

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report No. 50-322/82-26

Docket No. 50-322

License No. CPPR-95

Licensee: Long Island Lighting Company

175 East Old Country Road

Hicksville, New York 11801

Facility Name: Shoreham Nuclear Power Station

Inspection at: Shoreham, New York

Inspection Conducted: September 9 - October 13, 1982

Inspectors: J. C. Higgins  
J. C. Higgins, Senior Resident Inspector

10/22/82  
Date Signed

P. H. Hannes FOR  
P. H. Hannes, Resident Inspector

10/22/82  
Date Signed

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Date Signed

Approved by: Robert M. Gallo  
R. M. Gallo, Chief, Reactor Projects Section 1A  
Projects Branch #1, DPRP

10/25/82  
Date Signed

Inspection Summary:

Inspections On: September 9 - October 13, 1982 (Inspection Report No. 50-322/82-26)

Areas Inspected: Routine onsite regular and backshift inspections by the resident inspectors (151 inspection hours) and a region-based inspector and supervisor (10 inspection hours) of work activities, preoperational testing, and plant staff activities including: tours of the facility, procedure review, test program implementation, review of NRC Bulletins and Circulars, review of Construction Deficiency Reports, test results review, review of drawings, review of the hydrogen and oxygen analyzers, review of anchor bolt installations, and followup on previous inspection items.

Results: Of the ten areas inspected, no violations were identified in nine areas and one violation was identified in the tenth area (failure to ensure prompt incorporation of changes into drawings, paragraph 7).

## DETAILS

### 1. Persons Contacted

M. Giannattasio, Asst. Construction Superintendent (L)  
R. Gutman, Maintenance Engineer (L)  
J. Kelly, Field QA Manager (L)  
W. Matejek, Lead Advisory Engineer (S&W)  
J. McCarthy, Section Supervisor - FQA (L)  
M. Milligan, Project Engineer (L)  
W. Museler, Manager, Construction and Engineering (L)  
K. Nicholas, Lead Startup Engineer (GE)  
R. Perra, Assistant Superintendent FQC (S&W)  
J. Ricardo, Lead Startup Engineer (S&W)  
J. Riley, Operations Manager (GE)  
J. Rivello, Plant Manager (L)  
C. Seaman, Senior Asst. Project Engineer (L)  
J. Smith, Manager, Special Projects (L)  
R. Werner, OQA Engineer (L)  
E. Youngling, Startup 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 including management, clerical, maintenance, operations, engineering, testing, health physics, security, quality assurance, and construction personnel.

### 2. Previous Inspection Item Update

#### 2.1 Items Closed

- 2.1.1 (closed) Unresolved Item No. (322/79-21-01): CRD insert/withdraw lines: In this item the inspector questioned the adequacy of the supports for the control rod drive (CRD) insert and withdraw lines. This item was updated in reports 82-01 and 82-12. In a construction deficiency report (No. 81-00-09) the licensee reported certain inadequacies in the design and support arrangement for the CRD lines. Reanalysis and rework is in progress. This item is closed and all followup will be under Item No. 81-00-09.
- 2.1.2 (closed) Unresolved Item No. (322/80-16-01): Data Sheet Format: The licensee stated, considering the training of Startup Technicians and Test Engineers handling the data sheets, that no format change was needed. The inspector reviewed completed sheets from CG-4 at various times over the last two years, particularly for instruments with non-linear scales, and identified no instances where the format contributed to procedural errors. Technicians had added desired values manually in the remarks column in a number of cases. The same sheet is contained in SP-41.002.01 for use by the plant operating staff.

A Station Procedure Change Notice to step 6, page 17 of SP 41.002.01 was initiated to indicate use of the remarks column for desired values of non-linear or non-standard readings. This addresses the concern for station procedures. This item is closed.

- 2.1.3 (closed) Deviation No. (322/82-02-03): Loose Parts Monitoring System Hardware: This item identified deviations from Regulatory Guide (R.G.) 1.133 in the physical separation of channels and the alert level alarm. The inspection report cover letter also requested that the response address actions to improve the management control system as it applied to the plant's conformance to FSAR and other licensing commitments. The licensee improved his management control systems by instituting a Shoreham Plant Configuration Review Program. This program is underway and will receive final review under unresolved item no. 81-02-05, FSAR Conformance. The licensee stated in his response letter (SNRC 677) that completion of this program was anticipated by fuel load. Letter SNRC 677 also stated that the licensee intended to justify an exception to the requirement for physical separation of channels. They have subsequently done this in letters SNRC 721 and 769 to the Office of Nuclear Reactor Regulation (NRR), dated June 28, 1982 and September 14, 1982. NRR will evaluate the acceptability of their proposal.

