effect:" not considered at all or --

JUDGE BRENNER: Let the witness answer the question. Poor Mr. Ellis, through no fault of his own, is being piled on from both sides here and, as I recognize, it's hard for him to proceed through this cross-examination for the reasons I have already discussed and he has, in no measure, been hindered by the approach of the Staff, both in what's in the testimony and what's not in the testimony, let alone the fact that there are witnesses up there without any testimony.

BY MR. ELLIS:

Q Would you like for me to restate the question, Dr. Berlinger?

A (Witness Berlinger) Yes, please.

Q All right. Let me work at it another way:

Dr. Berlinger and Mr. Knox, you are aware, are you not, that of the methodology used by LILCO in

calculating the MESL's and establishing the qualified load, the enveloping qualified load?

A (Witness Berlinger) I think I understand your question. Let me answer by saying yes.

Q And you gentlemen -- I take it if you disagree, Mr. Knox, you would speak up, so I take your silence to be concurrence, is that right?

A (Witness Knox) The development -- or the basis for your testing at 3300, I consider that part of the qualification process for the diesel generator which was in Carl Berlinger's area. So I just don't know.

A (Witness Berlinger) Mr. Ellis, in some respects, I'm afraid to say anything because you want me to say something but other people don't want me to say something.

I tried to clarify before -- Judge Brenner, if you like I will try to clarify but I will put it in my own terms, if I can.

JUDGE BRENNER: All right. I'll give you that chance.

Now let me make one point -- this may already be on your mind: I think there's a problem between the term "qualified load" as a concept and the fact that the witnesses are talking about whether the machines have to be qualified for certain situations. And I don't know if I have diverted you or not or if you already had that problem

in mind, but if you want to include that in your explanation go ahead.

MR. ELLIS: May I attack it through questions, Judge Brenner?

JUDGE BRENNER: Yes, if you wish, I'll let you, but --

MR. ELLIS: And then perhaps at the end if Dr. Berlinger wants to add, I certainly will give him that opportunity.

JUDGE BRENNER: Give me one moment.

(The Board conferring.)

JUDGE BRENNER: After, I guess, an hour and 45 minutes or so -- it seems like a lot longer -- we are going to take a break.

MR. ELLIS: Thank you.

JUDGE BRENNER: During that break you are all going to get together and Dr. Berlinger is going to tell you what it is he's going to say to all of you together and then you can decide whether, when you come back, you want to develop it by questions, Mr. Ellis, or simply let him make his clarifying statement.

And Mr. Dynner, we'll hear from you on it, too, after the break.

MR. DYNNER: Yes.

I object to that procedure. I think this is

supposed to be a public hearing and I don't think it's appropriate for the witness to get together with counsel and decide --

JUDGE BRENNER: With you, too, everybody.

MR. DYNNER: Even if I'm included I think that the witnesses ought to testify here in the appropriate procedure and I object to that, I think it's -- there is nothing in the regulations that I have ever heard of --

JUDGE BRENNER: I am going to cut you short with an explanation: you're way off the mark here, Mr. Dynner, really. When you're on the mark I'm more than willing to listen to you but you are way off the mark here, you have totally mischaracterized what we are going to do.

We are going to get the information on the record. The question is how best to proceed to get that information. And if there is efficiency in the parties discussing in advance what that information is going to be, this is one place in a hearing where we need it, based on what I've heard so far.

There is a question here with the way terms are being used and the semantic understanding and latent and patent ambiguities in the record and this is an appropriate procedure to clarify that. And then parties can adduce whatever it is they wish to adduce on the record at the appropriate time. And right now Mr. Ellis has been under

a handicap that is not of his own making, as I think you recognize -- at least I certainly recognize it -- and he should be entitled to decide whether he wants to drag it out by questions or simply let there be a statement made and you can follow up when it's your turn for questions and so on. But we've got to get some of these basic things clarified before it goes too far.

And I tell you we all learn from our experiences and this may influence my next ruling if it comes up -- and it certainly had better not come up in this case -- when a party wants to put a witness on with either a lot of technical documents for evidence that nobody was told in advance or sufficiently in advance would be put in and, on the other hand, want to put the witness on anyway without having told the parties well in advance that an additional witness would be added to the panel.

We'll take a break until 3:30.

(Recess.)

JUDGE BRENNER: All right. We're back on the record.

Mr. Ellis, you were the questioner, although, as I have noted, you have been interrupted more than we like to see for reasons that we have all observed.

Do you want to proceed by questions or did some other approach --

MR. ELLIS: No, sir, I think that's the way -- I had indicated a preference for that; Dr. Berlinger indicated a preference for that --

JUDGE BRENNER: All we need is your vote, you're the questioner.

MR. ELLIS: Yes, sir, and so we decided not to have -- just to go ahead and try it that way.

BY MR. ELLIS:

Q Dr. Berlinger, given the conclusion that we have referred to earlier in the December 18th SER to the effect that -- that was on page 12 -- to the effect that the NRC Staff had concluded that the Shoreham EDG's would provide a reliable standby source of on-site power in accordance with GDC-17, I am correct, am I not, that it is the Staff's position that testing at 3300 Kw has established the diesel generators' capability to support loads the diesels are realistically expected to support following a LOOP or LOOP/LOCA?

A (Witness Berlinger) That is correct, Mr. Ellis.

Q Dr. Berlinger, further, I think you testified that there were conservatisms, in your view, in the MESL.

Am I correct that you believe that those conservatisms are adequate to accomodate the intermittent or non-continuous loads that are listed as A, B and C on page five of Mr. Knox's testimony?

(Witnesses Berlinger and Knox conferring.)

A (Witness Berlinger) Mr. Ellis, the load that is referred to on page five of Mr. Knox's testimony -- which are labeled A, B and C: the air compressor, oil transfer pump and motor operated valves -- are you calling these the cyclical loads?

Q Yes, I was, but since you have identified them it doesn't matter what label we attach to them.

