



LONG ISLAND LIGHTING COMPANY

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MILLARD S. POLLOCK
VICE PRESIDENT - NUCLEARSNRC-859
March 16, 1983

Mr. Richard W. Starostecki, Director
Division of Project and Resident Programs
U.S. Nuclear Regulatory Commission, Region I
631 Park Avenue
King of Prussia, PA 19406

NRC Inspection No. 82-35
Shoreham Nuclear Power Station, Unit No. 1
Docket No. 50-322

Dear Mr. Starostecki:

This letter responds to your letter of February 24, 1983, which forwarded the report of the routine inspection of activities authorized by NRC License No. CPPR-95, conducted by Messrs. J. C. Higgins and P. Hannes of your office on November 30 - December 31, 1982. Your letter stated that it appeared that one of our activities was not conducted in full compliance with the NRC requirements.

The report states that the test of one emergency diesel generator was performed in a manner that constituted an apparent noncompliance with 10CFR50, Appendix B, Criterion XI.

LILCO has thoroughly reviewed the conduct of the test in light of your inspection findings. As an attachment to this letter, please find our responses to your concerns.

In accord with discussions with your staff it is my understanding that upon receipt and review of our response to this issue, we are to meet with appropriate NRC Staff personnel to further define the rationale behind the decisions made in the conduct of this test.

The responsible personnel in the LILCO organization are available to meet with you at your earliest convenience.

Very truly yours,

*M. S. Pollock*M. S. Pollock
Vice President-Nuclear

cc: Mr. J. Higgins,
All Parties
Attach.

STATE OF NEW YORK)
 : ss.:
COUNTY OF NASSAU)

MILLARD S. POLLOCK, being duly sworn, deposes and says that I am a Vice President of Long Island Lighting Company, the owner of the facility described in the caption above. I have read the Notice of Violation dated February 25, 1983, and also the response thereto prepared under my direction dated March 16, 1983. The facts set forth in said response are based upon reports and information provided to me by the employees, agents, and representatives of Long Island Lighting Company responsible for the activities described in said Notice of Violation and in said response. I believe the facts set forth in said response are true.

Millard S. Pollock
MILLARD S. POLLOCK

Sworn to before me this
16th day of *March*, 1983

Rosa Lee Oliveros

ROSA LEE OLIVEROS
Notary Public, State of New York
No. 60-170063
Qualified in Nassau County
Commission expires Mar. 30, 19*84*

ATTACHMENT 1

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NRC Inspection Report No. 50-322/82-35 (page 8, item 6, Diesel Generator Testing) expressed concerns over the performance of Shoreham Preoperational Test PT.307.003B, "Emergency Diesel Generator 102 Electrical Test". The following includes the NRC concerns and LILCO's response for each observation:

1. NRC Concern:

Among other purposes the test was designed to fulfill an FSAR commitment to paragraph C.2.a. of Regulatory Guide 1.108, "Periodic Testing Of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants", which requires a 24 hour full load test. Twenty two hours of this test are to be run at the Diesel Generator's (LG's) continuous rating (100% or 3500 KW) and two hours of the test are to be at the Diesel Generator's two hour rating (3900 KW). Regarding the 2-hour portion of the test, the inspector noted inconsistencies within the test requirements. Specifically, step 8.5.4 of the test calls for a load between 3850 KW and 3900 KW for two hours; while the acceptance criteria associated with this step (step 10.4) specifies a load of 3900 KW for at least 2 hours.

LILCO Response:

In generating the criteria for test performance, the Test Engineer utilized the 2 hour rating of the diesel generator set (3900 KW) per Shoreham Specification SH1-089 as an upper limit for the performance of the step and used 110% of generator design rating or 3850 KW as the lower limit for the specified 2 hour load test. The 110% rating was specified in the DeLaval Diesel Generator Instruction Manual as the overload capacity for 2 hours in any 24 hour period. As a result of interviews with the Test Engineer, LILCO determined that it was the Test Engineer's judgment that this would be the desired operating range for the "load equivalent" to the diesel generator 2 hour rating per Regulatory Guide 1.108 (August 1977). This load range was approved by the Joint Test Group (JTG). LILCO is not aware of any guidance available on what constitutes a "load equivalent" as that term is used in Regulatory Guide 1.108.