The licensee's response to the deviation (SNRC-677) also stated that an audible and an external visual alarm would be added to the loose parts monitoring system panel in the main control room to alert control room personnel that an alert level has been reached or exceeded. This has been completed under Change Control Form B21/06 and the E&DCR P-4011 series. The alarm was satisfactorily tested utilizing a Startup Form 8.7 and was turned over to the plant operating staff. The inspector observed the visual alarm in the control room, listened to an alarm test, and noted that the installation met the requirements of R.G. 1.133. This deviation is closed.

- 2.1.4 (closed) Unresolved Item No. (322/82-13-06): Test Procedure Modifications: The licensee has approved Startup Instruction No. 10, dated September 20, 1982, titled "Modifications to approved test procedures after tests commenced." This instruction provides the necessary clarification for test exceptions and test change notices. This item is closed.
- 2.1.5 (closed) Unresolved Item No. (322/82-14-07): Procedure for Documentation Packages: The licensee issued Resource Center Instruction 206, "Transmittal of LSU Documentation to Records Management (SR2)", dated July 26, 1982. This procedure details the contents of a completed System Turnover package, which is to be sent for permanent records microfilming. This item is closed.

## 2.2 Items Remaining Open

- 2.2.1 (open) Unresolved Item No. (322/80-11-01): Quality Assurance (QA) for Fire Protection: The licensee has included the Fire Protection Program into the Field Quality Assurance (FOA) or construction QA audit program. FOA Field Audit No. 1349 was performed to review the conformance of the various fire protection systems with applicable specifications, procedures, and FSAR commitments. Several discrepancies were identified and addressed. Field Quality Control (FQC) has commenced reviewing construction site purchasing of fire protection items. The licensee issued the LILCO Quality Assurance Manual on June 21, 1982 to cover QA during preoperational testing and station operation. Appendix I to this manual details the permanent station QA requirements to be applied to the fire protection program. Operational QA has included fire protection items into their surveillance program. The inspector also reviewed coverage of preoperational maintenance by QA and noted that numerous Repair/Rework Requests for the Fire Protection System over the last several months had designated the work supervisor to cover the QA function. The licensee reviewed this area and issued a memo dated October 18, 1982 from the OQA Engineer to the Startup Manager and Plant Manager calling for a QA review of all maintenance documents before the work is performed. This item remains open pending further review of the implementation of QA for the fire protection programs.
- 2.2.2 (open) Unresolved Item No. (322/81-12-07): Submerged Cables: This item was also updated in inspection 81-22. Due to several instances of flooding of Electric Manhole No. 1 with brackish water, the licensee constructed temporary shelters around the areas to protect them from flooding. These shelters were effective. The licensee also initiated extensive rework in the manholes. On September 9, 1982 the inspector toured the areas and noted that they were dry, cleaned up, had electric tray covers and cable wraps installed, and had corroded parts replaced. Subsequent to this the licensee installed the permanent covers. The licensee has not yet addressed the effect of the continued submergence on the cables as raised in 81-22. Also, the licensee agreed to the need to open the permanent covers after a few months to verify no additional water leakage/accumulation in the electric manholes. This item remains open.
- 2.2.3 (open) Violation No. (322/82-04-11): Pipe Support out of Alignment: The licensee's response to this item was only required to address preventive actions, since the specific support misalignment was corrected prior to the completion of the inspection. In SNRC-743 dated July 28, 1982 the licensee stated that personnel have been reinstructed not to use permanent plant components to support scaffolding. A memo was issued on March 3, 1982 titled "Scaffold Erection", which also stated that permanent plant components must not be used in any manner to support scaffold. Notwithstanding the above, on tours on September 21, 1982 the inspector noted scaffolding hung from several pipe supports and restraints and in one case from a pipe just next to its containment penetration. The licensee removed the scaffold from the pipe the same day and stated that this area would receive further review. This item remains open.

### 3. Plant Tour

The inspector conducted periodic tours of accessible areas in the plant during normal and backshift 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 cleanness levels of systems under or following testing;
- Equipment Preservations - Maintenance of special precautionary measures for installed equipment, as applicable;
- QA/QC surveillance - Pertinent construction and startup activities were being surveilled on a sampling basis by qualified QA/QC personnel;
- Security - Adequate site construction security;
- Weld Rod Control - Observations to determine weld rod was being controlled per site procedures; and
- Component Tagging - Implementation of appropriate equipment tagging for safety, equipment protection, and jurisdiction.

Minor discrepancies identified were brought to the licensee's attention and were corrected.