My question to you is: given your testimony that you believe there are conservatisms in the MESL's, as calculated, am I correct that the conservatisms in your opinion are adequate to accomodate those three loads and still stay below 3300 in actuality?

A (Witness Berlinger) I can give you my own opinion, and that is that I believe that there may be sufficient conservatism in the MESL loads and, even though I took those numbers and added them up and that number exceeded 3300 kilowatts and the figure given by Mr. Knox's testimony is 3331.4 kilowatts, I can't agree with your statement because I have to look at -- the total number of 3331, as calculated and presented by Mr. Knox, is the worst or the maximum load that would be anticipated assuming the maximum continuous emergency service load requirement and the cyclical loads added together. The numbers add up for the worst case of 3331. That's in excess of 3300 kilowatts

which has been defined as the qualified load by virtue of the engine tests. All right.

The Staff -- and I'd like to try to explain, if I may. The Staff looked at the maximum continuous emergency service load requirement and, on the basis of those loads, made a determination as to whether or not the engines could support that load. And that load was below 3300.

It also had to make a determination as to whether or not loads greater than 3300 might be put on those engines to determine whether or not the engines were capable of supporting a load in excess of what you have identified as MESL.

The determination made by the Staff's consultants is addressed elsewhere in the testimony which will be discussed in the future.

Q Let me clarify a few things:

You said the 3331.4 would be the worst case anticipated. By that you didn't mean, did you, that you really would expect to see that load?

A (Witness Berlinger) That is correct.

Q What is correct, that you really --

A (Witness Berlinger) That I wouldn't anticipate that you would actually see that load on the engine.

Q All right.

A (Witness Berlinger) That yes, there is

conservatism in the analysis that's been performed such that, call it the 31.4 additional kilowatts that's been calculated most likely would not be seen by the engines. But it's included for conservatism. In other words, it's not a best-estimate calculation and I think Mr. Knox has testified to that.

Q When you say it's included, you mean it's included in the Staff's evaluation?

A (Witness Berlinger) We have considered it as part of our evaluation.

Q Mr. Knox and Dr. Berlinger, either of you, assuming for the moment that the testimony on page six survives, I am correct, am I not, that it is not the Staff's position that there should be 10 to the 7 or any lesser testing at 3900 because of that effect that's referred to on page six?

A (Witness Berlinger) Could you point me to the specific words that you are referring to on page six?

Q Yes, sir.

On page six, the last two paragraphs of page six refer to an effect which we have been having some testimony about concerning the fuel racks. There is a statement at the bottom of the page that:

"The worst case loading has been estimated to be 3900 Kw for less than 60 seconds."

Do you see that statement?

A (Witness Berlinger) Yes.

Q I am correct, am I not, that it is the Staff's position -- I'm sorry.

I'm correct that it is not the Staff's position because of this effect that any testing has to be done at 10 to the 7 or any other cycle loading at 3900?

A (Witness Berlinger) That is correct, Mr. Ellis. The Staff's assessment of the diesels is based on the maximum continuous load requirement and the fact that the diesel generators have been tested at 3300, which has been defined as the qualified load for that engine or those engines, and assuming that the maximum emergency service load requirement for continuous maximum emergency service load requirement is enveloped by the 3300 kilowatts and the Staff's conclusion, as stated in the SER, is that...

(Pause.)

-- that: "...the TDI diesel generators at Shoreham will provide a reliable standby source of on-site power in accordance with GDC-17."

Q Thank you.

Dr. Berlinger, I am correct, am I not, that the -- that you are not or have not made any calculations concerning the BMEP's and Kw loadings that are shown on the second two paragraphs on page six of Mr. Knox's testimony?

A (Witness Berlinger) Mr. Ellis, I personally have not done any calculations. However, we have asked our consultants at PNL to provide their judgment as to a maximum brake mean effective pressure that would be experienced in a number of different situations because of the fact that we are not requiring these engine fuel rack settings to be limited. The Staff has considered several -- call them scenarios or possible scenarios with regard to fuel rack setting.

As a for instance, when the engine gets a signal to start as it comes up to speed in order to achieve frequency and voltage requirements in accordance with our regulations the fuel rack will go to its wide open position. That wide open position could provide as much as 3900 kilowatts of power from the engine and that's over the first 10 seconds during which time the engine is started and coming up to speed. I think that's addressed in Mr. Knox's testimony in the first portion on page six of the first full paragraph.

Q I'm correct though, am I not, that the 3900 Kw is not a calculation which you have made or which you have personal knowledge of?

MR. DYNNER: Asked and answered and explained.

JUDGE BRENNER: I'm going to allow him to follow up by probing with this question given the previous answer.

He can focus it in a little better in the terms he has a question or wants to get at.

WITNESS BERLINGER: I have not done calculations myself.

BY MR. ELLIS:

Q Mr. Knox, you'll recall some time ago I asked you concerning the change in your view or position that's reflected on the bottom of page nine and page 10, I believe you also indicated on page 11, and I believe you testified that you made those changes without any coercion or duress.

Do you recall that testimony?

A (Witness Knox) Yes, I do.

Q Am I also correct that you made those changes -- in connection with making those changes you did not have any contact concerning changes of that kind with anybody from LILCO or Hunton and Williams?

A (Witness Knox) That's correct.

(Pause.)

MR. ELLIS: Judge Brenner, in connection -- I think I gave you a revised cross plan this morning. I hope you're not using the old one.

JUDGE BRENNER: No, I knew not to use the old one but I left the new one down in my office, but we've got another copy here I believe. Judge Morris has it and I'll share it.

MR. ELLIS: Judge Brenner, I do have an extra copy.

(Document handed to the Court.)

MR. ELLIS: I realize how risky it is. It invites some sort of inference that I am following it very closely, but in any event I am going to go on now to--

JUDGE BRENNER: You should know that I have read it even though I don't have it with me now. We got it about 8:10 this morning.

