LONG ISLAND LIGHTING COMPANY

Shoreham Nuclear Power Station

Supplement No. 1 to the

STARTUP REPORT

for the period November 15, 1985
to February 15, 1986

Approved: W. E. Steiger 2/14/86
Date

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Plant Manager

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1.0 Overview

This Startup Report Supplement has been written by the Long Island Lighting Company (LILCO) for submittal to the Nuclear Regulatory Commission in compliance with Shoreham Nuclear Power Station Technical Specifications, paragraphs 6.9.1.1 through 6.9.1.3, and Regulatory Guide 1.16, Revision 4, section C.1.a.

Technical Specifications and Regulatory Guide 1.16 require that a summary report of plant startup and power escalation testing be submitted within 9 months following initial criticality. Shoreham Nuclear Power Station (SNPS) achieved initial criticality on February 15, 1985. LILCO submitted a Startup Report on November 15, 1985. The scope of that Startup Report included fuel load and initial criticality under the .001% power license, NPF-19, and low power testing conducted under the 5% power license, NPF-36.

Since SNPS has not completed its startup test program or commenced commercial power operation, additional Supplements are required on a periodic basis. This Supplement covers the three month period from November 15, 1985 to February 15, 1986.

Shoreham has been in an outage since October. During this outage, the installed neutron sources were replaced and environmental qualification modifications were completed. The environmental qualification of plant equipment was required as a condition of the Operating License. Water level instrumentation reference leg piping from the reactor vessel to the drywell penetration was modified due to vessel level indication problems experienced during low power testing. A modification was made to the High Pressure Coolant Injection system to improve turbine startup response. Several temperature monitoring instruments in the drywell were relocated and insulation around the biological shield was modified to reduce local drywell temperatures. Pipe supports identified during thermal expansion walkdowns as actual or potential interference problems were replaced or modified. Installation of a corium ring underneath the reactor vessel is in progress.

At the direction of the Shoreham Plant Manager, the test organization reviewed the experiences of fuel loading and low power testing. Plant startup test procedures (STP's) and the station procedure for the administration of power ascension testing (SP 12.075.01) were reviewed and revised to incorporate the lessons learned from those experiences.

Test Condition Heatup test results have been reviewed and approved by the Test Review Committee (TRC) and the Review of Operations Committee (ROC). Some of the station modifications implemented during the outage affect prior test results. Consequently, some startup tests will be repeated. Plant management has scheduled a series of tests to be performed at less than 5% power. The schedule includes those tests that are identified in Chapter 14 of the FSAR to be completed in Test

1.0 Overview - (continued)

Condition Heatup which were previously performed but whose results may have been affected by plant modifications. Certain "opportunity" tests (for example, completion of Reactor Core Isolation Cooling system controller tuning and main generator synchronization) that are not required until higher power but which can be performed at less than 5% power are also scheduled. Startup is planned for early March and the scheduled duration of testing is approximately twenty-nine days. After the completion of scheduled testing, the plant will be ready for power escalation to Test Condition 1.

2.0 Chronology of Events

December 7, 1984	Received low power license .001%.
December 17, 1984	Sources loaded in core.
December 21, 1984	Fuel loading commenced.
January 4, 1985	Partial core shutdown margin test.
January 19, 1985	Fuel loading completed.
January 25, 1985	CRD open vessel testing completed.
February 17, 1985	Initial critical and shutdown margin test. Completed open vessel testing.
June 4, 1985	CRD open vessel retest completed.
July 3, 1985	5% low power license received.
July 7, 1985	Reactor critical sequence B. Test condition Heatup.
July 7, 1985	Heatup to 250°F System expansion performed. IRM performance completed.
July 8, 1985	Heatup to 325°F performed. APRM calibration.
July 9, 1985	SRV functional test performed (STP-26).
July 11, 1985	150 psig plateau reached. System expansion DW entry. RCIC testing. HPCI system testing.
July 14, 1985	Reactor scram #1 on Rx level.
July 17, 1985	APRM calibration at 150 psig. HPCI testing. System expansion testing. RBCLCW performance testing.
July 18, 1985	Reactor shutdown for RPV level instrumentation work.

