U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-322/84-46

Docket No. 50-322

License No. CPPR-95 Priority _____ Category B

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: December 3-7, 1984

Inspectors: S. Pullani
S. V. Pullani, Fire Protection Engineer 12-19-84
date

Also participating and contributing to the report were:

A. Fresco, Mechanical Systems Specialist, BNL
D. Kubicki, Chemical Engineering Branch, NRR
H. Thomas, Electrical System Specialist, BNL

Approved by: Clifford J. Anderson
C. J. Anderson, Chief,
Plant Systems Section
12/19/84
date

Inspection Summary:
Inspection on December 3-7, 1984 (Inspection Report 50-322/84-46)

Areas Inspected: Special, announced team inspection of emergency lighting and the safe shutdown capability of the plant in the event of a fire. The inspection involved 170 inspector hours on-site and 66 inspector hours in-office by the team consisting of 4 inspectors.

Results: No violations were identified. Eight deviations were identified in two areas. Eleven items remained unresolved at the end of the inspection.

DETAILS

1.0 Persons Contacted

1.1 Long Island Lighting Company (LILCO)

*L. Britt, Supervisor - Nuclear Licensing
*J. Carney, Corporate Fire Protection Engineer
H. Carter, Operations Engineer
*E. Dean, Assistant Operations Engineer
R. Diem, Nuclear Station Operator
*M. Giannattasio, Senior Project Engineer - Electrical
*R. Grunseich, Supervisor - Nuclear Licensing
R. Gutmann, Fire Protection Program Manager
J. Guttieri, Nuclear Assistant Station Operator
J. Haverly, Supervisor - Systems Engineering (Impell Corporation)
J. Johnson, Equipment Operator
*R. Kibinal, Director - Quality Assurance, Safety & Compliance
W. Laovis, Nuclear Assistant Station Operator
N. Lenis, Licensing
R. Loper, Manager - Operations Staff
*B. McCaffrey, Manager - Nuclear Licensing & Regulatory Affairs
P. Miller, Watch Supervisor
*A. Muller, QC Division Manager
*R. Paccione, Nuclear Systems Supervisor
P. Quinan, Fire Protection Supervisor
*G. Rhoads, Compliance Engineer (Impell Corporation)
*W. Steiger, Plant Manager
M. Vasely, Nuclear Engineer (Systems)
*J. Wynne, Compliance Engineer
*E. Youngling, Manager - Nuclear Engineering Department

1.2 Stone and Webster Engineering Corporation (S&W)

*R. Gauthier, Lead Power Engineer
*J. Murphy, Licensing Engineer
*R. Poltrino, Lead Control Engineer

1.3 Nuclear Regulatory Commission (NRC)

*C. Anderson, Chief, Plant Systems Section
*P. Eselgroth, Senior Resident Inspector

*Denotes those present at the exit meeting.

2.0 Purpose

This inspection was to ascertain that the licensee is in conformance with his previous commitments with respect to the emergency lighting and with

respect to the safe shutdown capability of the plant in the event of a fire.

3.0 Background

10 CFR 50.48 and Appendix R of 10 CFR 50 became effective on February 17, 1981 for plants licensed prior to January 1, 1979. For plants licensed or to be licensed after January 1, 1979 (Shoreham falls under this category), 10 CFR 50.48 and Appendix R are invoked by the licensing process which includes a review of the Fire Protection Program for conformance with the Standard Review Plan (NUREG-0800), Section 9.5.1, dated July 1981 or its previous version, BTP APCSB 9.5-1 including its Appendix A. Shoreham was reviewed against the latter document.

The review of the licensee's Fire Protection Program is documented in the Safety Evaluation Report (SER) dated April 1981 and its supplements 1 through 4. Various licensee commitments are documented in the SER, its supplements, and several licensee submittals. These commitments were used by the team as bases for the inspection.

4.0 Correspondence

All correspondence on the subject, between the licensee and the NRC, was reviewed by the inspection team in preparation for the site visit. Attachment 1 to this report is a listing of the correspondence reviewed.

5.0 Post-Fire Safe Shutdown Capability

The licensee's post-fire safe shutdown analysis of the fire protection provided for safe shutdown equipment is presented in three submittals. By letter dated May 21, 1981, the licensee provided a comparison of the plant design with Appendix R. The licensee also provided a separation analysis of cables within the reactor building by letter dated February 10, 1981 and analysis of shutdown circuits outside the reactor building by letter dated July 10, 1981.

The licensee's post-fire safe shutdown analysis demonstrated that systems needed for hot shutdown and cold shutdown are redundant and that one of the redundant systems needed for safe shutdown would be free of fire damage, by providing separation, fire barriers, and/or alternative shutdown capability.

