

LILCO, November 6, 1984

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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Before the Atomic Safety and Licensing Board

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

LILCO'S MOTION (A) FOR LIMITED
SUPPLEMENTATION OF THE DIESEL GENERATOR
ENGINE BLOCK RECORD AND (B) FOR LIMITED
REOPENING OF THE DIESEL GENERATOR CRANKSHAFT RECORD

This motion seeking a limited supplementation and reopening of the crankshaft and engine block records^{1/} is prompted by a series of recent events and developments. Chief among these are:^{2/}

1. Issuance of SER. On August 20, 1984, LILCO received the Staff's Safety Evaluation Report (SER)

^{1/} The motion is limited to the crankshaft and engine blocks because negotiations are still underway concerning settlement of the AE piston contention. Settlement may yet be achieved. If not, LILCO will submit a motion concerning the AE pistons similar to this motion.

^{2/} A more complete description of these events and developments is contained in LILCO's Status Report dated October 17, 1984. Accordingly, only a summary appears.

*add
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pertaining to the March 2, 1984 Program Plan of the TDI Owners Group. This SER established an interim basis for licensing.^{3/} Included among the elements for such licensing were provisions for determining a "qualified load" and performing certain confirmatory testing in the event the qualified load exceeded 185 BMEP. The "qualified load" was defined in the SER as a load which would meet or exceed the severity of the maximum emergency service load requirements for the set of diesel generator engines. See SER at pp. 13-14.

2. Determination of Qualified Load. On October 15, 1984, LILCO completed the tests, engineering review and analyses necessary to determine and confirm that the appropriate qualified load for the three Shoreham diesel generators is 3300 kw.^{4/}

^{3/} A permanent basis for licensing the TDI diesels must await the Staff's full evaluation of the complete TDI Owners Group Program. Review of the full program is not expected to be completed for at least 18 months.

^{4/} The Integrated Electrical Test, completed in late August 1984, enabled LILCO to conclude that the service loads during a LOOP/LOCA event are lower than the then current FSAR design loads. LILCO believed that 3300 kw would bound the maximum emergency service load for all three diesel generators and so advised the NRC Staff. See SNRC 1077. However, additional tests and analyses remained to be performed in order to confirm this belief.

3. Confirmatory Tests and Inspections. Concurrent with the effort to establish the qualified load, LILCO conferred with the Staff concerning aspects of the confirmatory testing recommended by the Staff in the SER and in its testimony. By mid-October, essential agreement had been reached, the details of which were set forth by LILCO in SNRC-1094, a letter dated October 18, 1984 from J. D. Leonard, Jr., Vice President-Nuclear Operations, to Harold R. Denton, Director-Office of Nuclear Regulatory Regulation. The principal confirmatory test requirement was an endurance run for 10^7 cycles at the qualified load for specified key components for which operating experience at the qualified load did not already exist. In the context of this litigation, the 10^7 cycles confirmatory testing is relevant only to the crankshafts.^{5/}

^{5/} The Staff has already determined that the R-5 engine experience with the AE piston, which far exceeds 10^7 cycles, is applicable to the Shoreham AE pistons. Accordingly, the 10^7 cycle confirmatory testing is not required for the Shoreham AE pistons. The Staff also determined that certain specific tests and inspections (but not including 10^7 cycle endurance testing) would be appropriate for the diesel generator engine block. These tests and inspections are described in SNRC-1094.

LILCO began the confirmatory tests and inspections on diesel generator 103 prior to reaching final agreement with the Staff and prior to final confirmation of the qualified load on the basis of preliminary results then available and in light of the substantial amount of time the testing would require.^{6/} The endurance run has been completed at the qualified load of 3300 kw and the post-test inspections are now underway. LILCO expects to have the results of these inspections available sometime between November 15 and 20, as reported to the Board during the hearing on November 1, 1984.

4. FSAR Revision. On October 22, 1984, LILCO submitted to the Staff an FSAR revision reflecting the definition of the new, qualified load and deleting operative (but not historical) references to the conservative design loads of 3500 kw (maximum continuous) and 3900

^{6/} 10 cycles equates to a total of 740 hours of engine operation at 3300 kw or above. With the Staff's concurrence, credit is given for all hours accumulated at or above the qualified load since the installation of the replacement crankshafts. At the time of the commencement of the tests, approximately 219 hours had been accumulated at or above the qualified load since the installation of the replacement crankshaft. Therefore, 521 hours of operation at the qualified load remained for completion of the test.