When establishing final acceptance criteria in step 10.4 the Test Engineer chose to specify 3900 KW as the load equivalent to the 2 hour rating of the diesel generator set. In the Test Engineer's view, the range specified in step 8.5.4 accomplished this objective. Therefore, while the acceptance criteria and the range specified in step 8.5.4 are apparently inconsistent, the difference has no substantive effect on the validity of the test. In order to eliminate any possible confusion the test procedure to retest the high load operation has been changed to make the relevant step in the test and the acceptance criteria clearly consistent.

2. NRC Concern:

The NRC inspector also noted test data which did not meet the acceptance criteria. No test exceptions in this area were noted, and the results were signed by the Test Engineer, witnessed by Operational Quality Assurance, and approved by the Joint Test Group.

The data to support these steps was recorded in Table II every 15 minutes from 1700 to 1900 on May 26, 1982 as follows:

<u>TIME</u>	<u>KW</u>
1700	3700
1715	3700
1730	3850
1745	3800
1800	3800
1815	3800
1830	3850
1845	3850
1900	3500

The licensee also recorded some data on a high speed chart recorder, including kilowatt load values. These charts were not officially part of the test results but were referred to by the Test Analysis Report. The load values on the charts were generally higher than those recorded in Table II. Throughout the 2-hour load test the chart recorder was run for approximately 5 minutes out of each 15 minute interval. The inspector reviewed the chart papers and noted some times when load was above 3900 KW and others when load was below 3700 KW. The inspector noted that neither the load values on the charts nor in Table II were sufficient to meet Regulatory Guide test requirements.

LILCO Response:

At the outset, it should be noted that the high speed chart recorder (Honeywell Visirecorder) output was part of the test data. This high speed recorder was listed in procedure Section 7.0 "Special Test Equipment" as one of the devices to be used in implementing this test and its operation is called for in various steps in Section 8.0 of this test. In addition, the Test Analysis Report for the procedure describes the calibration and use of the charts in collecting and evaluating data.

In the Test Analysis Report, the discussion of step 10.4 deals with the evaluation of the acceptance criteria for the 2 hour test. Although the section specifically cites the results in Table II, it also notes that strip chart data were recorded during the two hour load test. Interviews with the

Test Engineer involved confirmed that he did rely on both Table II and the strip chart results in concluding that the intent of the acceptance criteria had been met.

In accordance with procedure Section 8.5 the Test Engineer instructed the control room operators to bring the diesel to load at 1700 hours on May 26, 1982 while connected to the LILCO transmission system for the 2 hour test. He further instructed the operators not to make any load adjustments. The decision was made to conduct this test connected to the LILCO transmission system because sufficient Category I load was not available on the bus which diesel generator 102 supplies. LILCO has since confirmed that this is the only way high loading can be accomplished. The Test Engineer told the operator not to make load adjustments during the test because, in his view, this would closely simulate actual accident conditions. In an interview the Test Engineer explained that FSAR Table 8.3.1-2 indicates that operator action is not required during the first ten minutes of a LOCA. He believes that, consistent with this approach, it was appropriate to establish the load on the diesel for this test and then not allow the operator to intervene.

As a result of these decisions, the test was conducted with a load profile exhibiting fluctuations. These fluctuations were attributable to the fact that the diesel generator, a relatively small generator, was loaded on a large grid and thus it was affected by demand on the grid. As it happened, the load test was conducted during the time of day when load on the grid was fluctuating as is dropped from its peak for that particular day.