5.1 Systems Required for Safe Shutdown

The safe shutdown analysis considered components, cabling, and support equipment for systems needed to shut down. Thus, in the event of a fire, at least one train of systems free of fire damage would be available to achieve and maintain hot shutdown and to proceed to cold shutdown. For hot shutdown, at least one of the following shutdown systems would be available: (1) the Reactor Core Isolation Cooling System, (2) the High Pressure Coolant Injection System, and

(3) a combination of the Pressure Relief System (safety/relief valves), the Core Spray System and Residual Heat Removal (RHR) system. For cold shutdown, an appropriate portion of the RHR system would be available. Attachment 2 to this report provides additional details of the logic used for the shutdown.

Support systems and equipment are also required for safe shutdown. A complete list of safe shutdown systems and equipment is given in the licensee's Cable Separation Analysis Report (CSAR), Section 4.3.

5.2 Safe Shutdown Capability for Various Fire Areas

For equipment located in the primary containment, no fire protection features are provided because the containment atmosphere will be inerted during normal operation.

For equipment located in the reactor building (secondary containment), the licensee provided a cable separation analysis which divided the reactor building into overlapping 45 degree segments. The licensee assumed that all components, the cables and raceways, in a given segment were lost due to a fire; yet demonstrated that the capability to shut down still existed. NRC reviewed the cable separation analysis and concluded in Supplement 1 to the SER, Section 9.5.6, that it is an acceptable method of demonstrating that adequate separation exists between the redundant trains. Additionally, the licensee has committed (by July 10, 1981 letter) to verify that the "as-built" design has a minimum 20-foot separation between redundant safety-related components.

For equipment in areas outside the reactor building, the licensee has identified seven areas which contain cables for redundant shutdown equipment: the relay room, the control room, the diesel-generator rooms, the emergency switchgear room, the fuel oil pumphouse rooms, the screenwell, and the HVAC room.

In the diesel-generator rooms, the emergency switchgear room, the fuel oil pumphouse rooms, and the screenwell, redundant equipment is separated by 3-hour fire-rated barriers. Cabling to this equipment is contained in underground ducts. In the event that fire disables redundant equipment in the HVAC room, control room, or relay room, a remote shutdown panel is provided in the reactor building (see Supplement 1 to the SER, Section 9.5.6).

5.3 Remote Shutdown Capability

Sections 7.4.1.4, 7.5.1.4, and 7.5.1.5 of the Final Safety Analysis Report (FSAR) describe the remote shutdown panel's design and capability. By letter dated May 21, 1981, the licensee addressed Section III.L of Appendix R. The design objective of the remote shutdown panel is to achieve and maintain cold shutdown in the event of a fire disabling the relay room, the control room or HVAC room.

The RCIC system, safety/relief valves and one division of the RHR system can be controlled from the remote shutdown panel to achieve cold shutdown.

The design objective of the remote shutdown panel is to conform with the performance goals outlined in Section III.L. Reactivity control will be accomplished by a manual scram before the operator leaves the control room. The RCIC system will provide reactor coolant makeup and the RHR system and the safety relief valves will be used for reactor heat removal. Reactor water level, reactor pressure, suppression pool water level and temperature, and drywell pressure and temperature are among instrumentation available at the remote shutdown panel to provide direct reading of process variables. The remote shutdown panel also includes instrumentation and control of support functions needed for the shutdown equipment. Transfer switches are installed on this panel to electrically isolate the shutdown circuits from the Control Room/Relay Room and to provide a redundant fused control circuit. Procedures for use of the remote shutdown panel include sequencing of equipment and operator actions.

6.0 Inspection Methodology

The inspection team examined the licensee's capabilities for separating and protecting equipment, cabling and associated circuits necessary to achieve and maintain hot and cold shutdown conditions. This inspection sampled selected fire areas which the licensee had identified as being in conformance with BTP APCSB 9.5-1/Appendix R.

The following functional requirements were reviewed for achieving and maintaining hot and cold shutdown:

- Reactivity control
- Pressure control
- Reactor coolant makeup
- Decay heat removal
- Support systems
- Process monitoring

The inspection team also examined the licensee's capability to achieve and maintain hot shutdown and the capability to bring the plant to cold shutdown condition in the event of a fire in areas where remote shutdown capability is provided. The examination included a review of the drawings for the remote shutdown capability and review of the procedures for achieving the remote shutdown. Drawings were reviewed to verify electrical independence from the areas of concern. Procedures were reviewed for general content and feasibility.

Also inspected were fire detection and suppression systems and the degree of physical separation between redundant trains of Safe Shutdown Systems (SSSs). The team review included an evaluation of the susceptibility of

the SSSs for damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems.