2.0 Chronology of Events - (continued)

July 23, 1985	Reactor critical.
July 26, 1985	Reactor shutdown for RPV level instrumentation work.
July 29, 1985	Reactor critical.
July 31, 1985	Reactor pressure to 150 psig. HPCI system testing.
August 1, 1985	350 psig plateau. Drywell radiation survey. System expansion drywell inspection, system expansion data.
August 3, 1985	600 psig plateau. System expansion. RBCLCW performance. CRD testing.
August 5, 1985	800 psig plateau. System expansion. CRD testing.
August 7, 1985	Rated pressure plateau. System expansion testing. HPCI testing. RCIC testing. CRD testing. RBCLCW testing. Water level testing. STP-13 testing. Chemical and radiochemical testing. Radiation measurements. LPRM testing.
August 23, 1985	Reactor pressure reduced to 150 psig. HPCI testing. RCIC testing.
August 24, 1985	Reactor shutdown after initial heatup.
August 30, 1985	Reactor critical sequence A.
August 31, 1985	Scram #2 on loss of instrument air.

2.0 Chronology of Events - (continued)

September 3, 1985	Reactor critical sequence A. Second heatup to 150°F.
September 4, 1985	Heatup to 250°F - 150 psig. System expansion testing.
September 6, 1985	Reactor pressure 350 psig. System expansion testing.
September 6, 1985	Reactor scram #3 due to surveillance on level instrument.
September 7, 1985	Reactor pressure 600 psig. System expansion testing. CRD testing.
September 8, 1985	Unusual event due to Reactor level indication problem.
September 10, 1985	Reactor shutdown for repair of Reactor level problem.
September 11, 1985	Reactor critical and heatup to investigate level problem.
September 12, 1985	Reactor scram #4 on low water level indication. Actual level did not change. Level instrument problem investigated.
September 18, 1985	Reactor critical sequence A.
September 21, 1985	Reactor pressure 800 psig. System expansion testing. CRD testing. RPV level problem fixed.
September 21, 1985	Rated pressure reached. System expansion testing. Second heatup. RCIC testing. HPCI testing. MSIV testing. Water level testing. CRD testing. RWCU testing. Radiation testing. Chemistry testing.

2.0 Chronology of Events - (continued)

September 27, 1985	Reactor shutdown. Hanger placed on B reference leg. Miscellaneous maintenance.
October 3, 1985	Reactor critical sequence A. Third heatup to rated pressure. System expansion testing.
October 4, 1985	RCIC vessel injection at rated pressure. System expansion testing. RWCU system testing. MSR relief valve testing.
October 6, 1985	Initial turbine generator roll to rated speed.
October 8, 1985	End of heatup testing. Begin source replacement outage.

3.0 Test Results

The plant has been shutdown during the entire period covered by this Supplement. There are no new test results to report. As a result of testing performed during Test Conditions Open Vessel and Heatup (discussed in the Shoreham Startup Report, dated November 15, 1985), some corrective actions were identified which require repeating certain tests. Some of the equipment modifications made during the current outage invalidated previous test results, and, therefore, certain other tests need be repeated. The following is a brief discussion of startup tests that have been scheduled for low power testing prior to power ascension to Test Condition 1.

3.1 Control Rod Drive (STP-5)

Two activities are scheduled for the next startup to complete STP-5 for Test Condition Heatup. One activity is to obtain the individual rod scram time for rod 22-35 at rated pressure and temperature. The other activity is to perform tuning on the Control Rod Drive Hydraulic system flow controller.

A measureable difference in control rod drive normal insert and withdrawal stroke times was observed for selected rods which were timed at zero reactor pressure, at intermediate pressures, and at rated reactor pressure. Based on an evaluation of the stroke time data for the selected rods, thirty-four rods will have their normal withdrawal stroke time adjusted prior to the next startup.