(overload).^{7/} LILCO has provided answers to various Staff questions concerning the qualified load and expects to supply all requested answers prior to November 9, 1984.

These four developments, LILCO believes, strongly support the record reopening and supplementation requested here. The determination of the qualified load establishes that the maximum emergency service load requirements for the Shoreham diesel generators will not exceed 3300 kw during a LOOP/LOCA. LILCO firmly believes that the record should include and reflect this reality together with the pertinent results of the confirmatory testing and inspections. At the same time, LILCO

^{7/} See SNRC-1092. The definition of a qualified load supersedes the conservative design loads set forth in the FSAR and renders unnecessary any overload rating above the qualified load. The original overload rating of 3900 kw was only necessary for diesel generator 103 for the first ten minutes of a LOOP LOCA event. During this period, the conservative design load for diesel generator 103 was 3881 kw, some 381 kw above the nameplate continuous load rating. Accordingly, while these conservative design loads were in effect, LILCO committed to the establishment of 3900 kw as an overload rating and tested all three engines at that rating as well as 3500 kw. Now that 3300 kw has been determined to bound the maximum actual loads for any of the three diesel generators for any part of a LOOP LOCA event, the conservative design loads are no longer relevant and there is no need or requirement for an overload rating. The SER precludes testing above the qualified load.

believes that it has already presented adequate evidence of analyses, calculations and inspections that demonstrate that the 13 X 12" crankshaft and the existing diesel generator engine blocks can perform their intended functions at the currently existing FSAR conservative design loads. The evidence already presented by LILCO is also relevant to a consideration of the adequacy of these components at the new, qualified load of 3300 kw. Accordingly, LILCO's proposal for a limited and focused reopening and supplementation of the crankshaft and engine block records is designed to accommodate these realities and to give the Board the option of finding the engines acceptable at 3300 kw, at 3500 or at 3900 kw.^{8/} More specifically, LILCO's proposal for a highly focused and limited reopening and supplementation of the record is as follows:

^{8/} As counsel for LILCO advised the Board, the Board may find the components qualified at 3500 kw or at 3900 kw, but require confirmatory testing. In that event, a license would have to be limited to the load at which the confirmatory test was run, in this instance 3300 kw. At the same time, however, if confirmatory testing were required, LILCO would have the option of additional testing at higher loads in the future in order to take advantage of the Board's favorable findings at loads above 3300 kw. LILCO wishes to preserve this option for possible load growth. As LILCO advised the Board (Tr. 23,105-06), it intends to retain the TDI diesels as a source of emergency power at Shoreham to be used in conjunction with the three Colt diesels currently being installed and the 20 megawatt gas turbine already installed and operating.

1. Reopening of Crankshaft Record. LILCO proposes that the reopening of the crankshaft record be limited to evidence concerning:

(a) the results of the 10^7 cycle endurance tests and their significance to the record already developed; and

(b) the results of DEMA forced torsional vibratory stress calculations at 3300 kw and the effect of the new qualified load on the various safety factors already calculated by the parties.

2. Supplementation of Block Testimony. LILCO proposes that the Board permit supplementation of the engine block record to include evidence of the results and significance of the confirmatory strain gauge tests with respect to the cam gallery area.

These limitations on the reopening and supplementation of the record are justified in light of the extensive testimony already received, most of which is pertinent to the new, qualified load as well as to the former conservative design loads. Thus, the extensive testimony concerning the material

and engine test results, the various analyses and methodologies used, the conservatism of the finite element analyses, the fracture mechanics analyses, the cumulative damage analyses and all the results of the analyses and testing, as well as other matters, are all pertinent to assuring reliable operation at the new qualified load because they demonstrate reliable LOOP/LOCA operation at the higher conservative design loads.

With respect to the crankshaft, the results and significance of the 10^7 cycle endurance tests are manifestly relevant and important to this hearing. If inspection of the 13 X 12" replacement crankshaft following the completion of 740 hours of operation at 3300 kw or above discloses no cracks, then LILCO believes this will be conclusive evidence of the crankshaft's adequacy at this load. By the same token, LILCO agrees that evidence of cracks developing in the crankshaft in the course of the 740 hour run would be relevant to the Board's consideration of this contention.

