U. S. NUCLEAR REGULATORY COMMISSION

Region I

REPORT NO. 50-322/85-24

DOCKET NO. 50-322

LICENSE NO. NPF-19

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: May 16 - June 18, 1985

INSPECTOR: P. W. Eselgroth, Senior Resident Inspector — 6-18-85 Date Signed

APPROVED: J. R. Strosnider, Chief, Reactor Projects Section 1B, Division of Reactor Projects — 7/8/85 Date Signed

SUMMARY: The resident inspector reviewed the general area of isolating reactor coolant system pressure from low-pressure ECCS systems outside containment and disablement of the 4160 volt emergency bus auto-transfer capability for phase III and IV low-power testing. This report also includes follow-up reviews of previous inspection items covering emergency diesel generator failure to auto-start and the check for urethane parts in safety valves.

The inspector closed two previous inspection items, and opened one new item.

This report involves 87 hours of inspection by the resident inspector.

1.0 Persons Contacted

T. Carrier, Instr. and Controls Engineer (L)
A. Muller, QC Division Manager (L)
P. Pizzariello, Maintenance Engineer (L)
M. Shepherd, Systems Engineer (GE)
W. Steiger, Plant Manager (L)
J. Swanson, System Engineer (L)
K. Swenson, Sr. Discipline Engineer (S&W)

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

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

2.0 Status of Previous Inspection Items

2.1 (Closed) Unresolved Item 84-39-02: Emergency Diesel Generator Failure to Autostart.

In a previous inspection report (50-322/84-39), the inspector established this open item in conjunction with a failure of EDG-102 to autostart on August 21, 1984. This occurred during trouble shooting of the HPCI Leak Detection System which established a Bus 102 undervoltage condition and a simulated LOCA signal. The EDG had autostarted correctly during the first test run but failed to autostart for the second test attempt. Review by the licensee determined that at the end of the first test, when the Control Room Operator paralleled with the grid, he failed to pick up sufficient load on the EDG. The EDG apparently momentarily motorized which energized the Reverse Power Relay and tripped the 86B Lockout relay. Since no control room panel alarms or computer alarms were received, the operator was unaware of the trip when he attempted to restart the EDG for the second test.

The inspector's concern was that if a similar trip occurred during plant operation, the EDG would be in a condition where it would not autostart and this condition would not be annunciated. As a result of this event, the licensee implemented a Station Modification (SM84-106) to change the TDI Emergency Diesel Generator (EDG-101, 102, 103) annunciator scheme in the control room. This change results in activation of the EDG Inoperative Annunciator when the above described tripped relay condition exists. During this report period the inspector reviewed the status of this modification. This review included the associated Maintenance Work Requests (85-0682, 0684 and 0835), the Station Modification (84-106) package and the job site. The inspector found the installation work to now be completed and the systems returned to service. The inspector

also noted from the Station Modification Review Form that certain administrative closeout aspects of the modification package, including the Review of Operations Committees (ROC) sign-off, were required.

This item is closed, since the modification was subsequently approved on June 21, 1985 by the ROC during meeting No. 85-078. Completion of this item was a prerequisite to exceeding 5% power as required by Attachment 1 to the low power (Phases I and II) license.

2.2 (closed) Unresolved Item (84-39-03): Safety Related Solenoid Valve Polyurethane Parts.

As a result of a problem experienced at another reactor plant with the operation of Automatic Switch Co. (ASCO) scram pilot solenoid valves, reviews were conducted by the resident inspector at Shoreham during previous report periods. The particular valve Part No. T-ASCO HV-176-816-1, GE Part No. 9220138 had caused four rods to fail to scram on demand at another plant and caused eleven other rods to hesitate during routine quarterly control rod scram time testing.

The defective component was determined to be a polyrethane disc-holder subassembly which develops an adhesive quality at elevated temperatures (above 160°F), causing it to adhere to the seat of the scram pilot valve port.

The inspector reviewed a Shoreham master listing of safety related solenoid operated valves and other plant information provided by plant management in response to an NRC request that similar ASCO valve applications at Shoreham be reviewed for this problem. The inspector confirmed that the Shoreham valves were not T-ASCO HV-176-816-1, but instead were ASCO HVA-90405-2A valves. A previous inspection report (50-322/85-11) documented the determination by the licensee and the inspector that the scram pilot valves at Shoreham do not contain any urethane in its construction. This item remained open pending completion of the licensee's review for the presence of urethane parts in other safety-related valve applications.

The licensee has completed a review of ASCO valves at Shoreham in safety-related functions against applicable ASCO bulletins, catelogues, installation and maintenance instructions and has determined from this survey that no operating parts of the ASCO safety-related solenoid valves contain urethane parts.