MR. ELLIS: Well, I think I have followed portions of it fairly closely. I am now going to go on to Number 3 on page 2, the point that is listed Number 3.

BY MR. ELLIS:

Q Mr. Knox, on page 5 of your testimony you list kw loads attributable to diesel generator air compressor, diesel generator fuel oil transfer pump, and motor-operated valves.

Am I correct that you consider those loads to be the correct loads for those pieces of equipment and loads that supercede those that appear on page 4 of the December 3 SER?

A (Witness Knox) Yes.

Q Mr. Knox, let me just clarify--

MR. ELLIS: This is Number 9 on page 3.

BY MR. ELLIS:

Q This is to clarify my understanding of your review.

Am I correct that in your review you undertook to determine whether the 3300 kw qualified load adequately enveloped the maximum emergency service load for the worst case accident? Isn't that what you undertook to do?

A (Witness Knox) What I tried to do was to assure myself that the plant's design load was encompassed by the testing that was done.

Q And in that connection you reviewed the pertinent portions of the SER relating to various systems and the FSAR Revision 34. Am I correct?

A (Witness Knox) That's correct.

Q You did not actually go to Shoreham and verify numbers on nameplates, did you?

A (Witness Knox) That's correct. I based my review on what was presented in the FSAR.

Q And doing that, that is, going to Shoreham to verify numbers on nameplates, would not be necessary in your view, would it?

A (Witness Knox) That's correct.

Q In your review-- Strike that.

Turn to page 94 of your deposition, if you would.

In your review of the FSAR revision you were aware, were you not, that LILCO had used both nameplate

ratings in some instances and actual measured loads in others. Isn't that correct?

A (Witness Knox) That's correct.

Q And I am correct, am I not, that you would agree that that is an appropriate methodology to use?

A (Witness Knox) Yes.

Q A moment ago you told me that your task was to see that the testing encompassed the design load. Am I correct that you used the term "design load" in your answer as you defined "design load" on page 4 of your testimony?

A (Witness Knox) Can you repeat the question?

Q Yes, sir.

In response to my question about what you undertook to do you said you undertook to assure yourself th the plant design loads was encompassed by the testing. Do you recall that testimony?

A (Witness Knox) Yes.

Q And I'm asking now whether by your use of the term "design load" in that answer you intended the definition that you have in the second question and answer on page 4 of your testimony.

A (Witness Knox) Yes.

Q And that definition does not include any amount for operator error added loads, does it?

A (Witness Knox) That's correct.

Q And you would consider that appropriate, wouldn't you?

A (Witness Knox) Yes, I would.

JUDGE BRENNER: Which would you consider appropriate?

WITNESS KNOX: Not to include operator error in the loading of the diesel.

BY MR. ELLIS:

Q Turn to page 7 of your testimony, please, Mr. Knox.

In the second question and answer on page 7 you refer to pre-operational testing. You are aware, are you not, that the pre-operational testing with the Shoreham TDI diesel generators has been completed?

A (Witness Knox) No, I'm not.

Q When you refer there to the 3300 kw diesel generators were operated at 3300 kw for 24 hours, you are referring there to the 18-month periodic surveillance testing, aren't you?

A Yes. I would expect the 24-hour tests to be done as part of pre-ops as well as periodically thereafter.

Q Well, you know that they've run at least 525 hours without any interruption at 33-- Oh, I'm sorry. Strike that.

You are aware, are you not, that they have been

operated for 525 hours with only one operation at 3300 kw?

MR. DYNNER: Objection. The question is ambiguous and incomprehensible because it is not clear what "they" refers to.

JUDGE BRENNER: All right.

Can you clarify that, Mr. Ellis?

MR. ELLIS: Yes, I think maybe I can restate the question.

BY MR. ELLIS:

Q Am I correct that you mean by your answer there that pre-operational testing you would expect to occur or have occurred of 24 hours at 3300 kw. Is that right?

A (Witness Knox) Yes, on each diesel generator, not just one.

MR. DYNNER: Objection. It's a compound question. He said "to occur or to have occurred." Which is the question?

JUDGE BRENNER: I don't understand that objection, Mr. Dynner. I'm sorry, I don't understand your objection.

MR. DYNNER: Yes, I'll try to explain.

The question was phrased you expect pre-operational testing "to occur" would be future. "To have occurred" would be past. Therefore, it is not clear whther he is asking the witness whether the pre-operational

testing he's talking about here has already occurred and would be acceptable or whether he is going to require future pre-operational testing.

JUDGE BRENNER: Okay. I understand now.

Can you clarify that with some further questions, Mr. Ellis?

MR. ELLIS: Let me ask Dr. Berlinger:

BY MR. ELLIS:

Q Dr. Berlinger,--

JUDGE BRENNER: Why don't you stay with this witness since--

MR. ELLIS: All right.

JUDGE BRENNER: -- I'm granting the objection as to the question you asked this witness, and one reason for granting it, and I'm sure one reason it was made was because of one of Mr. Knox's earlier answers as to his knowledge of the state of the--

MR. ELLIS: All right. I'll go back to Mr. Knox.

MR. REIS: May I ask a question?

Was that really made with hearing his answer, that it was given before the objection came in? He had answered before.

JUDGE BRENNER: It doesn't matter. I'm granting the objection.

MR. REIS: You are striking the answer as well?

JUDGE BRENNER: It is not worth anything because we don't know what the witness meant. You're correct that the witness got a "Yes" in before the objection, but the point of the objection and the point of our granting it is we don't know what the "Yes" means.

BY MR. ELLIS:

Q Mr. Knox, am I correct that you are not familiar with the status of pre-operational testing that has been conducted on the various TDI diesels at Shoreham?

A (Witness Knox) That's correct.

Q Dr. Berlinger, --

A (Witness Berlinger) Yes, Mr. Ellis.

Q -- are you familiar with the -- generally familiar with the pre-operational and confirmatory testing that has been done on the TDI diesels at Shoreham?

A (Witness Berlinger) Yes, I am.