### 4. Test Requirements for Fuel Load

On September 21, 1982 the Senior Resident Inspector (SRI) and two representatives of Region I, NRC (L. Bettenhausen, Chief, Test Program Section and H. Nicholas, Reactor Inspector) discussed fuel load test and system completion requirements with the Startup Manager and his staff. The basis for the discussion was a proposed list of systems required for fuel load, dated August 31, 1982, given to the SRI by the Startup Manager. The licensee had proposed that 13 preoperational Tests (PTs), 21 Acceptance Tests (ATs), and 20 subsystems receiving only Checkout and Initial Operations (C&IO) Tests be completed at some time after fuel load. The NRC's initial position, as presented to the licensee, was that all PT's should be done before fuel load and that the list of AT's and C&IO tests to be deferred was too large. The NRC did however identify 25 subsystems/ tests from the latter groups which were clearly non-safety related and, from a systems standpoint, would not be required until some later milestone, such as initial criticality or plant heatup. Further NRC review of tests required for fuel load will take place to determine test procedure and tests results adequacy. If specific items or portions of tests are identified that need to be postponed past fuel load, these will be addressed on a case basis. The milestones, at which completion is required, will be specified prior to a determination on issuance of an operating license.

5. NRC Bulletins and Circulars

5.1 Bulletin 80-24

This Bulletin, "Prevention of Damage Due to Water Leakage Inside Containment", describes a flooding incident inside containment. The licensee has reviewed plant equipment and effected procedures to address the Bulletin concerns. During plant tours, the inspector verified equipment necessary for containment leak detection and control. Discussions were pursued with licensee personnel concerning equipment operation with respect to redundancy, instrumentation and controls. On site surveillance, station, and alarm response procedures were reviewed. In addition the drywell equipment and floor drain, reactor building equipment and floor drain, and suppression pool pump back systems were reviewed by the inspector for FSAR conformance. The licensee's response to this Bulletin was found adequate with the exception of the following discrepancies:

1. The drywell equipment and floor drain flow recorder, FR-506, in the control room was changed to level recorder, 505X, but FSAR paragraph 9.3.3.5.2 was not changed.
2. The calibration and functional test procedures, SP 44.403.01 and 02, for the drywell floor and equipment drain flow integrators contain numerous lateres and still reference FR-506, which is no longer there.
3. There were no calibration or functional check procedures for the reactor building floor and equipment drains or the suppression pool pumpback system.
4. Alarm response procedure (ARP) - 1397 for drywell floor and equipment drain high flow is not written and not referenced in SP.23.702.02.
5. SP.23.702.04, Suppression Pool Leakage Return, designates four ARPs as later.
6. Procedures do not have precautions to ensure at least one means of pumping is available from each floodable location during power operation per the Bulletin recommendations.
7. Concerns of the September 9, 1982 and September 29, 1982 letters or flooding from the NRC to LILCO are not yet incorporated into programs and procedures.

This Bulletin remains open.

### 5.2 Circular 80-10

This Circular, "Failure to Maintain Environmental Qualification of Equipment", discusses the importance of properly installing and maintaining environmentally qualified equipment. The inspector reviewed selected procedures and discussed current controls and policies for maintaining environmental equipment qualification with the Maintenance Engineer. Relative to the circular concerns, the following were noted:

- There are no specific administrative controls to identify environmentally qualified equipment prior to performing maintenance.
- There are no provisions for training personnel on environmental qualification requirements and the potential consequences from improper maintenance practices.

As a result of the above, the licensee has agreed to:

- institute measures for identifying environmentally qualified equipment prior to maintenance by modifying the scheduled activity worksheet and the history maintenance programs.
- provide for personnel training and issue a station procedure addressing environmental requirements, instructions and necessary precautions.

This Circular remains open.

### 5.3 Circular 81-08

This Circular, "Foundation Materials", describes insufficient compaction of foundation materials resulting in excessive settlement of plant structures at a number of sites. The inspector reviewed raw settlement data available onsite and requested additional information on the settlement program. The licensee obtained some further data and information from his Architect-Engineer. This information was reviewed by the NRC, Region I office with the following identified discrepancies.

1. There is no defined settlement monitoring program or procedure.
2. There is no documented review or approval of periodic settlement data by the licensee.
3. There was no discussion or apparent monitoring of differential settlement between structures with connecting pipe.
4. There was no discussion or apparent monitoring of groundwater depth and its effect on readings.

5. The 1980 measurements were compared with 40 year predicted values versus 1980 predicted values. In some cases the 40 year values are essentially used up. There was no discussion of predicted values for 1980 or tolerances on actual readings.

