

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report No. 50-322/84-18

Docket No. 50-322

License No. CPPR-95

Licensee: Long Island Lighting Company
P. O. Box 618
Shoreham Nuclear Power Station
Wading River, New York 11792

Inspection At: Shoreham, New York

Inspection Conducted: April 23, 1984 - May 27, 1984

Inspectors: *C. Petrone*
C. Petrone, Resident Inspector

5/25/84
Date Signed

P. Eselgroth
P. Eselgroth, Senior Resident Inspector

5/25/84
Date Signed

Approved By: *E. McCabe*
E. McCabe, Chief, Reactor Projects Sect. 1C

5/31/84
Date Signed

Summary: April 23 - May 27, 1984 (317 hours)

The inspectors reviewed and closed out ten previous inspection findings and four Construction Deficiency Reports. Emergency Diesel Generator testing was observed, flooding of the radwaste building was investigated, and several spurious initiations of the fire alarm system were reviewed. No violations were identified. Licensee actions were found to be acceptable.

DETAILS

1. Persons Contacted

R. Gutman, Maintenance Engineer (L)
J. Kammeyer, Assistant Head SEO (S&W)
J. Kelly, Field QA Manager (L)
R. Lawrence, Startup Engineer (S&W)
W. Matejek, Lead Advisory Engineer (S&W)
A. Muller, OOA Engineer (L)
J. Notaro, Chief Modification/Outage Engineer (L)
J. Leonard, Vice President, Nuclear (L)
R. Purcell, Startup Manager (L)
J. Riley, Operational Manager (GE)
J. Smith, Manager Nuclear Operations Support Division (L)
W. Steiger, Plant Manager (L)
D. Terry, Chief Maintenance Engineer (L)
J. Wynne, Lead Compliance Engineer (L)
E. Youngling, Nuclear Engineering Manager (L)

GE - General Electric
L - Long Island Lighting Company
S&W - Stone and Webster

The inspector also held discussions with other licensee and contractor personnel during the course of the inspection.

2. Previous Inspection Item Update

(closed) Violation 84-01-01: Failure of Rocker Arm Assembly Hold Down Bolts of FDG-101 Due to a Test Exception. During reassembly of EDG-101, the shift test engineer took a test exception to bypass steps to torque (tighten) the rocker arm hold down bolts in the mistaken belief that these bolts had never been loosened. During initial run-in of this engine these bolts worked loose causing some damage to the rocker arm assembly. In their responses to the Notice of Violation (Pollock letter to Murley dated January 13, 1984; SNRC 1022 dated April 16, 1984; and SNRC 1043 dated May 1, 1984) the licensee detailed their corrective actions which included review of all test exceptions taken during the reassembly of the other two engines, re-review of completed assembly procedures by the Joint Test Group, briefing of shift personnel, and assignment of personnel from the Independent Safety Engineering Group (ISEG) to review on shift activities.

The inspector independently reviewed the test exceptions taken during the assembly of all three engines and did not identify any discrepancies. The inspector also observed on shift activities and noted the active participation of ISEG personnel. All reassembly and testing activities on the emergency diesel generators were well controlled and corrective actions effectively implemented. The inspector had no further questions.

(closed) Violation 83-10-02: This violation identified that a Temporary Change Notice (TCN) had not been incorporated into the official "in use" version of PT 307.005C. In response to this violation, the licensee instituted new administrative controls to insure that TCN's or other procedure revisions are incorporated into all controlled copies of the procedures. During routine observation of preoperational tests, the inspector made spot checks of the in-use procedures and did not identify any additional procedures which were out of date. This violation is closed.

(closed) Unresolved Item 83-07-02: Excessive Vibration of Emergency Diesel Generators. This item was identified prior to the crankshaft failures and the identification of additional concerns during the dis-assembly and inspection of the TDI emergency diesel generators. Following these events, the engines were rebuilt with the new, larger crankshafts and other improved parts. Subsequent torsional and linear vibration measurements were made and analyzed by the licensee. These results are being evaluated by the NRR TDI Task Group which will determine if the present vibration levels are acceptable. Since the concerns identified in this unresolved item are being addressed as part of the TDI diesel generator design review and quality revalidation program, this unresolved item is closed.