The data obtained during the test is presented in the attached graph entitled Emergency Diesel Generator Load Test, Emergency Diesel Generator 102 - PT.307.003B (Step 8.5.4). This attachment presents load data versus time for the diesel generator 2 hour rating test period and plots data taken from both the control room load indicator, which was recorded in Table II of the test procedure, and from the visirecorder charts. It should be noted that the load profiles from the visirecorder charts and control room indicator do differ. In fact for the 2 hour test period, the visirecorder charts show a general load profile ranging from a high load of 3975 KW to a low load of 3650 KW while the control room indicator load profile indicates a load between 3700 KW and 3850 KW. (The final control room data point was 3500 KW but it was confirmed that this reading was taken after the load was reduced at the end of the test.) The Test Engineer utilized the chart recorder as a more accurate indication of load because the control room load meter was responding to load fluctuations. In fact, the strip chart recorder has now been designated as the primary instrument to be used in the re-performance of this high load test.

Based on all of the above factors it was the Test Engineer's judgment that the intent of the diesel generator 2 hour rating load test had been satisfied. LILCO has since determined that the integrated load profile (KW-hours) for the strip chart recorder for the two hours represents a loading of 99% of the total load that would result from running the diesel generator for 2 hours at exactly 3900 KW. LILCO believes, however, that the Test Engineer's judgments and their basis should have been more explicitly noted in the test report.

Because the Test Report did not adequately discuss the Test Engineer's judgments concerning the acceptability of the test, those judgments were not brought to the attention of the Joint Test Group for specific consideration. While the Joint Test Group review of these particular test results was quite extensive (including seventeen pages of comments), the Group did not note the discrepancy between the raw data and the acceptance criteria. This oversight is not an indication of Joint Test Group inattention to the Shoreham test program. Rather, there has been significant involvement by the Joint Test Group in diesel generator testing since it began. The involvement is indicated by actions taken in November 1982 at which time, the Joint Test Group decided to add an extended run on all three emergency diesel generators to the test program to provide further assurance that the engines will operate as designed. These extended runs will be for a minimum of 72 hours at a load consistent with that expected during a long term LOCA event. This decision preceded the first contact by NRC on the concerns associated with the diesel generator preoperational test covered by this inspection report.

It should also be stressed that the review process for the test results in question had not been completed at the time the NRC Inspector made his observations. The review process established by LILCO to assure multiple reviews of the pre-operational test program entails a fourfold review process by the Test Engineer, Joint Test Group, Operational QA and the Review of Operations Committee, each an independent group. This test package had not yet been reviewed by OQA in accordance with established OQA audit procedures, and it had not been reviewed and accepted by the Plant Staff Review of Operations Committee (ROC) in accordance with Plant Staff review procedures. LILCO believes that the discrepancy between the test results and the acceptance criteria would have been identified by ROC and OQA.

In addition to the above items, the NRC inspector noted several additional discrepancies:

3. NRC Concern:

Data was crossed out and re-entered and data was written over.

LILCO Response

The test procedure has been re-examined to evaluate the reasons for and impact of cross-outs and write-overs. A number of cross-outs and write-overs were as a result of the test results review process by the Joint Test Group (JTG). The JTG had requested that the Test Engineer clarify certain recorded data to be consistent with the procedure nomenclature. Examples of these clarifications are:

1. In several steps, the Test Engineer recorded time units of seconds instead of the actual minutes; this error was corrected.
2. The Test Engineer recorded a Test Change Notice (TCN) by the TCN step only instead of the standard practice of "TCN #1, Step ____"; this was corrected.
3. In Table II, Operations personnel inadvertently recorded "Diesel Gen. Load" as 35 KW instead of 3500 KW. The control room diesel generator load indicator has major graduations of 0, 10, 20, 30, 40, 50 and 55 KW with a x100 factor applied. The Test Engineer added "00" to standardize the engine load nomenclature.

LILCO has evaluated the cross-outs and write-overs in the procedure and determined that they do not affect the test results.

