

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report No. 50-322/83-08

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: March 1-31, 1983

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

4/11/83  
date signed

J.C. Higgins FOR  
C.D. Petrone, Resident Inspector

4/11/83  
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E.C. McCabe  
E.C. McCabe, Chief, Reactor Projects Section 2B

4/11/83  
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Approved by: Robert M. Gallo  
R.M. Gallo, Chief, Reactor Projects Section 1A

4/12/83  
date signed

Inspection Summary:

Inspections On: March 1-31, 1983 (Inspection Report No. 50-322/83-05)

Areas Inspected: Routine onsite inspections conducted during regular and backshift hours by the Resident Office Staff (573 inspection hours) of work activities, pre-operational testing, and plant staff activities including: review of previous items, tours of the facility, review of NRC Bulletins and Circulars, review of TMI items, review electrical wiring modifications, test procedure review, ESF reset review, followup on an allegation, and review of vendor audits.

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Results: Of the nine areas inspected no violations or deviations were identified in seven areas, one violation was identified in the eighth (failure to follow procedures, paragraph 6), and one deviation was identified in the ninth (ESF reset systems not per FSAR responses, paragraph 8).

## DETAILS

### 1. Persons Contacted

M. Giannattasio, Asst. Construction Superintendent (L)  
R. Gutman, Maintenance Engineer (L)  
K. Howe, General Supt. of Construction (S&W)  
J. Kelly, Field QA Manager (L)  
R. Lawrence, Startup Engineer (S&W)  
R. Loper, Technical Support Manager (L)  
W. Matejek, Lead Advisory Engineer (S&W)  
A. Muller, OQA Engineer (L)  
W. Museler, Manager, Construction and Engineering (L)  
K. Nicholas, Lead Startup Engineer (GE)  
T. Paulantonio, Lead Startup Engineer (S&W)  
J. Ricardo, Lead Startup Engineer (S&W)  
J. Riley, Operational Manager (GE)  
J. Rivello, Plant Manager (L)  
C. Seaman, Senior Asst. Project Engineer (L)  
J. Smith, Manager, Special Projects (L)  
D. Terry, Assistant Startup Manager (L)  
J. Wynne, 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. Followup on Previous Inspection Findings

#### 2.1 Items Closed

- 2.1.1 (closed) Inspection Followup Item (50-322/82-10-03), Friction Testing of Control Rod Drives (CRDs): RG1.68, Appendix A, Paragraph D.2.b requires friction testing of all CRDs at rated reactor pressure. Licensee Startup Procedure STP-5, Revision 1, Section 2.4. stated that this test would be performed only for 4 CRDs and provided justification for the same. The justification was that the licensee would be performing this test for all CRDs at zero reactor pressure and it could be demonstrated from testing of only 4 worst CRDs at rated pressure that no significant difference existed between zero and rated pressure conditions. The licensee's justification was based on previous CRD testing at other plants. However, since CRD installation practices could differ among plants, the inspector identified that the above justification should be based on Shoreham CRD test data. It was agreed that, if Shoreham test results of 4 CRDs at rated pressure showed

a significant difference from the test result at zero pressure conditions, all CRDs should be tested at rated pressure. The licensee, in Revision 2 of STP-5, revised the test procedure showing the above change.

- 2.1.2 (closed) Inspector Followup Item No. (50-322/82-10-04), Minimum Requirement for Successful Completion of STP-5, CRD System Tests: Revision 1 of STP-5, Section 8.0, excluded two subtests from the minimum requirement for successful completion of STP-5, namely, Subtest 8.4, Scram Discharge Volume (SDV) Testing and SDV Valve Testing, and Subtest 8.5, SDV Fill Time. However, these two subtests are required to be performed in accordance with IE Bulletin 80-17. The licensee subsequently revised STP-5 (Revision 2) to include these two subtests in the minimum requirement for successful completion of the test.
- 2.1.3 (closed) Unresolved Item No. (322/80-14-13): Lubrication Control: During a previous inspection it was noted that the licensee had a document, Mobil Lubrication Recommendation Book, which specified the lubricants to be used for all plant components. This book was not under administrative control as specified in ANSI N18.7-1972, paragraph 5.1. Subsequently, the licensee issued Station Procedure SP.31.019.01, "Lubrication Control" which contains a catalog of standard lubrication procedures, and a list of approved lubricants. The inspector reviewed this procedure and the licensee's Preventive Maintenance program. The licensee has specified lubrication requirements for each component in the Preventive Maintenance program. The type of lubricant is specified on the Scheduled Activity Worksheets (SAWs) and the lubrication procedure is specified by reference to SP.31.019.01. The inspector reviewed the completed lubrication SAWs for several safety related pumps and turbines. No deficiencies were identified. The inspector also toured the lube oil supply room and noted that the various oil and grease dispensers were clearly labeled and a lubricant issue log was being maintained as required by SP.31.019.01. The inspector had no further questions.
- 2.1.4 (closed) Unresolved Item No. (322/83-02-04): Siltemp Repair Procedure: This item identified that Engineering and Design Coordination Report (E&DCR) F-41238L allows for the repair of damaged SILTEMP wrapping by the addition of another layer of material over the first layer. The inspector questioned whether the licensee had derating data to support this method of repair. The licensee reviewed this question and decided that this method of repair should not be allowed for large power cables. One such cable had been repaired in this manner. Engineering and Design Coordination Report (E&DCR) F-41238 was revised to indicate this. The licensee removed all SILTEMP wrapping from this cable and installed new wrapping. The licensee also performed a review and determined that no other large power cables had been repaired in the above manner.