Q Has the required pre-operational testing for all three TDI diesels been completed?

A (Witness Berlinger) Mr. Ellis, I think that the pre-operational testing has been completed on the three engines. The reason I hesitated in giving you an answer, in addition to what would normally have been required by our regulations with regard to pre-operational testing, we have also imposed, after the engine, the 103 engine was torn down and reinspected and reassembled, that additional

pre-operational testing be performed on that engine.

And I believe that that testing has also been completed and the engine, the 103 engine, has been placed back in service.

Q Thank you.

Dr. Berlinger, with respect to the periodic surveillance testing at the qualified load of 3300, is it the Staff's position that it is adequate or satisfactory for LILCO to conduct these tests with an operator band of plus or minus 100 around the 3300?

A (Witness Berlinger) Yes, that is correct. And that is addressed in the PNL consultants' testimony that has been filed before this Board.

Q Mr. Knox and Dr. Berlinger, on page 10 of Mr. Knox's testimony the statement is made in the last answer on that page:

> "If 3300 kw is exceeded at any time by any amount, the associated technical specification action will require a subsequent analysis and inspection performed to demonstrate the capability of the diesel generator before continued plant operation would be allowed."

Am I correct that it is not the Staff's position that operation during the surveillance testing in the 3200 to 3400 range will require shutdown of the plant and

analysis of the engines?

A (Witness Knox) That's correct.

Q And that includes inspection, doesn't it? It would not require inspection for operation in the 3300 plus or minus 100 range for surveillance?

A (Witness Knox) Yes, that's correct.

Q On page 9 of your testimony, Mr. Knox, you refer to three loads, the single worst-case loads that could be connected following a LOOP. Do you see that at the top of the page?

A (Witness Knox) Yes, I do.

Q Am I correct that the figures you have listed there have been superceded and corrected by the figures that have been submitted by LILCO in its testimony and in a SNRC letter?

A (Witness Knox) These numbers were based on LILCO's testimony on pages 32 through 35. And if they have been changed then these numbers would be changed also.

JUDGE BRENNER: Wouldn't you want to know why they changed their numbers before you decided you would be willing to change yours?

WITNESS KNOX: If they no longer went over the 3300 it would be significant but otherwise I don't think it would be important.

JUDGE BRENNER: I'm sorry, I didn't hear you.

WITNESS KNOX: If they go over-- As long as they are still over the 3300 kw load rating, I don't think they've significantly changed. They may have dropped a few kw. But other than that....

JUDGE BRENNER: Do you know what they have changed to, approximately?

WITNESS KNOX: I don't think they did change. I thought they stayed the same.

BY MR. ELLIS:

Q Mr. Knox, were you present when Mr. Youngling explained the changes in this testimony here in this hearing?

A (Witness Knox) No, I wasn't.

Q Were you present, Dr. Berlinger?

A (Witness Berlinger) Yes, I was here for a portion of that, but I was not present during the entire period during Mr. Youngling's testimony.

Q Do you recall his explanation of the reason for the changes for the worst-case LOOP loads?

A (Witness Berlinger) No, I don't.

Q Mr. Knox, just to be clear, your deletion of the testimony and your -- your deletion of testimony on pages 9, 10 and 11, and addition of testimony on page 12, did you mean to include all of that when I asked you whether any of that was the result of any coercion or duress?

A (Witness Knox) Yes.

Q And I am also correct that in connection with all of the changes in your testimony, they were not done in connection with conversations with anybody from LILCO or Hunton and Williams?

A (Witness Knox) That's correct.

MR. ELLIS: Judge Brenner, I was going to leave the area now of Mr. Knox's testimony and proceed to the area of procedures.

JUDGE BRENNER: I wonder what the preference of the parties would be. Even though the witnesses are up there as a panel, I know we would not dismiss witnesses early; that is, they would remain for the end, unless something else occurs. Nevertheless, I don't know if the County would prefer to be able to ask its questions now while we're on this subject, or if you would rather wait.

MR. DYNNER: Judge, I think we would be just as happy having LILCO finish up with the panel, and then we'll come back with the panel as a whole.

JUDGE BRENNER: All right.

Mr. Ellis.

MR. ELLIS: Judge Brenner, I'll need a second for reinforcements.

JUDGE BRENNER: I don't hear any bugles, so I hope they're arriving.

(Pause.)

JUDGE BRENNER: Do you want a short break, Mr. Ellis?

MR. ELLIS: That would be helpful.

JUDGE BRENNER: Why don't we take a 10-minute break?

(Brief recess.)

JUDGE BRENNER: All right, you may proceed, Mr. Ellis.

MR. ELLIS: Thank you, Judge Brenner.

BY MR. ELLIS:

Q Mr. Clifford, have you ever been licensed to operate a nuclear power plant?

A (Witness Clifford) Would you define "nuclear power plant" in the context you're asking about a license?

Yes, I have been certified to operate a nuclear power plant.

Q A commercial nuclear power plant?

A (Witness Clifford) No, I have not.

Q What nuclear power plant have you been certified to operate?

A (Witness Clifford) I have been certified at the S1C prototype and S5W S3G Core 3.

Q Those are all Navy?

A (Witness Clifford) Yes, they were.

Q Gentlemen, this is addressed to any of the three of you. --Well, let me ask:

Mr. Buzy, have you in the past had occasion to review the emergency operating procedures for Shoreham?

A (Witness Buzy) Yes, I have.

Q And how about you, Mr. Clifford, have you ever

reviewed them before this?

A (Witness Buzy) May I clarify this?

Q Certainly.

A (Witness Buzy) It was in the process of reviewing training programs for shift advisors. That was last year sometime.

In addition to that, I have reviewed those revisions that were dated about December 20th of last year associated with the issue of diesel generators.

Q How about you, Mr. Clifford?

A (Witness Clifford) Yes, I have been involved in the review of emergency operating procedures at Shoreham.

Q Have you ever reviewed them prior to your involvement with this hearing?