The inspector had no further questions, this item is closed.

3.0 Isolation of Reactor Coolant System From Low-Pressure ECCS Systems Outside Containment.

During this report period the inspector reviewed the interface of the reactor coolant system with low pressure Emergency Core Cooling Systems (ECCS) outside containment with regard to the concern for precluding an intersystem loss-of-coolant accident (LOCA) which would bypass primary containment. This concern was the subject of IE Information Notice 84-74. This Notice described instances where the integrity of the high/low pressure interface or boundary, was degraded at various facilities due to such causes as the failure to prescribe that maintenance be performed in accordance with the appropriate vendor manual, lack of proper post work testing and improperly performed surveillances.

This review covered the following aspects of this area of concern:

- System interface arrangements including component and piping configuration and high/low pressure interfaces.

- Specific identification of all testable check valves with air operators.

- Identification of valves that normally maintain isolation for each high/low pressure interface as well as those which could be used to back up this function.

- A review of selected systems to determine the surveillance activities that apply to the isolation valves at each high/low pressure interface and identification of test types, frequency, plant conditions for testing, precautions/prerequisites, acceptance criteria and regulatory requirements.

- A review of selected systems to determine the applicable maintenance activities and practices that apply to the isolation valves, their operations and associated controls, and identification of corrective maintenance history, preventive maintenance, quality control, pre-maintenance checks and post-maintenance tests.

- Interviews with operations and maintenance personnel to determine the level of training provided to personnel involved in surveillance/maintenance of the subject isolation valves, instances of actual or potential over-pressurization of low pressure ECCS piping or components.

- A review of the extent of licensee actions relative to industry experience in this interfacing high/low pressure area.

The results of this review are as follows:

3.1 System Interface Arrangements.

The system arrangements reviewed are described here using the following nomenclature:

RCS	Reactor Coolant System, or Reactor Pressure Vessel
HV	Hand Valve
CK	Check Valve
AOV	Air Operated Valve
AOV(ck)	Air Operated Testable Check Valve
MOV(nc)	Motor Operated Valve, normally closed
MOV(no)	Motor Operated Valve, normally open
I	Location of Containment Penetration
H/L	High/Low Pressure Interface
PRV	Pressure Relief Valve, usually indicative of lower pressure
P	Pump

Low Pressure Coolant Inspection (LPCI A&B)

Component Sequence	Size	Component Number	
RCS			
HV(no)	24"	E11HV-71A,B	
AOV (ck)	24"	E11*AOV-81A,B	
MOV (nc)	2" by pass	E11*MOV-81A,B	
I			
MOV (nc)	24"	E11*MOV-37A,B	See Note
MOV (no)	24"	E11*MOV-36A,B	
H/L	24"		
P	16"	E11*P-14A - D	

NOTE: Loop level pump flow comes in on pump (P) side of E11*MOV-36 as 900# pipe into 300# pipe and comes in on RCS side of E11*MOV-36 as 900# pipe into 900# pipe.

Shutdown Cooling (RHR)

Component Sequence	Size	Component Number
RCS		
HV(no)	20"	E11*HV-170
MOV(nc)	20"	E11*MOV-47
I		
PRV		E11*RV-163
MOV(nc)	20"	E11*MOV-48
H/L	20"	
P	20"	E11*P-14A - D

Head Spray (RHR)

Component Sequence	Size	Component Number
RCS		
CK	4"	E11*04V-0030
MOV(nc)	4"	E11*MOV-54
I		
PRV	3/4"	E11*RV-164
MOV(nc)	4"	E11*MOV-53
H/L	4"	
P	16"	E11*P-14A - D

Core Spray (A&B)

Component Sequence	Size	Component Number
RCS		
HV	10"	E21*HV-71A&B
AOV(ck)	10"	E21*AOV-81A&B
MOV(nc) bypass	2"	E21*MOV-81A&B
I		
MOV(nc)	10"	E21*MOV-33A&B
H/L	10"	
PRV	1½"	E21*RV-93A&B
CK	12"	E21*12V-0013A&B
P	12"	E21*P-13A&B

3.2 Testable Check Valves.

E11*AOV-81A&B, E21*AOV-81A&B, are testable check valves. The air operators are normally in the closed position: air-to-open, fail closed. The air operator lifts the disc just off the seat via a "T" type arrangment at the end of the valve stem that lifts a fork-type hanger on the back of the disc. Normally the stem is in the down position which allows the disc to work like a swing check. Position indication is obtained via NAMCO position switches that monitor the position of the valve stem via a positioning arm.