The inspector reviewed the revised E&DCR and the results of the licensee review. The inspector also examined the subject cable and noted that the repaired wrapping had been removed and the cable had been re-wrapped to original specifications. No discrepancies were identified.

## 2.2 Items Remaining Open

- 2.2.1 (open) Unresolved Item No. (322/81-12-04): Core Spray System FSAR Description: In a sequence of FSAR revisions ending with Rev. 28, the licensee corrected the erroneous valve descriptions, control arrangements, pump flow rates, and relief valve discharges. The licensee has subsequently performed his own FSAR conformance review, as part of the Shoreham Plant Configuration Review (SPCR) Program, for the Core Spray and other systems and has identified appropriate FSAR corrections. The question of ventline caps is separately addressed under item no. (322/83-02-23). The only part of this item remaining open is the indication of protective actions. Specifically there is no control room indication or annunciation, as required by IEEE-279 and as committed to in the FSAR page 7.3-80 paragraph 19, for the Core Spray Low Pressure Permissive Relay. This area was addressed in a letter from the NRC to LILCO dated January 6, 1983 in Enclosures 2 and 3.
- 2.2.2 (open) Unresolved Item No. (322/82-34-14): Procedure Forms: This item was previously reviewed in report 83-05. The inspector reviewed SP.12.011.01, "Station Equipment Clearance Permits (SECP)", Rev. 10 and the following associated forms:
- Appendix 12.1, SPF 12.011.01-6 SECP Form
  - Appendix 12.2, SPF 12.011.01-7 SECP Log Book Form
  - Appendix 12.3, SPF 12.011.01-8 SECP Tagging Order Form

In the procedure each Form was identified with a Rev. 10 notation from the procedure. In addition, the Log Book Form had a form revision number of Rev. 9, and the Tagging Order Form had a form revision number of Rev. 6. The SECP Form had no form revision number. The inspector then reviewed forms in use by operations personnel and noted that a copy was used, which generally did not carry the procedure revision number. Thus, some SECP forms had no revision number at all on them. Also, some recently used SECP forms had a revision 5 on them, which was outdated. One of the recently used Tagging Order Forms had a Rev. 8 on it, which was also outdated and several had no revision number. The inspector noted that the form revision numbering system contributed to using improper forms. The inspector also noted that there did not appear to be an effective system for ensuring that correct up-to-date forms are used. This item remains open and applies to all station procedure forms.

- 2.2.3 (open) Violation No. (322/81-22-02): Yellow Line Masters: This item was previously reviewed in 82-13 and 83-05. The program scope for the revised program does not address all NRC concerns. Additionally inspector review noted that: the status of subsequent drawing editions was not annotated in several cases, and a portion of a safety related system was apparently not yellow lined (on ESK 6G3308, contact 3C between 2-12 and 2-13C).
- 2.2.4 (open) Unresolved Item No. (322/82-04-05): RHR Labeling Discrepancies: The licensee took some actions on this item and presented it to the inspector as ready for closure. The items corrected were the control room drywell spray mimic, Shutdown Cooling Isolation Reset label, and E11\*PCV-003 label. The remaining items are still open.
- 2.2.5 (open) Unresolved Item (83-05-11): 24VDC Power Supplies: No additional licensee input on 24VDC power supply capability was identified. Inspection of High Pressure Coolant Injection (HPCI) system power supply data (GEK-63046 Vol. I Tab 4, C&IO Package E41-6, PT 202.001-1) indicated a rating of 97-130V input and 40°C (104°F), with C&IO tolerance established at 24VDC  $\pm$  10%. For a 114.36 VAC input, test results indicated a 23.56 VDC output (E41\*E/S-006, GE Mod. 9T66Y987) and a 25.64 VDC output (E41\*E/S-008, GE Mod. 9T66Y988). No correlation to rated or circuit load was identified, nor was any data available to show acceptable regulation, ripple, or temperature or humidity tolerance.
- 2.2.6 (open) Unresolved Item No. (322/82-14-06): System Descriptions: The licensee has an ongoing program to update the System Descriptions.(SDs). The licensee's representative stated that all safety related SDs would be updated by fuel load with the remainder by the end of 1983. The inspector stated that this was an acceptable schedule. This item remains open.

### 3. Plant Tour

#### 3.1 Discussion

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 cleanliness 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 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.

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

### 3.2 Housekeeping

The licensee has continued implementation of corrective actions in the housekeeping area, described in the NRC Confirmatory Action Letter dated January 19, 1983 and in the licensee's reply letter dated February 25, 1983. The inspector noted that: housekeeping inspections by various groups continued, that LILCO management has been active in reviewing the above activities; and that overall cleanliness has gradually improved. Specific deficiencies were noted on tours by NRC and quality assurance personnel. These were addressed by the licensee as they were identified.

### 3.3 Outdated Drawing

During a tour of the Remote Shutdown Panel Room the inspector noted an outdated revision of an electrical drawing on a panel door. The licensee issued LILCO Deficiency Report (LDR) No. 1181 to address this.