Also, in LILCO's view, it is appropriate to limit the reopening to permit those parties who previously performed DEMA forced torsional vibratory stress calculations the opportunity to reperform the same calculations for a load of 3300 kw. But

LILCO firmly believes that this reopening of the record should not be an opportunity for a party to introduce calculations not previously included in its testimony. Thus, the County, which did not previously perform and introduce any DEMA forced torsional vibratory stress calculations at 3500 or 3900 kw, should not now be able to introduce the results of any calculations at 3300 kw.

The limitation of the reopening to DEMA forced torsional vibratory stress calculations is warranted because DEMA is the standard stated in the LILCO specification and the FSAR, and it is the only standard stated to be applicable by the Staff. While there has been substantial testimony concerning other standards (e.g., ABS), there is no compelling reason to permit new calculations relating to any of these. In any event, should the Board conclude otherwise, LILCO firmly believes that no new calculations should be permitted concerning the crankshaft by any party unless that party can demonstrate that it had previously performed and introduced into evidence the same calculation based upon the former conservative design loads.

With respect to the engine blocks, evidence concerning the strain gauge tests and results relating to the cam gallery

is manifestly relevant and material. The Staff requested the tests to confirm its consultant's and FaAA's conclusion that the vertical stresses which would drive growth of the cracks in the cam gallery if growth were to occur are compressive throughout the operating range of the engine. Significantly, the parties have had this data in their possession for more than ten days and there should therefore be little or no delay in the ability of all parties to present testimony concerning the results of this data.

As counsel for LILCO advised the Board (and as reflected in SNRC-1094), inspections of the cam gallery and block top areas will also be performed at the conclusion of the endurance run. LILCO does not currently believe that it is necessary to supplement the record with the results of these inspections. With respect to the cam gallery, the prior analysis already presented in testimony at great length, supplemented by the confirmatory strain gauge data, demonstrates and confirms that stresses in the cam gallery area are compressive and that even deep cracks in the original 103 block have not propagated and the much shallower indications in the 101, 102 and replacement 103 blocks will not propagate. Similarly, results of the block top inspection do not now appear necessary to the record. The

FaAA analysis already in the record at great length conservatively assumes the existence of ligament cracks and, on this assumption, demonstrates that the blocks can perform their intended function during a LOOP LOCA event with very substantial margin. Should the inspection detect ligament cracks, this would not affect the analysis or margins already demonstrated in the testimony presented. Should ligament cracks not be present, this would only serve to demonstrate the conservative nature of the analysis and to increase further the substantial margins already demonstrated in the record. In any event, LILCO will make available to the parties the results of both inspections so that any party may present a focused request for supplementation to the Board should they believe the results demonstrate relevant new information. LILCO's litigation schedule set forth below assumes that evidence of these inspections will be offered by some party.

LILCO proposes the following pre-hearing and hearing schedules based on its proposal for limited supplementation and reopening of the record described above.

Pre-Hearing Schedule

Endurance test	Completed November 2, 1984
Cam gallery strain gauge data	Completed and distributed to the Board and parties October 29, 1984
Post-test inspection on crankshaft	To be completed November 15-20, 1984
Cam gallery and block top inspections	To be completed November 15-20, 1984
Documents reflecting basis for 3300 kw qualified load	To be made available to the parties by November 12, 1984

Hearing Schedule

Discovery cutoff	December 5, 1984
LILCO's additional testimony due	December 12, 1984
County's additional testimony due	December 19, 1984
Staff's additional testimony due	January 4, 1985
Hearings commence	January 14, 1985

As counsel for LILCO advised the Board, LILCO currently believes that this additional litigation should take no more than two or three weeks in light of the limited and focused purpose of the additional testimony and in light of the fact

that there is already a very substantial record on these issues relevant to the new, qualified load as well as to the former conservative design loads.