3.3 High/Low Pressure Isolation Valves

LPCI: Normal: E11*MOV-37A,B

Backup: E11*AOV-81A,B and E11*MOV-81A,B

Shutdown Cooling (RHR):

Normal: E11*MOV-48

Backup: E11*MOV-47

Head Spray (RHR):

Normal: E11*MOV-53

Backup: E11*MOV-54

Core Spray:

Normal: E21*MOV-33A,B

Backup: E21*AOV-81A,B and E21*MOV-81A,B

3.4 Surveillance Activities

The inspector reviewed the surveillance activities that apply to these high/low pressure system (normal and back-up) isolation valves and determined the following:

Local Leak Rate Testing

This testing is required by Tech Spec. 3.6.1.2 and is performed every 18 ± 6 months. The various acceptance criteria for these isolation valves are as follows:

Acceptance Criteria	Isolation Valves
4.8 SCfh at 46 psig	E11*AOV-81A,B E11*MOV-37A,B
4.0 SCfh at 46 psig	E11*MOV-47 E11*MOV-48

Acceptance Criteria	Isolation Valves
2.0 SCfh at 46 psig	E21*AOV-81A,B E21*MOV-33A,B
0.8 SCfh at 46 psig	E11*MOV-53 E11*MOV-54
0.4 SCfh at 46 psig	E11*MOV-81A,B E21*MOV-81A,B

Leakage Testing

This testing is required by Tech Spec. 3.4.3.2.d and is performed every 18 months. The acceptance criteria is less than 1.0 gpm water at 1000 (+40, -120) psig. This testing applies to all of the paragraph 3.3 isolation valves above.

Containment Isolation Test

This testing, required by Tech Spec. 3.6.3, is performed during cold shutdown and involves valve stroke timing and position verification. Also, Tech Spec. 4.0.5 requires stroking these valves quarterly to meet ASME XI requirements. This testing applies to all of the paragraph 3.3 isolation valves above.

Logic Functional Testing

Tech Specs. 4.3.3.2 and 4.5.1.C.1 require that logic system functional tests and simulated automatic operation of all channels be performed at least once per 18 months for ECCS/LPCI and CSS to verify that each automatic valve in the flow path actuates to its correct position. These tests are performed during cold shutdown or refuel plant conditions at Shoreham. The inspector reviewed the LPCI and CSS logic system functional tests (SP No. 24.121.05 and 24.203.04, respectively), to verify that each test contains the necessary precautions and prerequisites to ensure proper plant conditions, ensure that only one logic test is being performed at a time and that no operations are being conducted that have the potential for draining the reactor vessel. A detailed review of the entire procedures was not conducted during this report period.

3.5 Maintenance Activities

All of the subject isolation valves have scheduled periodic maintenance activities on the operators which consists of annual check out of the Motor operators (SP No. 47.009.01, Motor Operated Valve Preventive Maintenance Program) and relubing the MOV's every 18 months. Modifications (changes in design) are implemented by way of the Interim Station Modification Program. Corrective maintenance is typically performed as a result of some deficiency relative to the surveillance testing requirements.

All work/maintenance activities in the plant are required to be covered by issuance of a Maintenance Work Request (MWR). The MWR procedure,by way of reference to the Composite Component List, calls for the identification of work on the subject valves to be safety related which in turn requires the implementation of QC hold point sign-offs and general overview of work on these valves. The MWR procedure also calls for the identification and use of the appropriate station procedure for maintenance on the type of valve involved, the applicable valve vendor technical manual and required post work testing. To date there has been little corrective maintenance work on these valves. The most recent example involved E11*MOV-47 "RPV-RHR Inboard Shutdown Cooling Containment Isolation Valve" which failed to pass a leak rate (1gpm) test on February 6, 1985 and had to be repaired. The resident and region-based inspectors periodically overviewed this maintenance job for proper adherence to procedures. The resident inspector reviewed the completed MWR No. 85-0660 for proper QC involvement and a region-based inspector witnessed the final leak test of the valve and independently verified the test pressure, the leakage rate, the test duration, that the valve was electrically shut from the control room and that the final test results were acceptable (Inspection Report 50-322/85-09). The resident inspector also reviewed the only known repair job on a testable check valve (E11*AOV-081A&B) which was done in 1982 and involved installation of new operators. The inspector found the work controls of this maintenance job to be satisfactory also.

3.6 Training

The inspector interviewed operations and maintenance personnel with regard to the training provided to those involved with maintenance and surveillance work associated with the subject isolation valves and any previous actual or potential over pressurizations of low pressure ECCS piping. The inspector received no indication from those interviewed of any previous actual or potential over pressurizations. With regard to training, this program consists of generic valve training complemented by pre-job briefings and on-the-job training. The inspector notes that one particular General Electric Start-up Engineer who has been closely involved with the overview and coordination of all maintenance activities associated with the subject isolation valves will soon be reassigned to other work. The inspector is also aware that a licensee engineer is being prepared to assume these 'cognizant engineer' responsibilities. If the cognizant engineer coverage of work on these valves is reduced from that provided in the past, the licensee should assess the need for some additional training of personnel involved in work on the subject isolation valves.