(closed) Construction Deficiency Report 83-00-03: "Cracks in TDI Emergency Diesel Generator Heads". Cracks in the cylinder heads of all three TDI diesel generators were identified by the licensee in March 1983. As an interim measure the licensee issued instructions to perform checks for jacket water leaks in all cylinders prior to each engine start. Subsequently, the licensee replaced all the cylinder heads with an improved design. Following this head replacement all three engines have accumulated several hundred hours of operation with no additional head cracks or jacket water leaks. However, the acceptability of the cylinder heads is under review by the NRR task group and will be addressed by them in a report to be issued at a later date. Based on NRR task group cognizance of resolution on this technical issue it is considered closed from the regional inspection records.

(closed) Construction Deficiency Report 83-00-09: COMSIP Containment Gas Analyzers. The licensee's 10 CFR 50.55(3) report identified a deficiency in the containment gas analyzer cell catalysts which made them susceptible to damage by gas samples containing iodine which would be present following a LOCA. The analyzers are used to measure primary containment oxygen and hydrogen concentrations both during normal and post accident conditions. Following a LOCA, the expected concentration of Iodine would reduce the usable life of catalyst to 8 - 10 days. To correct this problem, the licensee installed a new catalyst with an improved bed configuration. Vendor tests demonstrated the useful life of the new catalyst would exceed 120 days following a LOCA. Based on a review of the completed documentation including: E&DCR F-4443 and E&DCR F-4433A, which provided the installation instructions; and Repair/Rework Requests IT48-168 and IT49-172 which documented the results of the past installation leak test; the inspector determined that the new catalyst had been installed satisfactorily. The inspector verified that the leak test had been witnessed by a QA inspector. No discrepancies were identified.

(closed) Construction Deficiency Report 83-00-10: Diesel Generator #102 Crankshaft Failure. During preoperatioal testing, the crankshaft on EDG-102 broke in half. After extensive testing and analysis, the licensee concluded the crankshaft failed due to fatigue, caused by excessive torsional vibration, which resulted from inadequate design. New crankshafts with a one inch larger diameter crank pin were installed. Following replacement, each engine was run in excess of 450 hours; at least 100 hours of which was at or above 100% power. Non-destructive examination and torsional vibration analysis by the licensee indicated that the new crankshafts were not subject to the same excessive torsional vibration. Based on these results, and the inspectors observation that the new crankshafts completed the extensive testing intact, this item is closed. However, the NRR TDI Task Group is presently performing a detailed technical review of the test results and will make the final determination on the acceptability of the improved crankshafts.

The following unresolved items were written to document various problems associated with the Transamerica Delaval Inc. (TDI) emergency diesel generators and to ensure that an adequate review of these problems was performed. The licensee formed a TDI Owners Group to review and resolve these problems. Reports which address these unresolved items have been written and sent to the NRC TDI Task Group for their review. Since these reports have been issued, and responsibility for their review has been transferred to the NRR Task Group, the following unresolved items are considered closed:

(closed) Unresolved Item (84-02-03) Connecting Rod Bearing Defects:

(closed) Unresolved Item (84-02-04) Connecting Rod Wrist Pin Bushing Defects:

(closed) Unresolved Item (84-02-05) Cylinder Liner Crack; and

(closed) Unresolved Item (84-02-06) Turbocharger Low Oil Pressure.

(Open) Unresolved Item 82-26-07: This item identified that the four drywell analyzer lines have a single drain valve between containment atmosphere and the reactor building which did not provide the redundancy of isolation required by 10CFR50, Appendix A, Criterion 54. The Shoreham Safety Evaluation Report, NUREG-0420, Supplement No. 4, determined that the present design is acceptable for the interim period until the first refueling outage. When issued, the Shoreham operating license will contain the condition that two isolation barriers be installed in series in all instrument lines (which are not part of the automatic reactor protection system) by the end of the first refueling outage. This item is open pending installation of the barriers.

(closed) Unresolved Item 83-21-05: During a previous inspection, the Reactor Building Standby Ventilation System (RBSVS) was reviewed and found to differ from the description in the FSAR. Subsequently, the licensee issued Rev.31 to the FSAR which changed the system description to agree with the as-built condition of the system. The adequacy of the system was reviewed by NRR during their review of FSAR changes and by region-based inspectors during their on-going review of the RBSVS Preoperational Test results. This resolves the concerns identified in this item.