4. NRC Concern:

At 1700 on May 26, diesel generator load was increased above 3600 KW even though at 1645 engine operating temperatures were still increasing, in apparent conflict with the intent of Step 8.5.3.

LILCO Response:

Step 8.5.3 requires the diesel generator to be operated at a load of 3500 to 3600 KW for one hour or until after engine operating temperatures level off. This requirement is in the alternative, both conditions need not be met. The unit was operated at the required load for one hour and therefore the requirements of step 8.5.3 were met even though the operating temperatures had not leveled off.

5. NRC Concern:

Table II engine parameters for Step 8.5.3 were only recorded every 15 minutes vice every 10 minutes.

LILCO Response:

During the test, it took the data takers approximately 10 to 15 minutes to record the parameters required for for Table II. Therefore the procedural requirement of taking data every 10 minutes could not be met. It was the Test Engineer's opinion that taking the data every 15 minutes instead of every 10 did not effect the test results. LILCO has re-evaluated this decision and finds it to be acceptable. A test exception, however, should have been taken to explain the change in data taking.

6. NRC Concern:

Paragraph 10.4 of the acceptance criteria states that the Diesel Generator should be capable of carrying its design loads while maintaining its cooling system within design limits. The Test Analysis Report for paragraph 10.4 states that the data taken in Table II demonstrates that this criteria is met and that the Diesel Generator is capable of carrying its ratings while maintaining the cooling system limits of Table IV. Nevertheless:

1. Table IV gives Lube Oil Pressure parameters as 45 to 55 pounds per square inch (psi), while recorded values were 55.5 psi; and,
2. Table IV gives jacket water temperature parameters as 170 to 180 degrees Fahrenheit (°F) yet jacket water inlet temperature was as low as 158°F and outlet temperature was as low as 162°F.

LILCO Response:

The test results indicated that the lube oil pressure (55.5 psi) was slightly above the Table IV range 45 to 55 psi and that the outlet jacket water temperature (162°F) was lower than the Table IV range 170° to 180°F. (The inlet jacket water temperature is not defined for these load conditions and is used only for monitoring standby conditions). Since the oil pressure and outlet jacket water temperatures showed the diesel generator to be operating in a more conservative manner than anticipated by Table IV, the Test Engineer evaluated the diesel operation to be acceptable.

Moreover, the deviation in the lube oil pressure from the value specified in the test is less than the accuracy of the gage, which is two pounds. The Test Engineer, however, should have explained his conclusions in the Test Analysis Report or as a test exception.

LILCO has confirmed the validity of the Test Engineer's judgment. E&DCR #F-44795A issued February 15, 1983 revised

the DeLaval Diesel Generator Instruction Manual, modifying the ranges of jacket water outlet temperature and lube oil pressure. This revision was based, in part, on a review of field and factory data. DeLaval concurred in this manual change as required by LILCO's procedures. The appropriate temperature and pressure values recorded in the procedure Table II fall within the new permissible ranges.

LILCO Corrective Action

1. As discussed with Region I personnel in your offices on January 25, 1983 during the meeting to discuss the results of the Readiness Assessment Team Inspection (50-322-83-02), LILCO committed to re-perform the Emergency Diesel Generator 102 24 hour high load test runs to alleviate any concern about the ability of the diesel generator to successfully operate under maximum service conditions. In addition it should be noted that in light of recent modifications and reworks to the 102 emergency diesel generator it would have been necessary to re-perform the high runs independent of the NRC concerns expressed.
2. As already noted, the LILCO Joint Test Group has added a 72 hour test of the diesel to give further assurance that the diesel will be capable of operating under accident conditions. The decision to take this action was made in November 1982 prior to the time the NRC identified the concerns discussed in this inspection report.
3. To give additional confidence to the adequacy of the preoperational test results for the emergency diesel generator 102 electrical test, the Joint Test Group will reopen this procedure for review and the package will be reevaluated by the Joint Test Group along with participation of the ROC-Preoperational Test Results Review Subcommittee.