### 3.4 Non-Structural Weld Crack

During a tour of the Condensate Demineralizer Area the inspector noted a crack in the weld holding a cover on a support I-beam for Demineralizer N52-DE-002A. The licensee issued LDR No. 1174, whose disposition was to repair the weld. It was determined by the licensee that the weld in question did not affect the structural integrity of the demineralizer support leg.

## 4. NRC Bulletins and Circulars

### 4.1 Documents Closed

#### 4.1.1 Bulletin 82-04

This Bulletin, "Deficiencies in Primary Containment Electrical Penetration Assemblies", describes potentially significant problems associated with electrical penetration assemblies supplied by Bunker Ramo Corp. The licensee performed a review and determined that no Bunker Ramo Corp. electrical penetration assemblies are used at Shoreham. This item was added to the file for the Deficient Items List for the next revision. The inspector reviewed the electrical penetration purchase specifications, drawings, and inspected a sample of installed penetrations. No Bunker Ramo Corp. electrical penetration assemblies were identified. This Bulletin is closed.

#### 4.1.2 Bulletin 80-09

This Bulletin, Hydromotor Actuator Deficiencies describes two deficiencies associated with ITT General Controls (ITT-66) Model AH-90 and NH-90 Series Hydromotor Actuators. These problems included incorrect spring material and incorrect selection of spring size; either of which could result in failure of the actuators to open or close safety related dampers. The licensee performed a review and identified that 28 Model NH-90 and three Model AH-90 Series Hydromotor Actuators were used in safety related systems at Shoreham. These actuators were returned to the vendor for inspection, seal replacement, and spring replacement. All actuators were tested and a Performance Record and Test Certification Report issued for each unit. The vendor also issued Engineering Report 730.1.7, "Procedure for Spring Length Measurement and Adjustment - AH/NH-90 Hydromotor Actuators", which the licensee incorporated in the plant permanent files.

The inspector reviewed these documents including related correspondence, the implementing E&DCR, the revised Procedure for spring length measurement and adjustment, and the performance record and test certification reports. No deficiencies were identified. The inspector also toured selected parts of the affected systems to determine if the licensee had correctly identified the Model AH/NH-90 Hydromotor Actuators on safety related systems. The inspector did not identify any additional actuators of this type. This Bulletin is closed.

#### 4.1.3 Circular 77-01

This Circular titled "Malfunctions of Limitorque Valve Operators" described a situation where safety related motor operated valves (MOV's) failed to open due to an opening torque switch actuation. This Circular was previously reviewed in reports 82-15 and 82-35, which describe actions taken to jumper or bypass all opening torque switches and stroke valves electrically after maintenance. All operators have been made aware of the Circular's concerns and the good operating practice of electrically stroking a valve after manual operation, via required reading and the Operator's Qualification Guide. Additionally, safety related MOVs are electrically stroked periodically under the Section XI Inservice Pump and Valve Testing Program (nominal frequency is once per quarter). These actions adequately address the Circular's concerns and close the Circular.

#### 4.1.4 Circular 77-05

This Circular, "Fluid Entrapment in Valve Bonnets", describes circumstances in which fluid may become entrapped in the valve bonnet cavity of "split disc" and/or "flexible wedge disc gate" valves. This would then result in failure of valve parts or potential loss of valve function, if the temperature of the entrapped fluid increases, causing a pressure increase in the valve bonnet. The licensee performed a review of all Category I systems and identified 186 split disc valves. A field

walkdown of these valves revealed that 36 of these valves were in a configuration, described in the circular, which would tend to accumulate water in the bonnet. These valves were further evaluated to determine if they would be subject to the type of failures described in the circular.

The inspector reviewed the licensee's "Response to I&E Circular 77-05, Liquid Entrapment in Valve Bonnets", dated November 30, 1982, by SIGNA Energy Services. This report concluded that one valve required modification and another required operating procedure changes to eliminate the potential fluid entrapment problem. The inspector also reviewed Engineering and Design Coordination Report (E&DCR) No. L-0018, which was written to modify valve 1E51\*MOV-035 to provide a vent path to drain accumulated fluid in the bonnet. The inspector also performed a walkdown of approximately fifty percent of the split disc valves in the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems to verify that the valve types and configurations, recorded during the licensee's review, were correct. The inspector noted that the configuration of one valve was incorrectly recorded. The inspector requested that the licensee re-review their survey data to verify that no additional errors had been made.

The licensee reviewed all the walkdown sheets, made during the original survey, and determined that the recorded configuration for two valves (1E51\*MOV-32 and \*MOV-45) had been transposed. As a result, the detailed analysis was performed on valve 1E51\*MOV-32 rather than 1E51\*MOV-45. Subsequently the licensee performed a detailed analysis on 1E51\*MOV-45 and determined that this valve was not subject to valve bonnet over-pressurization as described in the Circular. The licensee also performed a re-walkdown of approximately eighty of these valves and identified no additional discrepancies between the walkdown data sheets and the as installed configuration of the valves. The inspector had no further questions. This Circular is closed.