This Circular remains open.

6. Construction Deficiency Reports (CDR)

(closed) CDR No. (322/81-00-08): Fire stops fell out of penetrations: This report, SNRC-637, dated November 20, 1981, described a situation where some fire stops slipped out of vertical penetrations which were painted with epoxy paint. The type which fell out was a Keasby-Bisco type SF-150NH radiation-resistant stop with iron particles, making it heavier than the usual fire stop. The licensee determined that the paint prevented proper adhesion, allowing the stops to slide out. It was further determined that the problem would not exist at the higher temperatures during a fire, since the fire stops expand and grip much more tightly when heated. Mechanical steel supports were designed for all of the SF-150NH seals to bolt the seals in place during normal operation and prevent their sliding out. The inspector reviewed:

- Selected Engineering & Design Coordination Reports (E&DCRs), which added the steel supports.
- Fire stop qualification test data for the SF-150NH stop, BISCO Report #748-68, February 28, 1982.
- Information pamphlet on Sylgard Elastomers.
- Actual installations in the plant with the new steel supports holding in the fire stops.
- July 30, 1982 letter from R. A. Keasby Co. to LILCO describing satisfactory qualification tests as a three hour fire barrier without steel supports, documenting that the steel in place retains half its strength even at the fire temperatures, and documenting the fire stop expansion at fire temperatures.

This CDR is closed.

7. Drawing Updating

During a review of the High Pressure Coolant Injection (HPCI) System drawings, the inspector noted that the wiring configuration on drawing 1.61-156 did not agree with that installed in the plant. A similar situation existed for the Reactor Core Isolation Cooling (RCIC) System and drawing 1.61-154. The changes were a design improvement called for by General Electric on Field Disposition Instruction (FDI) No. 36/88524. This change was authorized for the Shoreham site on E&DCR No. F-6085 and F-6085B dated June 20, 1979, which also called for incorporation of the change in drawings 1.61-154 and 1.61-156. Revision C to these drawings was issued in 1981, incorrectly indicating that this E&DCR was incorporated



in the drawings. The Master E&DCR Log, dated August 27, 1982, also indicated that E&DCR F-6085B had been incorporated into Rev. C of these drawings. The inspector also noted that drawing 1.61-156 - Rev. C had a vendor revision date of March 5, 1981 but a Stone & Webster review date of November 15, 1974. This item is a violation of 10 CFR 50, Appendix B, Criterion VI and was discussed with the Startup Manager on September 28, 1982. This item is designated No. (322/82-26-01).

## 8. Test Performance

### 8.1 Loop Level Pumps

The inspector reviewed the completed test records for the HPCI and RCIC system loop level pumps, CG.000.001, "Rotating Equipment". In both cases the pump shutoff head was not measured and there was no test exception taken to justify the omission of this parameter. The licensee stated that the pumps would be retested to verify the adequacy of the pump shut-off head. This item is unresolved and is designated item no. (322/82-26-02).

### 8.2 Filter Train Testing

The inspector reviewed procedure CG.000.037, "In Place Testing of HEPA Filter and Carbon Adsorber Stage" and witnessed portions of the procedure being performed on V41-FLT-006A. During the performance of the test, the inspector observed that:

- Test procedures were in use by personnel performing the tests.
- Test personnel were suitably qualified.
- Data was logged per the procedures.
- Test acceptance criteria were met for portions observed or appropriate notations made in the procedure.

With the exception of the items below, no discrepancies were identified.

The inspector noted that one of the test prerequisites was the Enclosure 3, Visual Inspection and that it had not been completely signed off. The licensee completed the remainder of the visual inspection satisfactorily and agreed that all signoffs on the visual inspection should be completed before performing any other filter testing. The inspector also noted that data was being recorded on similar vendor data sheets rather than the data sheets provided with CG.000.037. The licensee agreed that data should be taken on the approved data sheets, commenced doing so, and stated further that the procedure would be revised to make them more usable. CG.000.037-1 was subsequently approved, which accomplished this.

During the performance of the Airflow Distribution test and Airflow Capacity Test, the inspector noted that the prefilters and charcoal adsorbers were not installed and that ANSI-N510, paragraph 8.3.1 calls for all system components to be installed before performing the test. Discussions with licensee and vendor personnel indicated valid reasons for performing initial testing with the prefilters and charcoal not installed. The licensee stated that artificial resistance would be added for the initial airflow capacity test (this was added to Rev. 1 of the procedure) and that a final airflow capacity test would be performed with all components installed.