A (Witness Clifford) Yes, I have.

Q And was that--

A (Witness Clifford) I reviewed them in, I think it was 1982 as part of the licensing review for the emergency operating procedures, and specifically they are based on the BWR Owners Group technical guidelines. And, again, last summer I reviewed the emergency operating procedures for the temporary diesel generators in the 20 megawatt gas turbine installed at Shoreham.

Q Mr. Clifford, in connection with your review of the procedures for the low power procedure, am I correct

that some of those procedures are the same procedures that are in issue in connection with this qualified load?

A (Witness Clifford) Yes, I believe some of them are.

Q And you said you also reviewed the emergency operating procedures in 1982; is that right?

A (Witness Clifford) The procedures based on the BWR Owners Group technical guidelines, yes.

Q So you were familiar at that time with the number of procedures that existed and the kinds of operator actions required in the event of accidents and transients?

A (Witness Clifford) I was generally familiar with the actions. The only procedures we looked at at the time involved the BWR Owners Group technical guidelines based procedures.

Q Would that include the same procedures that are in issue in connection with the 3300 Kw qualified load?

A (Witness Clifford) Two of the procedures, yes.

Q All right, Mr. Eckenrode, tell me if you have had any opportunity, other than in connection with this case, to review the Shoreham emergency operating procedures.

A (Witness Eckenrode) No, I have not.

Q You would agree with me, wouldn't you, Mr. Clifford, that the number of emergency operating procedures used at Shoreham to respond to a LOOP/LOCA has

not changed with the definition, or establishment of a qualified load?

A (Witness Clifford) I cannot say that.

Q So what you're saying is you don't know one way or the other whether that number has changed?

A (Witness Clifford) I do not know.

Q Mr. Buzy, given your familiarity with them, wouldn't you agree that the number of procedures used at Shoreham to respond to a LOOP/LOCA has not changed as a result of the establishment of a qualified load?

A (Witness Buzy) I wouldn't know, either. I haven't seen an index to see exactly how many procedures existed before this issue came up, or what existed then.

Q Well, when you reviewed them, Mr. Buzy, I think you say in nineteen-- What was your first time?

A (Witness Buzy) I reviewed them for training for shift advisors last year. I reviewed indexes and a number of normal and emergency operating procedures.

I'm losing my voice.

Q I'm sorry. You might want to move the microphone a little closer. We'll take all the time we need.

A (Witness Buzy) I gave you my answer.

Q I'm sorry; I must have missed it.

A (Witness Buzy) Last year I reviewed Shoreham's normal and a number of emergency operating procedures for

shift advisor training.

At that time I looked at an overall plan. I didn't go into the details of each procedure.

Q Did you, nonetheless, at that time have in mind, or review, how many procedures were involved in responding to an accident or a LOOP/LOCA event?

A (Witness Buzy) In general, yes.

Q And am I correct that you did not at that time raise a concern regarding the manageability of the number of procedures?

A (Witness Buzy) I did not.

Q And am I correct that today you do not have a concern regarding the manageablity of procedures?

A (Witness Buzy) I have some concern when I read -- when I've gone through them, about the number of procedures that are used simultaneously.

Q Has this number of procedures that one might use simultaneously changed at all as a result of the establishment of a qualified load?

MR. DYNNER: Objection; asked and answered. He said he didn't know.

JUDGE BRENNER: I'm going to have to hear the question again; I'm sorry.

MR. ELLIS: Judge Brenner, I think Mr. Dynner is correct. I will accede.

JUDGE BRENNER: Okay.

BY MR. ELLIS:

Q Mr. Buzy, given that-- Strike that.

(Counsel conferring.)

BY MR. ELLIS:

Q Mr. Buzy, isn't it true that the operators at Shoreham have been trained and tested in their knowledge and use of symptom and event oriented emergency operating procedures?

A (Witness Buzy) I can't answer that question.

Q Do you know whether the Staff has reviewed, observed, and approved the training and testing of the Shoreham operators' use of symptom and event oriented emergency operating procedures?

A (Witness Buzy) I know the Staff has evaluated operators and licensed operators at Salem, and therefore the Staff has probably used these procedures at Shoreham.

Q You said "Salem." Did you mean Shoreham?

A (Witness Buzy) Shoreham; pardon me.

Q Well, wouldn't this training and testing that has been-- Strike that.

The operators at Shoreham, to your knowledge are they licensed?

A (Witness Buzy) Yes, they are.

Q And in going through the licensing process-- which

is administered by the NRC, isn't it?

A (Witness Buzy) That's correct.

Q (Continuing) --they would be tested and reviewed as to their ability to know and use the symptom and event oriented emergency procedures; isn't that right?

A (Witness Buzy) That's correct.

Q And wouldn't this review include a review of the operators' ability to handle multiple emergency procedures simultaneously?

A (Witness Buzy) That should be done. But as far as I'm concerned, I don't know if it was.

Q Well, there would be others on the Staff who would know that?

A (Witness Buzy) That's correct.

Q Who are they?

A (Witness Buzy) In all probability the Licensing Branch from Region I, Operator Licensing Branch in Region I.

Q Let me ask you, Mr. Clifford: Did you check with Region I to see whether they had any concern regarding the operators' ability to manage the procedures?

MR. DYNNER: Objection. I don't see the relevancy of that question or this line. What's at issue here is the particular procedures that LILCO is relying upon, and not some vague concept of some procedures that are unidentified that may have been reviewed by Region I, or may not have

been reviewed by Region I.

I think it's irrelevant. I think ne just ought to ask them what their concerns are about the procedures.

JUDGE BRENNER: Well, you can ask them that.

MR. DYNNER: I will.

JUDGE BRENNER: We'll overrule the objection. It's relevant, but it's going to have to be brought forth into context in order to be worth anything. --that is, the context of the procedures of concern now.

But we'll let you ask the question in the belief that it's foundation. But it won't be an end in itself.

BY MR. ELLIS:

Q Do you remember the question, Mr. Clifford?