#### 4.1.5 Circular 78-11

This Circular, "Recirculation M-G Set Overspeed Stops" was previously reviewed in inspection 83-01. Since that time the licensee has:

- Revised STP-29 to include a verification that the final electrical and mechanical stop settings satisfy technical specification (TS) section 4.4.1.1.2 requirements and that the process computer  $K_f$  value is conservative with respect to the actual stop settings; and
- Revised SP No. 54.604.07, "Thermal Limits Process Computer Evaluation (MAPLHGR, RGAF, MCPR, MLHGR)", to indicate that the actual  $K_f$  value used in the computer to calculate MCPR limits must be conservative with respect to the actual stop settings recorded in STP-29.

This Circular is closed.

#### 4.1.6 Circular 79-02

This Circular, "Failure of 120 Volt Vital AC Power Supplies" describes an incident in which at least two uninterruptable 120 volt AC power sources were lost (tripped). The licensee performed a review to address the four areas recommended in this circular and determined that:

- There are no time delays involved in switching of these power supplies and therefore no adjustment of the time delay is required.
- In addition to the system transformer taps, the inverter input is furnished with a potentiometer which was used to adjust the threshold value of the input voltages to optimize the input range.
- The protection circuitry was adjusted for undervoltage and over-current to provide the maximum equipment availability while ensuring power supply compatibility with load requirements and equipment ratings.
- The administrative controls employed to ensure operability of safety systems, after their subcomponents had been subjected to maintenance, were adequate.

The inspector performed a review to determine if the four items in the Circular had been adequately addressed. This review included system drawings, plant administrative procedures, and the results of the completed acceptance tests. No discrepancies were identified. This Circular is closed.

#### 4.1.7 Circular 79-17

This Circular, "Contact Problem in SB-12 Switches on General Electric Metalclad Circuit Breakers", describes a problem in which defects were found in SB-12 switches shipped during the time period of August 1, 1978 to July 1, 1979. This intermittent contact problem will cause a lack of continuity through the "a" contact of the switch that is used to energize the trip coil of the circuit breaker. This circular advised licensees to insure that all General Electric Company Metalclad Circuit Breakers, shipped during the period and used in or affecting the operation of safety related equipment, are replaced with new SB-12 control switches.

The licensee performed a survey to determine if any of these defective switches were in use in safety related systems at Shoreamm. This survey included:

- Control switches;
- Normal and Emergency 4160 volt switchgear;
- All 4160 volt breakers, including plant spares; and
- Recirculation Pump Trip (RPT) circuit breaker and cubicle switches.

This survey identified potentially defective SB-12 switches in several of the 4160 volt normal and emergency switchgear breakers and in the RPT breakers and cubicles. The licensee replaced these with new switches and listed the defective switches on the LILCO Deficient Items List to prevent future use.

The inspector examined the four RPT cubicles and circuit breakers and verified that the defective SB-12 switches had been replaced with new ones. The inspector also selected a sample of five 4160 volt normal and emergency switchgear breakers and determined by visual examination that none of them contained the defective switches. Two of these breakers were ones that had been identified during the licensee's survey as containing defective switches. The inspector verified that these switches had been replaced. The inspector also reviewed the documentation associated with these replacements, including purchase orders, letters, inspection reports, certificates of conformance, design specifications, and Engineering and Design Coordination Reports. No deficiencies were identified. This Circular is closed.

#### 4.1.8 Circular 79-18

This Circular, "Proper Installation of Target Rock Safety-Relief Valves", discusses the need to properly install insulation and valve components during maintenance. The licensee addressed these concerns in procedure SP 35.116.02 "Main Steam Safety/Relief Valve Inspection, Maintenance, Repair", Revision 0, dated January 10, 1983, which amplifies the instructions contained in "Target Rock Corporation, Safety Relief Valve Model 1567F Technical Manual" dated October, 1980. The inspector reviewed these documents and noted:

- That the two stage safety relief valves at Shoreham come equipped with the new silicone-nomex diaphragms as evidenced by a review of the bill of materials and the spare parts list in the technical manual;
- That inspection and replacement instructions for these diaphragms are included as part of the maintenance instructions and follow the valve manufacturer's recommendations;
- That instructions are included to install thermal insulation in accordance with the valve manufacturer's recommendations; and
- That the instructions include the manufacturer's recommended procedure steps and cautions to insure proper assembly of the air actuator, pilot, and main disk.

The inspector toured the drywell and verified that the accessible valves were the two stage type, Model 7567F. The licensee was in the process of installing thermal insulation on these valves in accordance with the valve technical manual and as required by this Circular. No discrepancies were identified during the inspectors review and tour of the plant. This Circular is closed.