The inspector further noted that for the high efficiency particulate (HEPA) filter leak tests the dioctyl phthalate (DOP) injection points were upstream of the uninstalled prefilters. One of the purposes of the preoperational test is to verify adequate injection points for periodic surveillance testing. This location and the initial testing without prefilters installed means that, for all periodic surveillance DOP testing, prefilters must be removed and then new prefilters installed upon completion. The inspector discussed this with plant staff personnel who agreed to the sequence. This item is unresolved pending establishment of a periodic filter test surveillance procedure, which would require the above. This is item no. (322/82-26-03).

#### 9. Test Procedure Review

The inspector reviewed the, "Drywell-Suppression Pool Vacuum Breaker Leak Test", PT.654.006 and also a draft of Revision 1. This test is performed to determine if the steam bypass area from the drywell to the suppression pool does not exceed acceptable limits. The inspector had the following six comments on the procedures:

1. The acceptance criteria is in the form of allowable pressure decay graphs (Figures 1 and 2), which assume initial pressures of 1 and 3 psid. Initial test conditions allow pressures up to 1.25 and 3.5 psid. This is acceptable but is currently not factored into the acceptance criteria graphs
2. Calculations from which the acceptance criteria figures were developed, including assumptions, were not available for review.
3. There were no test prerequisites calling for removal of non-conservative pressure sources in the drywell, e.g. instrument air or nitrogen, fire extinguishers, and portable gas cylinders.
4. An air block is applied between the Main Steam Isolation Valves at initial pressures below drywell test pressure, but data is not taken during the test to verify that pressures remain below drywell test pressure during the test.
5. Any leakage from the Suppression Pool would bias the test in the non-conservative direction.
6. The nitrogen supply to the drywell floor seals was not isolated and the seal pressures were not recorded throughout the test for possible correction of test results due to nitrogen inleakage to suppression pool.

The licensee's representative acknowledged these comments. This item is unresolved and is designated item no. (322/82-26-04).

10. Hydrogen and Oxygen Analyzers

The licensee has added remotely operated hydrogen ( $H_2$ ) and oxygen ( $O_2$ ) analyzers which read out in the control room for post-accident monitoring of drywell and suppression pool  $H_2$  and  $O_2$  concentrations. The inspector reviewed:

- FSAR sections 6.2 and Vol. 16, II.F.1,
- NUREG-0737, TMI Action Plan Requirements, Item II.F.1, Additional Accident Monitoring Instrumentation,
- Operation Manual for K-III/K-IV Containment Hydrogen Monitor

The inspector also toured the various system panels and piping both alone and in company with the system test engineer. The inspector had a number of questions regarding system status, design and operation. With the exception of the below three items, these questions were all satisfactorily resolved by the system test engineer.

1. When in the sample mode,  $H_2$  is used as a reagent gas for the  $O_2$  analyzer and  $O_2$  as a reagent gas for the  $H_2$  analyzer. The analyzer return is near (approximately 3 feet) the suction and in a relatively dead spot of the Drywell, creating the possibility for short cycling and erroneous readings.

This is unresolved item no. (322/82-26-05).

2. The 29.9%  $H_2$  calibration gas does not appear appropriate, since the vendor manual states that, when a  $H_2$  value less than the widest analyzer range (30%  $H_2$ ) is of primary concern, then this same percent of  $H_2$  should be used as the calibration gas. Since the NUREG-0737 requirement is only for monitoring up to 10% and the explosive limit is below this, it appears that a value less than 30% is of primary concern.

This is unresolved item no. (322/82-26-06).

3. The four drywell analyzer lines have a single drain valve between the containment atmosphere and the Reactor Building. This does not provide the redundancy of containment isolation as required by 10 CFR 50, Appendix A, Criterion 54.

This is unresolved item no. (322/82-26-07).

11. Anchor Bolt Installation

The inspector toured the plant and observed completed anchor bolt and baseplate installations, with particular emphasis on anchor bolts from different baseplates and different supports located close to each other. The inspector also reviewed E&DCR No. P-2640G which provides comprehensive requirements for drilled in concrete anchor bolts, including minimum spacing between bolts on adjacent baseplates. Further the inspector discussed with engineering and quality control (QC) personnel the mechanisms for inspecting these items and dispositioning discrepant conditions. The inspector identified a number of bolts which were close to adjacent baseplates. All bolts either met the spacing acceptance

criteria or had been adequately addressed on an individual basis by QC and engineering. The inspector had no further questions in this area.

12. Unresolved Items

Areas for which more information is required to determine acceptability are considered unresolved. Unresolved items are contained in Paragraph 7.1, 7.2, 9 and 10.

13. 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 inspector also attended the entrance and exit interviews for one region-based inspection conducted during the inspection period.