A (Witness Clifford) Yes; the question was did I check with anyone in the Licensing Branch, the Operator Licensing Branch in Region I during my evaluation? And not knowing the context, but yes, in the context I'll just answer no, I did not.

Q Wouldn't you agree with me that-- Mr. Buzy, wouldn't you agree with me that these -- that the persons who actually tested the operators in their use and knowledge of the event and symptom oriented emergency operating procedures would be--

I'd like Mr. Buzy's answer alone on this, Mr. Clifford.

Wouldn't you agree with me, Mr. Buzy, that he persons who actually tested and reviewed the operators' knowledge and use of the symptom and event oriented emergency procedures would be the persons better able to determine whether there is any valid concern regarding the manageability of the procedures?

MR. REIS: Objection, Mr. Chairman. The question didn't go to the procedures we are concerned with here. Apparently something else may have been looked at by Region I, but it does not concern whether these procedures--

JUDGE BRENNER: I was just going to overrule that same objection, Mr. Reis.

Go ahead, Mr. Ellis.

BY MR. ELLIS:

Q Mr. Buzy?

A (Witness Buzy) Could you repeat that again, please?

MR. ELLIS: Yes, sir. Can the Reporter read it, please?

(Whereupon the Reporter read from the record as requested.)

MR. DYNNER: I now have another objection. It's on different grounds, and it's on the basis that there's a premise included in that question, and that is that the people at Region I actually did review those particular

procedures, and there's no testimony on that fact.

JUDGE BRENNER: Your point is a narrow technical one, and it's correct. But I'm going to overrule the objection, given the prior testimony of this witness that he thought that they may have reviewed it. And given that belief, the question is pertinent in a number of respects both as to possible substance if it gets connected up, as I indicated previously, and also as to qualifications and knowledge of the witnesses.

After all that, can you recall the question?

Mr. Ellis, do you still want this particular witness to answer it?

MR. ELLIS: Yes, sir.

JUDGE BRENNER: All right.

Maybe you weren't here when we explained the guidelines, but if a questioner wants just a particular witness to answer without conferring, he's entitled to that. And then if somebody wants to add after the line is developed, we'll certainly permit the witnesses to give us the information at that point.

On the other hand, if the question is just directed to the panel generally you are entitled to confer.

BY MR. ELLIS:

Q Mr. Buzy?

A (Witness Buzy) My understanding is, could we have

used-- Could the panel member, in lieu of myself, if from Region I, be a licensing examiner from Region I and perhaps been more qualified than myself? Is that what you're asking?

Q Let me repeat the question.

Wouldn't you agree with me that the examiners who actually reviewed the operators in their knowledge and use of the symptom and event oriented emergency procedures at Shoreham, would be the persons who would be better able to determine whether there is any concern regarding the manageability of the procedures at Shoreham?

A (Witness Buzy) They could have been used, yes.

Q Do you know whether the number of procedures that-- Mr. Clifford, do you know whether the number of procedures to be used by the operators at Shoreham to respond to a LOOP/LOCA is any different from the number to be used at other BWRs generally?

A (Witness Clifford) I really can't say because I don't know the specific procedures that they would have set up to cover the same conditions that Shoreham has set up for these particular conditions.

Q What do you mean by particular conditions?

A (Witness Clifford) Well, I understand that there was one additional procedure that was generated in December that needed to be generated -- at least I assume that LILCO determined it needed to be generated -- and the actions in that procedure, since it was a new procedure, I assumed that it covered something that LILCO saw was missing from some other procedure.

And I cannot say whether a procedure like that or whether those actions that I assume LILCO had now stated are now incorporated into some other procedures exist at any other plant, I can't say that.

Q Mr. Clifford, you know, don't you, that that procedure was deleted?

A (Witness Clifford) I understand from testimony last week that, yes, that procedure has been deleted.

Q Didn't you have knowledge of that before the testimony that you heard here?

A (Witness Clifford) I was not aware of it before the testimony last week, no.

Q Did you prior to the filing of your testimony

on, I believe, February 5th receive or have in hand the revisions that Mr. Notaro testified to when he was on the stand?

A (Witness Clifford) Yes, I did.

Q And those that you received did not include the 29.015.04, isn't that correct?

A (Witness Clifford) They did not include that procedure or some of the other procedures we had reviewed previously. Part of the problem we had during our review of the revised procedures was that we did not know what had happened to the procedures that were not submitted that were part of the original set.

Q Were you at the February 8th meeting?

A (Witness Clifford) Yes, I was.

Q And isn't it true, that at the February 8th meeting Mr. Notaro at that time said that 29.015.04 had been deleted?

A (Witness Clifford) I don't remember that statement, no.

Q Have you now reviewed the procedures -- I'm sorry, have you now reviewed the procedures with the revision numbers that Mr. Notaro testified to as being the latest when he was on the stand?

A (Witness Clifford) I have reviewed some of those procedures to some level of detail.

Q Okay.

Have you provided anyone with a list of specific changes that you think should be made other than what appears in the letter of February 5?

A (Witness Clifford) No, I have not.

Q Am I correct with regard, Mr. Clifford, to your concern regarding the manageability of procedures that that concern will be alleviated, with respect to the procedures, if LILCO satisfactorily completes the response to the RAIs that relates to procedures -- by the RAI, I mean the letter of February 5.

MR. REIS: I object to the question in that I don't know what the word "satisfactorily" means, if it means to the satisfaction of the Staff or the satisfaction of LILCO or what the word means.

MR. DYNNER: I also object on the grounds of the vagueness and ambiguity of the question --

JUDGE BRENNER: That objection is granted.

I assume you meant the Staff's satisfaction given the whole context of the question, Mr. Reis. But I thought that you were going to make the objection that Mr. Dynner made and that one is granted.