#### 4.1.9 Circular 79-19

This Circular, "Loose Locking Devices on Ingersoll-Rand Pump Impellers", describes an apparent generic problem associated with locking devices used to retain impellers on Ingersoll-Rand (IR) Types A, W, WD, and WDF pumps. The Circular recommends that the licensee review the pumps used, or planned for use, in safety related systems, to determine if the identified types of IR pumps, or units with similar impeller locking systems are used. The licensee should determine that the impellers are presently locked in an acceptable manner and that maintenance and installation instructions provide adequate guidance to ensure that pump impellers will be securely locked in place. As discussed in Inspection Report 82-15, the licensee's initial review determined that none of the Ingersoll-Rand type A, W, WD, WDF pumps were installed in safety related systems, but the review did not address other pumps with similar impeller locking systems as recommended in the Circular. As a result, the licensee expanded the scope of the review to include other safety related pumps with similar impeller locking systems. As a result of this review the licensee identified four safety related pumps (1M50\*P137A, 137B, 138A, and 138B) which were not supplied with impeller locking devices. Engineering and Design Coordination Report (E&DCR) F-44879 was issued to install special locking assemblies. The inspector reviewed the completed E&DCR and noted that the installation of the locking devices had been verified by a Field Quality Control Inspector. The inspector also verified that this change had been incorporated in the vendor's maintenance manual. The inspector performed a walkdown of approximately fifty percent of the safety related pumps and did not identify any IR type A, W, WD, or WDF pumps. The inspector also reviewed the vendor drawings for approximately twenty-five percent of the installed safety related pumps and did not identify any additional pumps with impeller locking devices similar to the IR types A, W, WD, or WDF. This Circular is closed.

#### 4.1.10 Circular 80-09

This Circular, "Problems with Plant Internal Communication Systems", describes losses of offsite power at two sites which resulted in the loss of various internal communications, paging, and evacuation alarm systems which were powered from a non-safeguards bus. The inspector reviewed the Circular and the licensee's actions during inspection 83-01. Subsequently, the licensee took action to resolve the identified concerns. The inspector performed a followup inspection and verified by visual examination and procedure review that:

- The power supplies for the in plant telephone system had been connected to non-interruptable power supply outlets.
- Signs prohibiting radio transmission in the prohibited areas (e.g. control room, emergency switchgear room, and relay room) had been installed; and a Scheduled Activity Worksheet (SAW) had been written to periodically verify that the signs were maintained.

- Station Procedure SP 23.319.01, Revision 2 had been issued, which included precautions against radio transmissions in the specified areas.

This Circular is closed.

#### 4.1.11 Circular 80-22

This Circular, "Confirmation of Employee Qualifications", discusses two instances in which unqualified individuals were hired as designers/engineers by a utility and an architect-engineering company. In each case the employer failed to confirm the validity of their technical and educational qualifications as presented in their employment applications. The inspector reviewed the Stone & Webster Engineering and LILCO Personnel Policies and noted that procedures included requirements to verify professional licenses, technical degrees, and employment history for newly hired employees. The policies also call for a reverification of the qualifications of personnel who were hired prior to implementation of these policies. The inspector discussed the implementation of these policies with responsible personnel. This Circular is closed.

#### 4.1.12 Circular 81-12

This Circular, "Inadequate Test Procedure of PWR Protection System" described a situation in which circuit breakers in safety systems failed to trip. The failure of these breakers due to an out-of-adjustment condition or lack of periodic cleaning and relubrication of the trip shaft mechanism, was addressed in Bulletin 79-09 and closed in inspection report 83-05. Circular 81-12 identifies other breaker failures attributed to a different cause; namely, inadequate test procedures. The Reactor Protection System (RPS) periodic test procedure in use at the time did not verify the trip function of the undervoltage trip coil independently of the shunt trip coil. Both coils were tested simultaneously so failure of one coil would not be apparent since energization of either coil is sufficient to cause a trip. The licensee reviewed all Category IE breakers at Shoreham and found that although no GE type AK-2 Circuit Breakers were used, breakers of the dual type coil design were used in the normal and reserve supply breakers to 4.16 KV buses 101, 102, and 103, and to the 4.16 KV Recirculation Pump Trip (RPT) breakers. However, the coils on each of these breakers is on a separately fused circuit with the capability for independent testing. The inspector reviewed electrical system drawings and walked down selected portions of these systems in the plant. No GE AK-2 type circuit breakers were identified. The inspector also reviewed the Shoreham Preventative Maintenance Program and Protective Relay Trip Operational Tests and determined that these procedures include steps to independently test both trip coils on the dual coil breakers. The inspector identified no discrepancies. This Circular is closed.

#### 4.1.13 Circular 81-13

This Circular, "Torque Switch Electrical Bypass Circuit for Safeguard Service Valve Motors", describes valve malfunctions resulting from electrical bypass circuits around the valve-open torque switch on Limitorque valve operators not being installed. The inspector reviewed the licensee's initial response and documented this review in Inspection Report 82-30. To address concerns identified by the inspector, the licensee issued procedure SP 87.001.10, "Motor Operated Valve Static Test", which provides the necessary checks to ensure that torque switches are bypassed, as required, whenever a new or modified valve is installed. The licensee also provided justification for why plug, ball, and butterfly valves do not require torque switch bypasses. The inspector reviewed these documents and identified no discrepancies. This Circular is closed.

#### 4.2 Documents Remaining Open

##### 4.2.1 Bulletin 79-18

This Bulletin, "Audibility Problems Encountered on Evacuation of Personnel from High-Noise Areas", describes problems with plant announcement systems, particularly in high noise areas. The Bulletin specifies surveys be made with maximum anticipated noise levels and corrective actions be taken as determined necessary. The licensee's preliminary determination has identified two areas where the site announcement/alarm system (Gaitronics) requires enhancement: the Diesel Generator Rooms, and the Diesel Fire Pump Room. Gaitronics units in these areas will receive volume boost cards to increase volume only when equipment is running and strobe lights for visual indication. The modifications will be performed prior to fuel load. The licensee has concluded that the full plant survey per the Bulletin is not practical until after fuel load when all noise-generating equipment can be run to its full capacity. The licensee's representative stated that the remaining field testing per the Bulletin would be accomplished during the power ascension test program and that modifications resulting from these tests and analyses would be made as required. This Bulletin contains both pre-fuel load and post-fuel load items and remains open.