LILCO's request for a limited reopening and supplementation of the crankshaft and block records meets the appropriate legal standard, timeliness and importance.^{9/} The record on blocks has not yet closed. Indeed, only LILCO's panel has been fully cross-examined; cross-examination of Staff and County panels on this issue remains to be completed. While the crankshaft record is closed, only LILCO's findings have been filed and no decision has been written. Under these circumstances and given that it is the applicant who seeks the reopening, the cases setting forth and applying the familiar reopening standard are not entirely applicable.^{10/} Rather, the

^{9/} NRC cases do not establish a clear standard for supplementation of the record. Since supplementation involves matters which are the subject of ongoing hearings, it makes sense to apply a lesser standard than for reopening where litigation of the case or a major part of it has been completed. For present purposes, however, it is a distinction without a difference since, as demonstrated below, the reopening standard is met.

^{10/} The familiar reopening standard requires that (1) the motion be timely, (2) new evidence of a significant safety or environmental question exist, and (3) the new evidence might

(footnote continued)

more appropriate standard is that the request be timely and that the supplementary information or evidence be of substance and importance. This point was well stated by a Licensing Board faced with a request to reopen a record after findings had been filed but before a decision had been reached:

Many of the cases cited to us by the parties are addressed to motions to reopen the record of a case after an initial decision on all or a portion of the record has been written. Those precedents are not applicable here. Instead, we need only find that OCRE's motion is timely and that it raises an issue of substance. We need not find that it would change the result of an issue that we have not yet decided, even though findings of fact have already been filed.

(footnote continued)

materially affect the outcome. See Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), LBP-83-57, 18 NRC 445, 476 (1983); Duke Power Co. (McGuire Nuclear Station, Units 1 and 2), ALAB-369, 15 NRC 453, 465 (1982); Kansas Gas and Electric Co. (Wolf Creek Generating Station, Unit 1), ALAB-462, 7 NRC 320, 338 (1978). This standard is met here only if the Board were to determine that the evidence already submitted was not adequate to warrant the issuance of a license at 3500 kw. Given that the Board has not yet reached its decision, LILCO believes that the appropriate and efficient course of action is to proceed now to supplement the record to include this important new evidence, even if the traditional standard applies. Cf. Tr. 19,353-62 (this Licensing Board received copies of Budnitz deposition but deferred final judgment on reopening and admitting this testimony until the time of decision).

Cleveland Electric Illuminating Co. (Perry Nuclear Power Plant, Units 1 & 2), LBP-83-52, 18 NRC 256, 257 (1983).

The reopening of the record by an applicant also presents important policy questions that need to be considered by the Board in ruling on such a request. Under the traditional reopening standard, the movant must show that the issue is significant and is likely to have an effect on the outcome of the case. Where an applicant has developed new information which relates to an important matter in dispute, it is faced with a significant dilemma. Under traditional analyses, to meet the reopening standard, the applicant must essentially concede that its proof to date is insufficient in order to argue that the new information is likely to affect the result.^{11/} On the other hand, the applicant may defer any attempt to inject the new information until after the Board rules on the merits. If the ruling is adverse, the applicant can seek reopening. But the applicant then risks being told that its motion is untimely and incurs substantial delay by waiting until the case is decided to present its new evidence.

^{11/} In the instant case, LILCO firmly believes it has met its burden of proof with the evidence to date. The new information in question simply shows that there are greater margins of safety than the record already reflects.

At least one licensing board has recognized that the reopening standard is not entirely symmetrical. In Texas Utilities Electric Co. (Comanche Peak Steam Electric Station, Units 1 and 2), LBP-84-10, 19 NRC 509 (1984), the Board applied a more lenient standard to an applicant's request to reopen:

We are permitting Applicant to reopen the record without a showing of good cause because it does not seem to us logical or proper to close down a multi-billion-dollar nuclear plant because of a deficiency of proof. While there would be some "justice" to such a proposition, there would be no sense to it.

Furthermore, we note that intervenors receive several procedural advantages in our proceedings that also are not fully symmetrical and that compensate for the application of different standards for reopening the record.

19 NRC at 530.

The application of a different standard to an applicant's motion to reopen is consistent with the approach taken by the Appeal Board in Commonwealth Edison Co. (Byron Nuclear Power Station, Units 1 and 2), ALAB-770, 19 NRC 1163, 1169 (1984). There, as here, additional inspections and other activities with the potential to affect the Licensing Board's decision were underway before the conclusion of the hearings. That

Licensing Board declined to delay its decision to consider these significant activities. The Appeal Board reversed, holding that the Licensing Board should have provided for further proceedings to allow that applicant to introduce additional evidence.^{12/} In essence, the Appeal Board recognized the principle that licensing boards should be flexible in permitting applicants to introduce additional evidence of the sort here in issue.