3.2 Water Level Measurement (STP-9)

The problems with water level indication seen during low power operation were attributed to condensation in the instrument piping between the reactor vessel and the condensing chamber. New piping has replaced the old, with improved pipe slope and shorter piping runs. All the narrow and wide range level instruments have been recalibrated. Correct response on the level indicators will be verified by lowering water level to normal prior to reassembling the vessel. Startup test data will be collected at rated temperature and pressure to confirm that all the affected instruments meet the criteria for agreement.

3.3 LPRM Performance (STP-11)

The 'C' detector in the nuclear instrumentation local power range monitor (LPRM) string 20-37 did not show any response to control rod withdrawal. The 'A', 'B', and 'D' detectors in the same string responded properly. The cable connector under the vessel was repaired during the current outage. Detector response will be verified in section 8.6 of STP-11, scheduled during Test Condition 1.

3.4 Process Computer (STP-13)

Traversing Incore Probe (TIP) tubing underneath the reactor vessel was disassembled to permit control rod drive maintenance. New core limits will be measured and programmed into the process computer during testing scheduled following the next startup.

3.5 RCIC (STP-14)

Some controller tuning was performed with the Reactor Core Isolation Cooling (RCIC) system injecting to the reactor vessel during Test Condition Heatup. System speed and flow response were acceptable at rated flow conditions; however, additional controller tuning is required to increase speed loop stability at reduced flow conditions. Following completion of this additional required tuning, a series of quickstart demonstration tests will be performed.

The RCIC turbine exhaust check valves were replaced during the current outage. Minimum turbine operating speed at which check valve cycling does not occur will be determined with steam supply pressure to the turbine at 150 psig during the RCIC retest scheduled for March.

3.6 HPCI (STP-15)

The High Pressure Coolant Injection (HPCI) system Woodward Governor RGSC (ramp generator and signal convertor) enclosure was relocated as part of the station's environmental qualification modifications. A "hydraulic bypass" was installed around the HPCI EGR actuator to allow control oil pressure to cycle the control valve fully open and then partially closed before the stop valve opens on system startup. This modification should significantly improve the startup response of the HPCI system. These two modifications require that all HPCI functional and stability demonstration tests be repeated.

A HPCI endurance run is also scheduled for the March retest program. An endurance run was attempted in September and aborted because indicated suppression pool temperatures approached the plant Technical Specifications limiting condition for operation. The high temperatures resulted from thermal stratification of the suppression pool during HPCI operation. Local to bulk suppression pool temperature differences on the order of 15°F were observed. Permanent corrective action is under evaluation. The endurance run is scheduled with the remaining low power testing, although not required to be completed before the end of Test Condition 3.

3.7 Recirculation Flow Control System (STP-29)

The purpose of the test performed in Test Condition Heatup was to demonstrate that the initial controller settings are stable at low power and core flow. This test demonstrated satisfactory stability and established a new interim lower limit for operating the recirculation system motor-generator sets (MG's). The new lower limit was established to avoid the limit cycles which were observed on the 'B' MG. An administrative limit of 24% was established, and the electrical low speed limiter will be adjusted to 24% prior to startup. No additional recirculation system testing is required before the next regularly scheduled testing at Test Condition 1.

3.8 Reactor Water Cleanup System (STP-70)

Recalibration of Reactor Water Cleanup (RWCU) system flow transmitters and a thorough check-out of the leak detection circuit are believed to have corrected the previously reported problem with frequent spurious system isolations.

Calibration of the bottom head drain flow indicating loop was not successfully completed during Test Condition Heatup. The installed differential pressure transmitter was overranged with RWCU system flow routed entirely through the bottom head drain line. The installed transmitter is scheduled to be replaced by February 27, and the calibration test (STP-70, Appendix A) is scheduled for the upcoming series of plant restart tests.