##### 4.2.2 Other Documents

During the inspection period the inspector also reviewed Circulars 79-21, 79-24, and 81-01, but was unable to close them for various reasons. They will be reviewed again when licensee actions are complete.

## 5. Three Mile Island (TMI) Modifications

As a result of the accident at Three Mile Island in 1979, the NRC issued a number of new requirements, detailed in NUREG-0737, "Clarification of TMI Action Plan Requirements". The implementation of several of these items was reviewed on site. Item numbers are from NUREG-0737.

### 5.1 Item II.B.1, Reactor Coolant System Vents

NUREG-0420, the Shoreham Safety Evaluation Report, Supplement 1 (SSER-S1), states that the Safety Relief Valve (SRV) system satisfies this venting capability requirement provided positive valve position indication is provided in the control room. The control room has individual, front panel SRV position indication (pressure sensed) and individual, back panel recorder printout of SRV position indication (temperature sensed). A common alarm is annunciated in the control room. Sensor qualifications and calibrations are considered under review of TMI item II.D.3, SRV positive position Indication. Sampling review of operating and emergency procedures showed licensee consideration of the reactor vessel head vent lines and the main steam line drains as alternate means of depressurizing (cooling) and the securing of such vent paths when necessary. On watch, operating staff personnel were knowledgeable about these features and the associated procedures. TMI item II.B.1 is closed.

### 5.2 Item II.B.7, Containment Hydrogen Control

NUREG-0420, The Shoreham Safety Evaluation Report, Supplement 1, accepted the licensee's containment inerting system design for maintaining oxygen less than 4% by volume during normal operation. Draft Technical Specification (TS) 3.6.6.2 requires that drywell and suppression chamber oxygen be less than 4% by volume from within 24 hours before reducing thermal power below 15% of rated. Draft TS 4.6.6.2 requires regular surveillance of containment oxygen concentration, and draft TS 3.10.5 permits suspension of TS 3.6.6.2 for the first 6 months after initial criticality. NRC inspection of containment oxygen measurement provisions was accomplished during inspection 322/82-26. Routine resolution of outstanding items and inspection of Technical Specification requirements will verify compliance with this TMI item. This item is closed.

### 5.3 Item II.D.3, Direct Indication of Relief and Safety Valve (SRV) Position

For TMI item II.D.3, NUREG-0737, clarification of TMI Action Plan Requirements, and NUREG-0420, the Shoreham Safety Evaluation Report, Supplement 1 (SSER-S1) state the following.

- (1) The operator should have unambiguous SRV position indication.
- (2) SRV position should be indicated and alarmed in the control room.
- (3) A reliable single-channel indication, powered from a vital instrument bus, may be provided if backup methods of determining SRV position are available.
- (4) SRV position indication should be seismically qualified.
- (5) SRV position indication should be environmentally qualified.
- (6) Human factor analysis should consider operator use of SRV position information under normal and abnormal conditions, integration into emergency procedures and operator training, and other alarms during an emergency and the need for prioritizing alarms.

The SSER-S1 accepts the use of a safety grade pressure sensing system backed-up by temperature sensors. Integration into operator training and procedures is a basis for acceptability.

Onsite inspection of the SRV position indication verified individual pressure sensed and individual temperature sensed control room indication of SRV position with a common alarm, and with the pressure instrumentation being designated as safety-related. Checkout and Initial Operation (C&IO) testing calibrated both temperature and pressure equipments, and sampling review of the C&IO data identified no unacceptable conditions. On-watch operators were aware of the indication available and applicable operating and emergency procedures, stated that the operating procedure was being revised to incorporate the pressure sensing instruments in addition to the temperature sensors, confirmed that training had been conducted on the pressure and temperature instrumentation, and indicated preference for the pressure instrumentation because it provides instantaneous identification of an open SRV while the temperature recorder prints out individual tailpipe temperatures once each recorder cycle. Operating Procedure SP 23.116.01 identifies actions to be taken on indication of open SRV's and refers to the Emergency Shutdown Procedure for cases when an open SRV cannot be closed. The Emergency Procedures are symptomatic procedures based on BWR Owners Group work, and receive separate NRC review.

Drawing review showed that the SRV tailpipe pressure instrumentation is supplied from 125VDC vital power through HPCI Inverter E41\*INV-007 and 24VDC power supply 1E41\*E/S-006. Sampling review of the pressure loop seismic and environmental qualification and discussion with NRR:EQB identified no problems other than the qualified life of the pressure transmitters being 2 years and 10 months. That qualification is considered conservative and adequate to justify operability during the first operating cycle.

Calibration procedures were not available for the safety-related pressure sensing loops and the important-to-safety temperature sensing loops; the licensee stated they would be provided.

TMI item II.D.3 remains open pending revision of calibration, operating, and emergency procedures.