(closed) Unresolved Item 83-02-23: Capping Vents and Drains. This item identified the need to cap open ended vent and drain lines with single isolation valves to provide protection against uncontrolled releases of contaminated primary coolant or other radioactive liquids and gases, outside primary containment. The licensee issued procedure TP23.002.01, Rev. 0, which provided instructions to cap all vents and drains with single isolation valves (except those which discharge directly into a drain funnel) and to verify that the valves are closed. It also requires that both valves on double valved vent and drain lines be checked and verified shut. The inspector reviewed the procedure and noted that all valves had been verified shut and vents or drains had been capped as required. The inspector also toured the Reactor Building and inspected accessible vents and drains on the Reactor Core Isolation Cooling System (RCIC), the High Pressure Coolant Injection System (HPCI), the Residual Heat Removal System (PHR) and the Core Spray System (CS). No uncapped vents or drains with single valve isolation were identified other than those which discharged directly into a drain funnel. All valves appeared to be in the closed positions as required. No discrepancies were identified; this item is satisfactorily resolved.

(closed) Construction Deficiency Report 83-00-01, Square D Contactor Coils: This report identified a deficiency with certain contactor coils in 480 volt motor control centers. During accelerated aging tests, as part of the vendors on-going nuclear qualification to IEEE 323-1974, certain contactor coil materials used in older design coils were found to exhibit significantly shorter life than predicted. The licensee established a program to identify and replace the suspect contactor coils. The inspector reviewed the Engineering and Design Coordination Reports (E&DCR's) F44884, and E&DCR L-0137 and noted that they included appropriate instructions for the replacement and testing

of the contactor coils. Review of the completed maintenance work requests and the computer based status sheet indicated changeout of the suspect contactor coils had been completed. No discrepancies were identified and the inspector had no further questions.

3. Plant Tour

The inspector conducted periodic tours of accessible areas in the plant during normal, backshift, and weekend hours. During these tours, the following specific items were evaluated:

- Hot Work - Adequacy of fire prevention/protection measures used;
- Fire Equipment - Operability and evidence of periodic inspection of fire suppression equipment;
- Housekeeping - Maintenance of required cleanliness levels of systems under or following testing;
- Equipment Preservation - Maintenance of special precautionary measures for installed equipment, as applicable;
- QA/QC Surveillance - Pertinent construction and startup activities were being surveyed on a sample basis by qualified QA/QC personnel;
- Security - Adequate security for site construction and new fuel storage activities;
- Weld Rod Control - Observations to determine weld rod was being controlled per site procedures;
- Component Tagging - Implementation of appropriate equipment tagging for safety, equipment protection, and jurisdiction.

During these tours the inspector observed the checkout of the tools which will be used to install the neutron sources in the reactor vessel. The inspector noted that the source grappling tool and guide tool appeared to work well when handling a mockup source. The technicians were also setting up an underwater camera which will be used by the grappler operator during handling of the actual sources.

No discrepancies were identified.

4. Emergency Diesel Generators (EDG)

The licensee successfully completed the Integrated Electrical Testing (IET) of EDG-101 and EDG-102 on April 18, 1984 and turned these units over to the plant operating staff for performance of routine surveillance activities. The IET was witnessed by a region-based inspector who will document his observations in inspection report 322/84-11.

The resident inspector witnessed various routine surveillance testing activities of EDG-101 and EDG-102 including a "black start" (eg. no offsite power) test of EDG-101 on April 26, 1984. The inspector verified that the engine started, came up to speed, and picked up the required test load within the allowed 10 seconds. No discrepancies were identified.

Because the existing cracks on the cylinder block of EDG-103 were propagating, the licensee decided to replace it with a new cylinder block which incorporated several design improvements intended to reduce the possibility of cracks. The engine was moved to the turbine deck where it was disassembled and the old cylinder block removed. The new replacement cylinder block is expected on site May 28, 1984. Reassembly, reinstallation in the diesel generator room, and preoperational testing are scheduled to complete in September, 1984.

In the interim, the licensee is proceeding with construction of a new building to house the replacement Colt-Fairbanks Morse diesel generators. The first Colt diesel generator arrived on site May 19, 1984; the second is expected by the end of May, 1984 and the third by the first week in July 1984. Preoperational testing and integrated electrical testing are scheduled to complete in July, 1985.

The inspector will continue to observe and review the emergency diesel generator program.

5. Radwaste Building Flooding

On May 9, 1984 and on May 21, 1984 the Radwaste Building Floor Drain Filter Room floor became flooded by an estimated 7,000 gallons of uncontaminated water in the first instance and about 3,500 gallons in the second instance due to unrelated system malfunctions. These spillages, which would be expected to contain varying levels of contamination during normal plant operations, resulted in about two inches of water level on the floor on May 9 and about one inch of water on May 21.