3.9 Residual Heat Removal system (STP-71)

The pupose of this test is to demonstrate the ability of the Residual Heat Removal (RHR) system to remove decay and residual heat from the reactor coolant system and from the suppression pool. A suppression pool cooling test is scheduled to be performed in conjunction with a HPCI endurance run. (See Section 3.6 for a discussion of suppression pool thermal stratification).

3.10 Reactor Building Closed Loop Cooling and Drywell Air Cooling (STP-37)

The purpose of this test is to demonstrate that with the maximum design Reactor Building Closed Loop Cooling Water (RBCLCW) supply temperature, all RBCLCW-supplied components are adequately cooled and that the Drywell Air Cooling (DAC) system maintained drywell temperatures within plant Technical Specification limits. Because modifications made to insulation and instrumentation in the drywell affect the overall heat load on the system and the temperature distribution seen by the temperature monitoring instruments, all sections of this test completed in Test Condition Heatup have been scheduled to be repeated during the next plant heatup.

3.11 Service Water System (STP-42)

The purpose of this test is to demonstrate that the service water system adequately cools its normal service heat loads. This test, although scheduled for Test Condition Heatup, was not performed before the plant shut down for the current outage. This test is now scheduled for the next startup and low power testing.

3.12 Loose Parts Monitoring System (STP-814)

The purpose of this test is to perform the initial set-up of the Loose Parts Monitoring System (LPMS), to adjust the system's sensitivity and alarm setpoints, and to demonstrate the ability to detect impacts as required by Regulatory Guide 1.133.

Plant personnel were unable to successfully complete the initial sensitivity adjustment. The system vendor was called to the site to troubleshoot and repair the system. This test is scheduled to be performed concurrently with neutron monitoring system detector drive-in and drive-out operations during the next startup.

4.0 LICENSE CONDITIONS

Technical Specifications require that the Startup Report discuss the license conditions which affect plant startup and power escalation testing. The specific license conditions are delineated in paragraph 2.C of the Shoreham Operating License (NPF-36 of July 3, 1985). Each condition is summarized and its status, as it applies to the completed portion of the test program, is provided below.

4.1 Condition: The maximum core thermal power shall not exceed 5% rated core thermal power.

Status: During the period of this report the reactor was maintained in the refueling mode.

4.2 Condition: The plant shall be operated in accordance with the Technical Specifications and the Environmental Protection Plan.

Status: The Low Power Test Program has been conducted in accordance with Technical Specifications and the Environmental Protection Plan. In a very few circumstances, the provisions of Technical Specifications were exceeded. Each circumstance has been previously reported to the NRC and has been the subject of a Licensee Event Report (LER).

4.3 Condition: The plant shall maintain the fire protection program as described in the Fire Hazards Analysis Report and in the FSAR.

Status: The provisions of the Fire Protection Program have been adhered to, except for a single missed fire watch in a Low Pressure Coolant Injection (LPCI) motor-generator set room. This fire watch was missed because the door latch was broken. A more complete description will be provided in a Licensee Event Report which is currently in preparation.

4.4 Condition: Changes to the initial test program shall be reported within one month.

Status: All changes to the test program as described by Chapter 14 of the FSAR will be reported to the NRC prior to their implementation.

4.5 Condition: The initial inservice inspection shall be developed and implemented before the first refueling outage.

Status: This condition is not affected by the Low Power Test Program. Development of the inservice inspection program is in progress.

4.6 Condition: Control rods shall be tested for boron loss after the first refueling outage.

Status: This condition is not yet applicable.

4.7 Condition: The provisions of the NUREG-0737 action plan described in the SER, supplements 1 and 4, shall be followed.

4.7.1 Status: To date, the qualifications of five of the required seven backup STA's have been submitted to and approved by the Commission. The remaining two positions are unfilled. LILCO is currently preparing a letter that will submit the resume of a qualified candidate for the sixth position.