5.4 Item II.K.3.15

This item, "Modify Break Detection Logic to Prevent Spurious Isolation of HPCI and RCIC Systems", describes a situation in which startup of these systems causes a pressure spike which is sensed by the break detection circuitry and results in a spurious isolation of the HPCI and RCIC systems. The licensee adopted the BWR Owners Group recommendation and issued Engineering and Design Coordination Report (E&DCR) F-39190 to adopt a time delay relay scheme, which would eliminate spurious isolation of the steam supply line isolation valves. The inspector reviewed the E&DCR, GE Field Disposition Instruction, FDI No.TFEO, the associated Engineering Change Notice (ECN), and system drawings. The inspector also examined the affected relay cabinets (H11-P617, P618, P620, and P621) and verified that the old relays had been removed and new relays of the proper type had been installed. No discrepancies were identified. This item is closed.

5.5 Item II.K.3.24

Under this item, Space Cooling for HPCI and RCIC Systems, the licensee was required to confirm the adequacy of space cooling for the HPCI and RCIC systems in the event of loss of offsite AC power. The licensee's space cooling for HPCI and RCIC is from the Reactor Building Standby Ventilation System which receives power from the onsite emergency diesel generators, thus satisfying this item. This item is closed.

5.6 Item III.D.3.4

This TMI item, "Control Room Habitability" addresses the need for the licensee to assure that control room operators will be adequately protected against the effects of accidental release of toxic and radioactive gases and that the nuclear power plant can be safely operated or shut down under design basis accident conditions. The licensee submitted the results of their findings to the Office of Nuclear Reactor Regulation, who performed a review of the submittal and published the results in NUREG-0420, Supplement No. 1, Safety Evaluation Report (SER). The SER accepted the licensee's systems and analyses and stated that the licensee had further committed to include provisions for carbon dioxide (CO<sub>2</sub>) detection and alarm, and that when these additional modifications had been completed, they will have satisfied the requirements for control room habitability.

The inspector reviewed the documentation associated with the installation of the CO<sub>2</sub> monitors including the FSAR, SER, and Engineering and Design Coordination Report (E&DCR) P-3834. The inspector toured the plant and verified that the detectors had been installed in accordance with the E&DCR. The inspector also reviewed the results of the Checkout and Initial Operation (C&IO) procedure and noted that the CO<sub>2</sub> monitors had been checked out and calibrated successfully. The inspector also reviewed the preoperational test procedure for the Control Room Air Conditioning System (CRAC) and noted that steps had been included in this procedure to verify that the CO<sub>2</sub> monitors would, on detection of high CO<sub>2</sub> levels, isolate the air intake valves, initiate an alarm, and print a warning on the process computer alarm typer. The inspector identified no discrepancies. This TMI action item is closed.

#### 6. Electrical Wiring Modifications

Modifications to electrical wiring are accomplished on site via E&DCRs. After system turnover to Startup, implementation of E&DCRs is required to be done via a Repair/Rework Request (R/RR). The R/RR then specifies retesting required.

The Main Steam Isolation Valve Leakage Control System (MSIV-LCS) was turned over to Startup in 1981. Checkout & Initial Operation (C&IO) testing was completed on portions of the system's motor control center, R24\*MCC-111Z, in July of 1981. On October 31, 1981 E&DCR No. F-32337B was written, which stated that certain cables were terminated in this MCC, but should actually be spares. The E&DCR resolution was to disconnect, tape and mark these cables as spares. On October 3, 1982 this E&DCR was verified by construction personnel as having been implemented. No R/RR was written to perform the wiring disconnections and no C&IO retesting was performed or scheduled for this MCC to verify that the wiring changes were correctly implemented. This is a violation of 10 CFR 50, Appendix B, Criterion V and is designated item no.(322/83-08-02).

On September 22, 1982 E&DCR No. F-32337C was issued to further address the wiring in this MCC. The inspector noted that the wording in different parts of this E&DCR was contradictory: in one place stating that the indicated wires would be terminated (or attached), in another stating that they would be disconnected. The licensee therefore initiated Revision D to the E&DCR to clarify the intent of Revision C. The actual wiring appeared to have been done correctly in accordance with the design function.

#### 7. Diesel Generator Preoperational Test

On March 7, 1983 the licensee approved procedures PT.307.005A, B and C to perform various electrical load tests of the Emergency Diesel Generators (DGs). One purpose of these tests is to implement the requirements of Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used As Onsite Electric Power Systems At Nuclear Power Plants" (R.G. 1.108) for full load and two hour load tests. The full load continuous rating of the DGs is 3500 Kilowatts (KW) and the two hour rating is 3900 KW. In the procedure, the

licensee specified the acceptance criteria as  $3500 \pm 70$  KW and  $3900 \pm 80$  KW. The inspector noted that the procedure as written and approved did not meet the requirements of R.G. 1.108 due to the negative tolerances. The inspector further noted that non-conservative negative tolerances of this type should in general, not be used; however, if needed, then they must be accompanied by specific engineering justification. Other instances of non-conservative negative tolerances have been identified previously: DG testing violation (82-35-01), polar crane load lifts (report 82-15, para. 9), Drywell Floor Seal Testing (report 82-15, para. 8.2), and Battery Testing (80-13-02). This item is unresolved and is designated Item No. (322/83-08-03).