3.7 Licensee Actions on Industry Experience

In October 1984 the licensee reviewed the event which occurred at Browns Ferry 1 on August 14, 1984 for applicability to Shoreham. At Browns Ferry a portion of the low pressure core spray system piping was apparently pressurized to near reactor pressure while performing a surveillance test. This was due to a combination of operator error and improper assembly of a solenoid valve on the testable check valve. This surveillance at Browns Ferry was conducted while the plant was at 100% power. The October 1984 review at Shoreham was conducted by the Independent Safety Engineering Group which concluded the following for Shoreham: "Testing of the core spray injection valve is never performed during power operation. Also, Tech Spec. 4.4.3.2.2 requires leak rate testing of *AOV-081 after each time maintenance is performed on the valve. Leak rate testing would identify any erroneous valve reassembly prior to return to service".

During this report period, the inspector provided the licensee with a copy of the 'Report to Congress on Abnormal Occurrences, July - September 1984'. This report discusses the problems of degraded isolation valves in Emergency Core Cooling Systems which have occurred at various nuclear plants and the associated corrective actions. The licensee has not yet completed its review of industry experience in this area.

This is unresolved item 85-24-01 pending completion of the licensee's review of industry experience and any identified actions to be taken as a result of this review.

4.0 4160 Volt Emergency Bus Auto-Transfer Disablement

In Supplement No. 6 to the Shoreham Safety Evaluation Report, the NRC Staff reviewed the electrical independence of the 20 MW gas turbine from the four mobile alternate power supplies and their circuits and discussed a concern that the electrical cross connections (shown on FSAR Figure 8.2.1-1) between the two alternate sources could cause their common failure.

Concerning the interconnections through 4.16-kV buses 1A, 1B, 11, and 12, the applicant stated that breakers numbered 420, 430, 460, and 470 on FSAR Figure 8.2.1-1 are normally open. Regarding the interconnection between 480-V buses 11A and 12A, 11B and 12B, 11C and 12C, and 11D and 12D shown on FSAR Figure 8.2.1-1, the applicant also stated that the breaker interconnecting each of these buses is normally open. As part of the Technical Specifications for Shoreham, the staff stated that it would require verification, once every 12 hours, that each of these normally open breakers remains open. As to the remaining interconnections through the 4.16-kV emergency buses numbered 101, 102, and 103, the applicant indicated that plant procedures would prevent such interconnection. Procedure directs that one of the two supply breakers to each of these buses normally would be kept open, while the other breaker normally is kept closed. The staff expressed the concern that because these breakers included an automatic transfer

capability between the two breakers, some event or single failure could cause failure of both sources of alternate power. To preclude this occurence, the staff stated that it would require that the transfer capability be removed for phases III and IV of the low-power license.

During this report period, the resident inspector reviewed the 4160 Volt Emergency Bus Distribution procedure (Station Procedure No. 23.309.01) and a draft temporary procedure change notice which is intended to accomplish the disablement of the automatic transfer capabilities. This temporary procedure change will implement change throughout SP No. 23.309.01, as necessary, to have the Reserve Station Service Transformer breakers to the 4160 volt emergency busses numbered 101, 102 and 103 maintained in the pull-to-lock position and caution tagged. This temporary procedure change would be implemented by the licensee upon receipt of a low power testing license for phases III and IV.

The inspector had no further questions.

5.0 Site Tours

The resident inspector conducted periodic tours of accessible areas in the plant, in the new Colt Diesel Generator Building and around the site in general. During these tours the following specific items were evaluated:

- Fire Equipment - Operability and evidence of periodic inspection of fire suppression equipment;
- Housekeeping - Maintenance of required cleanliness levels;
- Equipment Preservation - Maintenance of special precautionary measures for installed equipment, as applicable;
- QA/QC Surveillance - Pertinent activities were being surveilled on a sampling basis by qualified QA/QC personnel;
- Security - Adequate security coverage for areas toured;
- Component Tagging - Implementation of appropriate equipment tagging for safety, equipment protection, and jurisdiction.

All items observed during general site/plant tours were found to be satisfactory.

6.0 Unresolved Items

Areas for which more information is required to determine acceptability are considered unresolved. An unresolved item is identified in paragraph 3.7.

7.0 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. Based on the NRC Region I review of this report and discussions held with licensee representatives on June 18, 1985, it was determined that this report does not contain information subject to 10 CFR 2.790 restrictions.

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