4.7.2 Status: The requirement to mark control room indicators with operating limits, and with trip and alarm setpoint values is not yet implemented. The requirements of the provision remain under review and shall be implemented prior to the completion of this startup test program.

4.7.3 Status: Modifications to the post accident sample facility, which will enable sampling using the modified core damage procedure, are in progress as noted in Section 3.21 of IE Inspection Report 85-038. This requirement is to be tracked by Region I as 50-322/85-04-19.

4.7.4 Status: The modifications required to implement the emergency response capabilities, as required by Attachment 1 to the license, are in progress.

4.8 Condition: Prior to November 30, 1985 all electrical equipment shall be qualified.

Status: LILCO sought and was granted an extension of the November 30, 1985 deadline by the Commission. Station modifications to environmentally qualify the required electrical equipment are now complete.

4.9 Condition: The remote shutdown system shall be improved prior to the first startup following the first refueling outage.

Status: The modifications will be implemented as required.

4.10 Condition: The RHR system may not be operated in the steam condensing mode except under emergency conditions.

Status: The station procedures have been modified to preclude the steam condensing mode of operation except as a last resort when all other methods of core and containment cooling have failed.

4.11 Condition: Two containment isolation barriers in series will be installed by the end of the first refuel outage.

Status: Methods to satisfy this condition will be completed by the end of the first refuel outage.

4.12 Condition: The provisions of Appendix 3 to the license shall be satisfied as they apply to the TDI diesel generators.

Status: Station procedures and maintenance schedules have been modified to include the required TDI diesel generator tests and inspections. Currently, new procedures are being written to segregate the inspections required by Attachment 3 from the regular technical specification surveillances and preventive maintenance procedures.

4.13 Condition: The results of the independent design review shall be incorporated prior to exceeding 5 percent power.

Status: Complete.

4.14 Condition: a.) Prior to exceeding five percent power, radiation monitoring panels 1D11*PNL-117A, B and radiation monitoring pumps 1D11*P126, 134 shall be qualified. b.) The invessel storage racks shall be qualified prior to use.

Status: a.) The required qualification for the radiation monitoring equipment has been completed. b.) The invessel storage racks have been administratively prohibited from use.

4.15 Condition: The plant shall have on-shift advisors as required by Attachment 2 of the license.

Status: The plant currently has sufficient numbers of qualified on-shift advisors to satisfy this condition.

4.16 Condition: The Emergency Core Cooling Systems performance shall be reanalyzed for the second cycle and beyond, utilizing models that account for burnup gas pressure and local oxidation and which are approved by the NRC.

Status: This condition will be completed by the required date.

4.17 Condition: The licensee shall implement the response to Generic Letter 83-28 on schedule.

Status: All provisions stipulated in SNRC-1013, 1116, 1184, and 1217 are complete except for the provision that requires the Safety Parameter Display System (SPDS) to be operable prior to the first restart after the first refueling and the review of Technical Specification testing intervals. This review will be done as committed to in SNRC-1184.

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JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

February 15, 1986 SNRC-1234

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Supplement No. 1 to the Startup Test Report
Shoreham Nuclear Power Station
Docket No. 50-322

Dear Mr. Denton:

Attached is Supplement No. 1 to the Startup Report written by the Long Island Lighting Company in compliance with Shoreham Nuclear Power Station Technical Specifications, paragraph 6.9.1.1 through 6.9.1.3, and Regulatory Guide 1.16, Revision 4, section C.1.a.

This report addresses each of the startup tests identified in Chapter 14 of the FSAR to be performed in the test conditions of Open Vessel and Heatup. It includes a description of the measured operating condition values or characteristics obtained during the test program period between November 15, 1985 to February 15, 1986, with a comparison of these values to the acceptance criteria, together with a description of any corrective actions required to obtain satisfactory operation.

If there are any questions, please contact this office.

Very truly yours,

J. D. Leonard, Jr.
Vice President-Nuclear Operations

GJG:ck

Attachment

cc: J. A. Berry

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