LONG ISLAND LIGHTING COMPANY
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MILLARD S. POLLOCK
VICE PRESIDENT-NUCLEAR

March 16, 1984 SNRC-1022

Mr. Richard 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 of January 2 - 13, 1984
Shoreham Nuclear Power Station - Unit 1
Report No. 50-322/84-01

Dear Mr. Starostecki:

In accordance with Title 10CFR Part 2.201, Attachment 2 of this letter provides LILCO's response to the Notice of Violation contained in Appendix A of your letter dated February 16, 1984 which forwarded the results of special safety inspection 50-322/84-01.

Our response includes (1) the corrective steps which have been taken and the results achieved; (2) the corrective steps taken to prevent recurrence of similar violations; and (3) the date when full compliance is expected to be achieved.

While we anticipate that you will find this response acceptable, please do not hesitate to call my office should you require further information or clarification regarding our reply.

Very truly yours,

M. S. Pollock

M. S. Pollock
Vice President-Nuclear
MSP:ck

Attachment

cc: C. Petrone
R. Caruso
All Parties Listed in Attachment I

AFFIDAVIT

STATE OF NEW YORK)
ss:
COUNTY OF SUFFOLK)

MILLARD S. POLLOCK, being duly sworn, deposes and says that I am the Vice President - Nuclear for Long Island Lighting Company, the owner of the Shoreham Nuclear Power Station. I have read the Notice of Violation dated February 16, 1984, and also the response thereto dated March 15, 1984 prepared under my direction. 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
16 day of March 1984

Jacqueline A. Ivone
JACQUELINE A. IVONE
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No. 01IV4601469, Suffolk County
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ATTACHMENT I
Diesel Generators

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ATTACHMENT 2

RESPONSE TO NOTICE OF VIOLATION

Violation

10 CFR 50, Appendix B, Criterion V, and Shoreham FSAR Section 17.1.5.A require that activities affecting quality be prescribed by and accomplished in accordance with appropriate instructions, procedures, or drawings.

Contrary to the above, the reassembly of Emergency Diesel Generator (EDG) 101 was not prescribed by and accomplished in accordance with an appropriate procedure. Step 32 in Section G of the Assembly Guidelines for EDG-101, requiring torquing of valve rocker arm assembly hold-down bolts, was omitted by an approved test exception. That omission resulted in untorqued hold-down bolts on three cylinders and in consequent bolt and subcover damage during engine test operation on December 30, 1983.

This is a Severity Level IV violation (Supplement II).

Response

Description of Event

At approximately 6:00 PM on December 30, 1983, Diesel Generator (DG) 101 was shutdown manually when an operator heard an unusually loud engine noise. Following this shutdown, it was found that the rocker arm shaft hold-down bolts had failed on the #3 cylinder, causing the rocker arms and vertical push rods to malfunction and strike other components. At this point, all testing was suspended on DG101, DG102 and DG103, pending resolution of the rocker arm problem discovered on DG101.

(1) Corrective steps taken and results achieved.

(a) An external and internal inspection was performed on DG101 to fully determine the causes of the failure of the rocker arm shaft hold-down bolts on cylinder #3, the extent of the damage caused by the malfunctioning cylinder #3 rocker arms, and the conditions of the rocker arms and shaft hold-down bolts for the other cylinders on the engine.

The rocker arm shaft hold-down bolts on cylinder #3 were found to have loosened, allowing the rocker arm to move out of position and causing one bolt to break in half and the other bolt to be severely bent. Also, the hold-down bolts on cylinders #4 and #7 were found to be loose. The looseness of these bolts was apparently due to the failure to torque them to the required 365 ft-lbs.

As discussed in NRC Inspection Report 50-322/84-01, the reason for the failure to torque the rocker arm shaft bolts and the failure to detect this omission during subsequent procedural reviews was due to inaccurate information provided to the Test Engineer at the time the exception to the torquing step was taken. The Test Engineer felt that there existed adequate justification for not torquing the rocker arm shaft bolts since he was informed (incorrectly) that they were not previously loosened. He was confident that there was no need to torque the bolts, and indeed, there is a risk associated with implementing a torquing procedure which calls for disassembly and reassembly of engine components (i.e., you run the risk of overtorquing, not reassembling properly, shearing bolts, etc.)

(b) For DG 101, the damaged components on the #3 cylinder were replaced, including the four hold-down bolts, the rocker arm assemblies, and the intermediate pushrods. In addition, the subcovers for the #3, #4 and #7 cylinders were replaced with subcovers of an earlier design which were left over from a previous voluntary subcover upgrading program.