BY MR. ELLIS:

Q Mr. Knox, on page 10 of your testimony -- I'm sorry, Mr. Clifford -- you state that:

"We believe that if these specific concerns identified in our February 5, 1985 Request for Additional Information are adequately addressed by the Licensee, reasonable assurance could be found that these three questions would be satisfied."

So am I correct that that would include the concern over the manageability?

A (Witness Clifford) If the concerns are addressed to our satisfaction then yes, we believe that reasonable assurance could be found. And that is based on the procedures submitted at the beginning of January.

JUDGE BRENNER: Mr. Ellis, where did you read your quote from? I was a step behind.

MR. ELLIS: Page 10 of the Clifford testimony.

JUDGE BRENNER: Thank you.

BY MR. ELLIS:

Q You say, Mr. Clifford, that the February 5th Request for Additional Information was based on the procedures that were submitted in early January, is that correct?

A (Witness Clifford) That's correct.

Q And you have not completed your review of the procedures that you received some time before February 5th; they're not incorporated in that, are they?

A (Witness Clifford) We did not feel it was appropriate to incorporate or address any new comments because based on the review we had done to date on the revised procedures submitted in late January a number of the same concerns existed, a number of additional concerns were raised, and we felt it was appropriate to find out the answers to the originial questions before we continued a review of another set of procedures.

Q Mr. Clifford, are you prepared today to go through procedure-by-procedure and tell me, with respect to each procedure, each change that you think is important to be made in connection with the qualified load?

A (Witness Clifford) Which revision?

Q The latest.

A (Witness Clifford) No, I am not.

MR. ELLIS: Judge Brenner --

JUDGE BRENNER: Mr. Ellis, when you say "the latest," you mean the latest ones that Mr. Notaro testified to?

MR. ELLIS: I mean the ones that he testified to and that were supplied to the Staff a few days prior to their testimony, yes, sir.

JUDGE BRENNER: All you had to say was yes, I understand your feelings on the last part of your sentence.

MR. ELLIS: Judge Brenner, may I cover one other

subject? I do not think I will finish today. I will be close but I won't finish today and I think it would be an appropriate time to recess. But I do want to cover another subject.

JUDGE BRENNER: Yes, did you want to ask the other two witnesses sponsoring that same piece of testimony the same question you just asked Mr. Clifford?

MR. ELLIS: Yes, sir. I will.

JUDGE BRENNER: You don't have to do it now.

MR. ELLIS: I'll ask it now.

BY MR. ELLIS:

Q Mr. Buzy, Mr. Eckenrode, I take it that you, as Mr. Clifford, are not prepared today to go over each of the procedures that Mr. Notaro testified to on a line-by-line basis and tell me what changes you think should be made in order to provide reasonable assurance that the 3300 will not be exceeded?

A (Witness Buzy) I'm not prepared.

A (Witness Eckenrode) That's correct. I'm not either.

(Counsel conferring.)

Q Mr. Buzy, are you familiar with the training program in general at Shoreham for the operators?

A (Witness Buzy) Yes, I am.

Q And are you generally satisfied that is an

adequate and appropriate training program?

A (Witness Buzy) Yes, I am.

Q You haven't had an opportunity, I take it, to review the lesson plans that have been revised by LILCO to accomodate the Staff concerns, have you?

A (Witness Buzy) Not in any detail.

MR. ELLIS: Let me point out to you, Judge, because I think it's only fair to do so, that those revisions are not yet final and the Staff hasn't been given a final final version of that. I have given the County a less than final version and I hope to have that soon.

So I want to point that out in fairness to the Staff. I expected to have that here by today. That was accomodating concerns from the February 5th and the February 8th meetings.

BY MR. ELLIS:

Q Mr. Clifford, on page eight of your testimony you refer to actions that would have to take place outside of the control room to determine if the number of non-safety loads that were operating may add an unacceptable level of confusion or delay. What non-safety loads were you referring to there?

A (Witness Clifford) There were a list of loads in the loss of off-site power procedure. A number of those were required to be operated outside of the control room.

Q Well can you be specific as to the loads that gave you concern?

(Counsel conferring.)

A (Witness Clifford) Right off the top of my head, no. There are a list of loads in the loss of off-site power procedure that Mr. Eckenrode and I went through with a watch supervisor in the control room and he explained which of the loads were operated and indicated inside the control room and outside the control room.

Q Well the operator then -- This was an operator at Shoreham?

A (Witness Clifford) Yes, it was.

Q Well he certainly knew where the loads were and what they were, didn't he?

A (Witness Clifford) What and where, yes. That was not necessarily our concern.

Q That is, you weren't concerned that the operators didn't know what the loads were or where they were, is that right?

A (Witness Clifford) That was one of the things that we checked while we were there and confirmed that in fact the person we talked to did know so that did not enter into necessarily that person's concern but in general there was a concern regarding sending operators out during a condition such as a LOOP/LOCA where there was a great deal

of activity in the control room and interaction between that person outside the control room and the people inside the control room and the amount of confusion that that could possibly add to the watch engineer and the watch supervisor trying to mitigate the event and keeping the big picture.

Q It's true, isn't it, that the field operator doesn't do anything without the direction and approval of the control room?

A (Witness Clifford) That is true and that was one of our concerns.

Q So then why do you have a concern regarding the operator actions outside the control room?

A (Witness Clifford) The specific direction would have to come from the watch supervisor to operate loads outside the control room. In our view, that could possibly lead to a diversion of his attention from activities inside the control room at a critical time.

Q How is that different from any other plant in the country that's got -- strike that.

Do other plants have loads outside the control room?

A (Witness Clifford) Yes, they do.

Q Well can you explain to me why you have this concern about Shoreham specifically and not about other plants?

A (Witness Clifford) Yes, because the diesel generator load is limited and operators outside the control room at other plants aren't necessarily as concerned with the loads or the small loads or the types of loads that they would be operating because they have been shown and proven to the operators to be within the capacity of the machines.

Q Do you know that of your own knowledge?

A (Witness Clifford) From walk-throughs we have done, yes.