Finally, policy considerations dictate that the traditional reopening standard is inappropriate here. First, its application would tend to discourage additional analyses or confirmatory tests. If it is difficult to reap the benefits of such data, applicants may be unwilling to expend time and resources pursuing additional information. This is particularly true since the applicant runs the risk that any unfavorable information which is developed would likely form the basis for reopening the record by the Board or other parties. See Texas Utilities Electric Co. (Comanche Peak Steam Electric Station, Units 1 and 2), LBP-84-10, 19 NRC 509, 530-31 (1984). Thus,

^{12/} This decision is more fully discussed in LILCO's Status Report dated October 17, 1984, pages 5-7.

sound policy dictates that applicants be given a reasonable opportunity to present such information if it is favorable. Second, strict application of the reopening standard would tend to postpone all decisions about the use of new information favorable to the applicant until after a decision had been rendered. This would introduce unnecessary delays into the licensing process.

As a consequence of the above, LILCO believes that the appropriate inquiry when an applicant moves to reopen the record is whether the new information is timely and whether it relates to a significant issue. Given that any reopening is likely to delay the licensing process, there should be a strong presumption of significance when the applicant seeks to reopen. The Board should permit reopening unless it is patently clear that the matter is cumulative or tangential.

LILCO's motion meets the appropriate standard for reopening. First, LILCO's request is timely. Indeed, much of the evidence LILCO believes should be added to the record is not yet even available, including specifically the results of the crankshaft endurance test.^{13/} Although development of the

^{13/} In any event, as one Board has correctly noted, "the timeliness inquiry is clearly subsidiary to the significance of the

(footnote continued)

qualified load has been underway for several months, this load was not finally determined until October 15. LILCO promptly submitted a status report to the Board and parties on October 17, 1984 and later advised the Board of its proposal for hearing evidence related to the qualified load. This written motion is being submitted pursuant to the discussions held before the Board on October 30 and November 1, 1984. Thus, LILCO has kept the Board and parties apprised of the developments of the qualified load and informed all concerned of its intentions within a reasonable time.

Second, the subject matter of LILCO's motion is a substantial issue. The actual load to be carried by the diesel generators following an accident is central to conclusions concerning diesel generator reliability. For example, it is undisputed that the stresses experienced by the crankshaft are directly affected by the loading of the machines. Moreover, the undisputed record establishes that the lower the load, the lower the stresses on the crankshaft. Thus, establishing a

(footnote continued)

material to be considered." Consumers Power Co. (Midland Plant, Units 1 & 2), 18 NRC 242, 249 (1983). See also Vermont Yankee, ALAB-138, 6 AEC 520, 523 (1973).

qualified load level of 3300 kw, well below the former conservative design load levels of 3500 kw continuous and 3900 kw overload, may have a direct and substantial bearing on the conclusion this Board must reach.14/

For all the reasons stated herein, LILCO respectfully requests that the Board permit the reopening and supplementation of the record requested in this motion.

Respectfully submitted,
LONG ISLAND LIGHTING COMPANY

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14/ See pages 1-11 for a more detailed discussion of the significance of the new evidence LILCO intends to submit.

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DATED: November 6, 1984

CERTIFICATE OF SERVICE

In the Matter of
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Docket No. 50-322 (OL)

I hereby certify that copies of LILCO's Motion (A) For Limited Supplementation of The Diesel Generator Engine Block Record And (B) For Limited Reopening Of The Diesel Generator Crankshaft Record were served this date upon the following by first-class mail, postage prepaid, or by hand as indicated by an asterisk:

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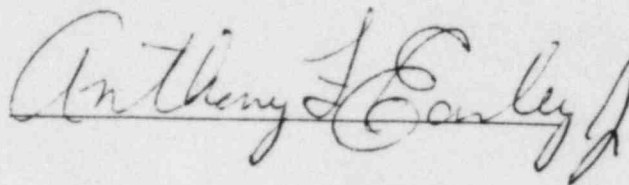
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A handwritten signature in cursive script, reading "Anthony J. Carley". The signature is written in dark ink and is positioned to the right of the typed names of the other attorneys.