For cylinders #4 and #7 on DG 101, NDE examinations were performed on the rocker arms, intermediate push rods, and rocker arm shaft hold-down bolts. Of the eight hold-down bolts for cylinders #4 and #7, six bolts were, as a conservative measure, replaced with new bolts from spares, and two existing bolts were reused. The existing rocker arms and intermediate push rods were reinstalled on DG 101 for cylinders #4 and #7. NDE tests indicated that these existing components were suitable for re-installation on the engine. However, as an additional conservative measure, new subcovers, rocker arm shaft hold-down bolts, rocker arm assemblies, and intermediate push rods will be installed on cylinders #4 and #7. A new subcover will also be installed on cylinder #3. This will occur following receipt of the necessary parts from Transamerica Delaval Inc.(TDI).

In addition to repairing the damaged components on DG101 for cylinders #3, #4 and #7, the rocker arm shaft hold-down bolts were checked for the proper torque for all the other cylinders on DG101, as well as all cylinders on DG102 and DG103. The results of this retorquing operation were that all hold-down bolts were found tight and torqued to the required 365 ft-lbs.

(c) An extensive re-review was performed of the DG101, DG102 and DG103 Assembly Guidelines in order to ensure that no unjustified exceptions were taken to the DG assembly procedures. These reviews centered on test exceptions taken in the guidelines, and verified through various documentation reviews or by other means that the work associated with any exceptions was adequately performed and QA witnessed. The results of this review were that all exceptions taken during the assembly of the DG units were technically justified, although minor non-technical clarifications were deemed necessary to certain exceptions. The results of these reviews were formally processed by the Joint Test Group and attached to the completed DG Assembly Guidelines.

(d) Following completion of the repairs on DG101, completion of the rocker arm shaft hold-down bolt torque checks on DG101, DG102 and DG103, and the reviews of the three DG assembly procedures, the Startup Manager formally released the DG units for continued testing. DG101 was released for testing on January 4, 1984; DG102 on January 5, 1984; and DG103 on January 7, 1984.

(2) Corrective steps taken to prevent recurrence of similar violations:

Following the discovery of the failure to torque specific rocker arm shaft hold-down bolts, LILCO undertook an extensive review program to examine the DG Assembly Guidelines for similar omissions, as discussed above. The results of this review were positive, and enabled LILCO to conclude that the engines were ready to proceed further with testing. The fact that the engine assembly effort was conducted under a rigorous and documented program, allowed LILCO to conduct a timely evaluation and correction of deficiencies. This has been evidenced by the fact that all subsequent testing of DG101, DG102 and DG103 and has been successfully completed without recurrence.

Specific steps taken by LILCO to ensure that similar occurrences are not repeated during the continuing DG recovery effort and preoperational testing program are:

(a) To enhance the flow of information among DG recovery personnel, and upgrade shift turnover procedures, the situation leading to the failure of the rocker arm shaft hold-down bolts was reviewed with the following individuals/groups, on the dates shown:

- The Joint Test Group, on 1/4/84.
- The Review of Operations Committee, on 1/5/84.
- Test Engineers assigned to the DG units, on 1/10/84 and 1/11/84.
- The Nuclear Review Board, on 1/11/84.

- Operational Quality Assurance personnel assigned to the DG units, on 1/11/84.

These meetings stressed the importance of providing accurate and timely information among various shifts, and the methods to be used to ensure only justified exceptions are taken to test or other procedures.

(b) Beginning on January 9, 1984, the LILCO Independent Safety Engineering Group (ISEG) began providing around-the-clock on-shift coverage of preoperational testing for the DG units. The ISEG coverage provides an independent technical review of the preoperational testing, including assurance that testing is performed in accordance with the Startup Manual.

The ISEG review and on-shift coverage was mandated by Executive Directive 84-01, issued January 10, 1984 by the LILCO Vice President - Nuclear. Project Plan ISEG-84-001 was approved to implement ISEG coverage of diesel generator preoperational testing. Six ISEG engineers (two per shift) have been assigned to the project on a full time basis. ISEG is empowered with "stop work authority" over diesel generator testing in the event that procedural violations or technical errors (or omissions) are observed which may affect the quality, the reliability, or the physical integrity of the emergency diesel generators.

(3) The date when full compliance will be achieved:

(a) With regard to retorquing of the rocker arm shaft hold-down bolts for DG101, DG102 and DG103, and reviews of the Assembly Guidelines for all three DG units, these activities were accomplished by January 7, 1984.

(b) Meetings with responsible individuals and groups, to review the events leading to the failure of the rocker arm shaft hold-down bolts and to discuss necessary corrective/preventative actions, were completed by January 11, 1984.

(c) Installation of a new subcover for cylinder #3 on DG101, and installation of new subcovers, rocker arm assemblies, intermediate pushrods, and rocker arm shaft hold-down bolts for cylinders #4 and #7 on DG101 (as discussed above), will be completed as soon as practicable following receipt of these materials from TDI; estimated delivery date is currently March 26, 1984.

(d) ISEG coverage began on January 9, 1984, and will continue until the DG recovery program is complete; ISEG review has included preoperational testing, as well as the Inspection Outage assembly and disassembly Procedures that are being currently performed on the DG units.