#### 8. Engineered Safety Feature (ESF) Reset

NRC Bulletin 80-06 first addressed the issue of some plant designs, which did not provide an adequate ESF Reset. The concern deals with the time after an actuation signal for an ESF System has come and cleared, and the seal-in actuation logic is being cleared by the ESF reset button. Under this item, when the reset button is used, no ESF equipment should automatically change state back to its non-safety mode. The Office of Nuclear Reactor Regulation (NRR) in FSAR question 223.88 asked the licensee to review his design and identify all instances where components would change state on an ESF reset. A few instances were identified. In a subsequent review, Region I identified that the Control Room Air Conditioning System also changed state on a reset from a manual initiation. The licensee was asked by NRR in FSAR questions 223.99 and 100 to conduct a further review to ensure that manual ESF initiations were considered. The licensee stated that they were and further committed to verify the ESF reset design review in preoperational tests. During this inspection period, the inspector again reviewed this area. Two additional areas were identified where ESF systems change position on a reset: (1) The Reactor Building Standby Ventilation System (RBSVS) changes to the non-safety mode on a reset from a manual initiation and from a low differential pressure initiation, and (2) The Traversing Incore Probe (TIP) Nitrogen Purge Containment Isolation Valve reopens after a reset of the Nuclear Steam Supply Shutoff System. This is a deviation (322/83-08-04).

Additionally, the inspector noted that the preoperational test program did not fully test to verify that components did not change position after the actuation signal clears and then after a system reset from both automatic and manual initiations. (e.g. Core Spray and Residual Heat Removal). And, for some components (e.g. RBSVS), the preoperational test program verified that components did change position. This did not fulfill the intent of the commitments made in the FSAR. Bulletin 80-06 will remain open.

## 9. Monitoring Instrumentation

During a review of Emergency Core Cooling Systems (ECCS) monitoring instrumentation, the inspector noted that some items, covered in the Standard Technical Specifications (TS), had been deleted from the Shoreham Draft TS (e.g. Core Spray sparger pipe break instrumentation, ECCS keep full instrumentation and suppression pool water level). These had been deleted as a result of meetings and discussions between the NRC staff and the Boiling Water Reactor (BWR) Licensing Review Group. The inspector questioned how surveillance and operability of these instruments was to be addressed, but did not receive definitive answers. This item is unresolved (322/83-08-05).

## 10. Flexible Boot Seals

The adequacy of the overlap provided in Bisco flexible boot seals at Shoreham was questioned in an allegation to the NRC. These boot seals are used to seal wall penetrations where applicable pipes pass through a wall sleeve or hole. The applicable Keasby-Bisco installation procedures for such seal installation were reviewed. Those procedures cover cutting and installation of boot seals for pipe penetrations where there is clearance between the pipe and the surrounding sleeve, which is fixed to the wall. In general, a 3" surface area is prescribed on the sleeve extension for boot installation with the boots sealed for about 2" or more and the excess material trimmed off after sealing and compression ring installation. For longitudinal boot sleeve sealing, the procedures prescribe cutting both the pipe end (smaller) and sleeve end (larger) of the boot such that the conical boot exceeds the circumference of the component, to which attached, by about 2", with a tight seal resulting in a longitudinal boot seal seam width of about 2". Sampling inspection of about 20 installed boot seals showed that a longitudinal boot seam overlap of 2" or more was maintained. The seal material on the pipes and sleeves of the installed boots was trimmed off next to the installed compression ring, which was placed very close to the end of the sleeve. This practice results in a sealed surface of about 0.5" or less. The purpose of such compression ring placement was described by licensee personnel as being to minimize chafing wear at the end of the sleeve. The reason for trimming the seal so close to the compression ring on the sleeve and on the pipe was stated to be the conical shape of the installed boot and the need to determine that no "fishmouth" shape existed on the seal at the edge of the compression ring. Confirmation of the acceptability of the strength of boot seals so trimmed was to be obtained from Bisco by the licensee. This item is unresolved (322/83-08-07) pending receipt of that documentation. No other discrepancies were identified.

## 11. Vendor Audits

During a review of NRC, Region IV 1982 Vendor Inspections, the inspector noted two performed at The Rockbestos Company of Connecticut in which numerous nonconformances were identified. Rockbestos supplies various types of electric cable to Shoreham. The inspector questioned the Quality Assurance (QA) Department regarding the findings of their most recent audits of Rockbestos and whether the pre-audit planning had considered the results of the NRC inspections. An Audit was performed for LILCO by Stone & Webster (S&W) in October, 1982 but the NRC inspections had not been used for preplanning, primarily because of unavailability of the results in the time frame of the

audit preparation. S&W normally does use those documents for audit preplanning. As a result of discussions with the inspector, the licensee's representative agreed to:

1. Revise LILCO's QAP18.1, Program Audit Procedure, to specifically require an auditor to review, among other items, pertinent NRC vendor inspections as part of pre-audit preparations, and
2. Perform a new audit of Rockbestos, taking into account the 1982 NRC inspections.

The inspector had no further questions at this time.

12. Unresolved Items

Areas for which more information is required to determine acceptability are considered unresolved. Unresolved items are contained in paragraphs 7, 9 and 10 of this report. Item numbers 83-08-01 and 83-08-06 were not used in this report.

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.