Q Well let me be clear about what I'm asking, whether you know that of your own knowledge:

Do you know of your own knowledge that -- Strike that.

I still don't understand why you think there will be confusion, can you explain that -- other than -- Let me put it this way:

Do you think the level of confusion is any different after the establishment of the qualified load as compared to prior to the establishment of the qualified load?

A (Witness Clifford) That depends on how the operator outside the control room is actually controlled and whether it is a direction face-to-face that the operator leave the control room and go operate a load or whether he has to go to the LILCO operating station, call in, get

permission and find out what the load is at that particular time.

Q Well you tell me how it's done, if you know.

A (Witness Clifford) Part of our problem is we don't know how it is intended to be done at Shoreham.

Q Why didn't you ask Mr. Notaro?

MR. DYNNER: Objection.

MR. REIS: Objection --

MR. DYNNER: -- That presupposes that he didn't ask him, number one --

BY MR. ELLIS:

Q Well did you ask him?

JUDGE BRENNER: Wait.

That number one is overruled because we will get that as part of the answer.

What's your other objection -- or did you have one?

MR. DYNNER: My other objection is as to relevancy.

MR. REIS: My objection was as to relevancy, too. The question is whether the procedures were correct, not whether they asked a question of a particular person in reviewing those procedures or not. Let's get to whether the procedures are correct, not what they asked Mr. Notaro.

(The Board conferring.)

JUDGE BRENNER: We are going to allow the question because it relates to what these witnesses know or reasonably should be expected to know.

Now, conceivably, that question and answer won't establish that directly, but it will help us evaluate their testimony with that standard in mind; that is, what they know or reasonably should be expected to know at this point.

Given the paucity of information in the testimony -- in the written testimony, which I discussed last week, it reinforces the view that we will permit this exploration.

I expect that all parties are going to have a need to explore this testimony more than should have been necessary if it had been developed as it should have been in the prefiled direct, and the fact that counsel, whose client is in apparent disagreement -- more than apparent -- in disagreement with some of the conclusions of this testimony, is more than willing to pursue it, is all to the better in terms of a complete record.

So we will allow the question.

The question is: why didn't you ask?

WITNESS CLIFFORD: The question was: why did I not ask Mr. Notaro?

And the answer to that is that our reviews are

not necessarily based on specific questions and answers of individuals. We tried to make an evaluation based on our assessment of the situation and tried to determine the basis that licensees or applicants have for their conclusions.

We raised this particular concern, and it was raised in our request for additional information in terms of analysis or evaluation, and we are looking for analysis and evaluation.

BY MR. ELLIS:

Q Isn't it true -- let me ask you first, is it important for you in your assessment to know how the orders are communicated to the field operators for activities outside the control room?

A (Clifford) It is more important in our assessment to determine whether or not that method will cause confusion and what method that the licensee or applicant uses to evaluate that level of confusion.

Q Well, until you know the method you can't know whether it could cause confusion, can you? You are just speculating about whether there is confusion?

A (Clifford) I may be speculating, but I have nothing to base any other conclusion on because I have not seen any evaluation by LILCO that shows whether or not confusion will exist.

MR. ELLIS: Judge Brenner, I think this is an

appropriate time to cease for the day, and I might point out that I will have to think about this, but I may have a proposal because I think this kind of proceeding may not be the most efficient way to get at this.

JUDGE BRENNER: I have heard that before, I know, somewhere.

MR. ELLIS: Well, I will try to -- I don't see that it is terribly efficient to proceed this way. It may be good practice for interrogators, but it is not getting the job done, which is to get the procedures resolved.

And so I will give some thought to that this evening and consult with other counsel and with my client and see if we can't do something that will expedite it.

I think one of the problems we have is because of the litigation context there is, I think, an unnecessary fear about getting together to talk about things.

JUDGE BRENNER: I don't understand that.

MR. ELLIS: Well, it exists.

JUDGE BRENNER: Let's not belabor it.

All right, you have made your statement. I wanted to say something that is, I guess, related, but my main interest in bringing it up was for you to think about the schedule this week.

As we said, after we finish this subject, if we completed it before the end of the day on Thursday we would

not of course expect the other witnesses in this week and we would continue the hearing on March 5th with the crankshaft witnesses.

It is my hope, however, and has been since we discussed that much of the schedule last Thursday, that we would not have to take up until the full time on Thursday --

Mr. Reis, did you want to say something? I haven't finished the thought.

MR. REIS: No.

JUDGE BRENNER: -- because I think we could use some time to discuss matters among the parties and the Board on the record after we had finished with the witnesses, some of which have been on the plate in terms of things we have asked LILCO to think about, and there are at least one or two loose ends from the report of the parties that the parties may want to tell us about, and some other subjects of that nature.

And although I don't know, the Board by then might have some other things to set out, also, but not necessarily, and in any event, Thursday after completing these witnesses might be a good time.

So I ask you to factor in in your approach the fact that let's not just fill up the time until the end of the day on Thursday because we could make use of that time in this proceeding.

And if there is nothing further for today, we can adjourn until 9:00 in the morning.

We did note -- I noted that some of the witnesses were suffering the after effects of some sort of flu bug, or whatever, and I hope you get some rest this evening, and I hope none of us who have recovered in the past catch it again as a result of being in this room.

All right, let's adjourn for the day and go off the record.

(Whereupon, at 5:03 p.m., the hearing was recessed, to reconvene at 9:00 a.m., Wednesday, February 20, 1985.)

# CERTIFICATE OF OFFICIAL REPORTER

This is to certify that the attached proceedings before the UNITED STATES NUCLEAR REGULATORY COMMISSION in the matter of:

NAME OF PROCEEDING: LONG ISLAND LIGHTING COMPANY

DOCKET NO.: 50-322-OL

PLACE: BETHESDA, MARYLAND

DATE: TUESDAY, FEBRUARY 19, 1985

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission.

(sigt) Anne G Bloom

(TYPED)
ANNE G. BLOOM

Official Reporter
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