LILCO Preventative Action

1. The Startup Manager has reviewed the circumstances associated with the concerns expressed in this inspection report with the Shoreham Startup Staff (including Test Engineers and Startup Management), the Joint Test Group and the ROC-Preoperational Test Results Review Subcommittee. This review stressed that:
 - a.) Test Engineers must ensure that judgments made during testing are adequately documented either in the Test Analysis Report or test exceptions.

b.) Preoperational test reviewers must ensure that raw data is reviewed to ensure that it supports the conclusions stated in the test procedure and Test Analysis Report, and that there is adequate justification for any test exceptions noted.

2. The OQA Engineer has reviewed the concerns raised in this inspection report with the OQA inspector involved in this test as well as other OQA inspectors involved in the diesel generator test program emphasizing the need to verify the acceptability of test results.
3. After a thorough review of the circumstances discussed in this inspection report, LILCO believes it is an isolated instance caused by the Test Engineer's failure to document properly the judgments made in the conduct of the diesel generator load test. LILCO believes this is an isolated instance for several reasons. First, fifty three (53) completed test procedures were reviewed by Torrey Pines Technology as part of the independent assessment of the Shoreham facility performed during 1982. This number represented 100% of the test procedures completed and approved by JTG at that time. The results of the Torrey Pines investigation (taking in excess of 450 manhours to complete) showed no instances where preoperational test results did not meet acceptance criteria. Second, through March 8, 1983 there have been a total of 94 preoperational tests approved by the Joint Test Group, almost all of which have now received approval by the plant Review of Operations Committee or the Preoperational Test Results Review Subcommittee (PTRRS) of ROC. In addition more than 75% of those procedures have completed final QA audit by the Operational Quality Assurance organization. For the procedures audited by OQA, or reviewed by ROC or the PTRRS, no instances of undocumented deviations from acceptance criteria have been found. Finally, the NRC has (as of March 4, 1983) reviewed 93% completed preoperational tests that have been approved by the Joint Test Group. No other instances of failure to meet acceptance criteria have been noted in this review.

To confirm LILCO's conclusion that this was an isolated event, LILCO is undertaking an evaluation of those test procedures currently in a state of review similar to the procedure involved in this I&E Inspection Report. This review will be conducted by a certified Level III Test Engineer from Stone & Webster, Boston. There are four test procedures that will be reviewed as part of this program.

4. Prior to the identification of the NRC's concern in this matter, LILCO recognized the need to ensure thorough and timely review of completed test procedures during the busy period prior to fuel load. In November 1982, ROC still had to review over half of the total preoperational tests prior to fuel load. Therefore on December 10, 1982 LILCO created a subcommittee of the ROC and modified the review process for attaining Joint Test Group approval of preoperational test results. Under the new process, review and approval by the ROC-Preoperational Test Results Review Subcommittee is required prior to the Joint Test Group approval of the preoperational test results. The Preoperational Test Results Review Subcommittee consists of the Shoreham Plant Operations Engineer, Instrumentation and Control Engineer, Reactor Engineer, and Maintenance Engineer. Three of the four personnel involved in this subcommittee hold a Shoreham NRC Senior Reactor Operator License. This change in procedure for Joint Test Group approval provides a more timely review of the test results by members of the Plant Review of Operations Committee and gives the JTG the benefit of the additional knowledge of the Preoperational Test Result Review Subcommittee prior to JTG approval. Completed test procedures must still be given a final review by Operational Quality Assurance and the full Review of Operations Committee.

PT. 307003B TABLE II DATA

EMERGENCY DIESEL GENERATOR LOAD TEST

EMERGENCY DIESEL GENERATOR LOG - PT. 307003B (CONT'D) 2-5-6

LEGEND:

- △ Indicates data extracted from Ship Charts
- Indicates PT. 307003B Test Data