On May 9 water was spilled from the regenerative evaporator portion of the liquid radwaste system at approximately 9 a.m. when a flexible rubber piping joint ruptured in the 12 inch discharge side of the regenerative evaporator pump. The rupture hole size was estimated to be 3/4 inch in diameter. The system was last run in November 1983 and was in wet layup at the time of the rubber joint failure. The system was not declared fully operational pending a modification to the Evaporator Bottoms Tank. The flexible joint failure, compounded by the Radwaste building floor drain sump pump (1G11-P-034A/B), being out of service for sump cleaning, caused minor flooding of elevation 15 from evaporator

(1G11-E-044) and reboiler (1G11-E-086) drainage. The need for cleaning of the floor drain sump had been reported two weeks prior to this occurrence on Maintenance Work Repair (MWR) 84-2823. By 11 a.m. on May 9, the Main Control Room was aware of the problem and cleanup of the waste liquid was completed by noon using temporary sump pumps. No damage to any equipment, other than the joint itself, was incurred during the flooding or the subsequent cleanup. Plant management was not informed of the flooding in the Radwaste Building until Friday, May 11.

On May 21, 1984, failure of two automatically operated valves in the Radwaste Building High and Low Conductivity Drain Systems caused an overflow of uncontaminated water from the Floor Drain Sump onto the Floor Drain Filter Room floor to a level of about 1 inch (approximately 3,500 gallons). Radwaste Building Equipment Operators discovered the spillage at approximately 8:45 p.m. on May 21, 1984 and secured the processing systems which drain to the Flow Drain Sump. The particular automatic valves found to have not operated properly were (1) a solenoid operated vent valve, SOV-342, in the High Cond. Drain System and (2) an air operated process valve, AOV-289B, in the Low Cond. Drain System. Plant management was informed at approximately 9:15 p.m. on May 21, 1984 and the water was cleaned up by the end-of-shift. The NRC Resident Inspector was not informed of the spill until approximately 1:30 p.m. on the following day.

Corrective Actions

1. Standing Order No. 17, Rev. 1, was issued effective May 14, 1984 to emphasize that the Emergency Call List is to be utilized during the prefuel load time period when any incident occurs which would result in entry into the Emergency Plan if the plant were operating. Plant Management was informed of the May 21, 1984 Radwaste Building flooding in a timely manner. Timely notification of an NRC Resident Inspector needs improvement.
2. The regenerative evaporator pump flexible rubber piping joint was removed and is being inspected to determine the cause of the joint rupture. Corrective action for this pipe joint and any necessary actions for other similar joints in the plant is being assessed. Plant records indicate that a design change request for the flexible joints on both the regenerative and waste evaporators, recir. pumps suction and discharge, was made on December 16, 1983 and EEAR 84-020 was issued on January 16, 1984.
3. The plant is investigating the causes of the SOV-342 and AOV-289B auto valve failures in the High and Low Conductivity Systems.
4. The plant is reviewing the apparent inability of the floor drain sump and associated pumps to handle the quantity of sump water additions experienced on May 21, 1984 without overflowing.
5. Plant Management has taken action to provide increased management attention to the resolution of outstanding Radwaste Building equipment problems by reviewing the status of these items at the weekly site managers meeting.

The plant's assessment of cause of the Radwaste Building equipment problems is an unresolved item (84-18-01) and will be reviewed during a subsequent inspection.

6. Fire Alarms/Personnel Safety

The inspector has observed that the occurrence of fire alarms in the Office Building Annex and Technical Support Center receives a mixed response from personnel with some leaving the building and others, who assume the alarm to be spurious based on past experience with the alarm system, remaining in the building. The fire alarms observed by the inspectors have been spurious.

The inspector discussed the observed alarm responses with plant management and the personnel safety hazard associated with regarding alarms as spurious without some announcement or confirmation that this is in fact the case. The plant has taken action to correct the spurious alarm problem and is reviewing what steps should be taken in the event of future fire alarm conditions to ensure that alarm response is consistent with maintaining personnel safety.

This safety concern is unresolved item (84-18-02) and will be reviewed during a subsequent inspection.

7. Unresolved Items

Areas for which more information is required to determine acceptability are considered unresolved. Unresolved items are contained in paragraph 5 and 6.

8. Management Meetings

At periodic intervals during the course of this inspection, meetings were held with licensee management to discuss the scope and findings of this inspection.

The Resident Inspectors also attended the entrance and exit meetings for inspections conducted by region-based inspectors during the period.