The inspection team examined the licensee's fire protection features provided to maintain one train of equipment needed for safe shutdown free of fire damage. Included in the scope of this effort were fire area boundaries, including walls, floors and ceilings, and fire protection of openings such as fire doors, fire dampers, and penetration seals.

The inspection team also examined the emergency lighting for areas of the plant necessary for safe shutdown.

7.0 Inspection of Protection Provided to Safe Shutdown Systems

7.1 Protection in Various Fire Areas

The team reviewed the protection provided to SSSs in selected fire areas for compliance with BTP APCSB 9.5-1/Appendix R. The following fire areas were inspected:

- Battery Room A
- Battery Room B
- Emergency Switchgear Room 101
- Emergency Switchgear Room 102
- Emergency Switchgear Room 103
- Diesel Generator Room 101
- Diesel Generator Room 102
- Diesel Generator Room 103

The cables of redundant divisions in the above areas are completely enclosed by a three-hour rated wall. Safe shutdown cables of a division do not cross over and mix with the cables of its redundant division.

The team did not identify any unacceptable conditions except as follows:

Backup Information for CSAR

Backup information required to evaluate the licensee's Cable Separation Analysis Report was not available at the site for the team to review at the time of the inspection. This information is required to confirm the cable separation in secondary containment. The licensee stated that such information can be generated from the computer program stored in Stone & Webster's office at Boston and can be made available to NRC.

This is an unresolved item, pending receipt and review of the information by NRC (50-322/84-46-01).

7.2 Safe Shutdown Procedures

7.2.1 Procedure Review

The team reviewed the following safe shutdown procedures:

- SP 29.022.01, Shutdown from Outside Control Room, Revision 4
- SP 23.133.01, Remote Shutdown Control System, Revision 5
- SP 29.010.01, Emergency Shutdown, Revision 4

The scope of review was to ascertain that the shutdown could be attained in a safe and orderly manner, to determine the level of difficulty involved in operating equipment, and to verify that there was no dependence on repairs for achieving hot shutdown. For purpose of the review, a repair would include installing electrical or pneumatic jumpers, wires or fuses to perform an action required for hot shutdown.

The team did not identify any unacceptable conditions except as follows:

a. No Reference to the Possibility of a Loss of Offsite Power Condition for Shutdown from Outside the Control Room

The primary procedure, SP 29.022.01, does not currently provide any directions to the operator in the event that off-site power is lost. The licensee has initiated a Station Procedure Change Notice (SPCN) 84-1656 to correct this condition. The team reviewed the SPCN and found it acceptable. This item is closed.

b. Minimum Actions to be Performed in the Control Room Not Identified

In the immediate actions of the primary procedure, reference is made to the Emergency Shutdown Procedure, SP 29.010.01. The latter procedure is designed for control room operation only and does not specify the minimum operations to be taken prior to evacuating the control room.

The licensee agreed to resolve this by relocating a note in the primary procedure, SP 29.022.01, that as much of the Emergency Shutdown Procedure as possible should be performed from the control room prior to evacuation.

This change is also under SPCN 84-1656 previously mentioned. The team reviewed the SPCN and found that this item is satisfactorily resolved. This item is closed.

7.2.2 Procedure Walk-Through

The team walked through selected portions of the procedures to determine that shutdown could be attained in an orderly and timely fashion. The team did not identify any unacceptable conditions except as follows:

Locations of Certain Remote Shutdown Components Not Specified

Certain operations must be performed locally when utilizing the Remote Shutdown Panel. The specific locations of the various valves and components is not indicated in the procedures.

The licensee has agreed to revise the procedures. Pending issuance of the revised procedures, this remains as an unresolved item (50-322/84-46-02).

7.3 Protection for Associated Circuits

Appendix R, Section III.G, requires that protection be provided for associated circuits that could prevent operation or cause maloperation of redundant trains of systems necessary for safe shutdown. The circuits of concern are generally associated with safe shutdown circuits in one of three ways:

- Common bus concern
- Spurious signals concern
- Common enclosure concern

The associated circuits were evaluated by the team for common bus, spurious signal, and common enclosure concerns. Power, control, and instrumentation circuits were examined for potential problems. A sampling basis was used in making the examination, since many circuits were involved and a determination of cable routing took considerable time.

7.3.1 Common Bus Concern

The common bus concern may be found in circuits, either safety related or non-safety related, where there is a common power source with shutdown equipment and the power source is not electrically protected from the circuit of concern.

The team examined, on a sampling basis, 4160V, 480V and 125V DC bus protective relay coordination. The team also examined, on a sampling basis, the protection for specific instrumentation, controls, and power circuits, including the coordination of fuses and circuit breakers. The licensee plans to perform relay setting at approximately 18-month intervals. No unacceptable conditions were identified.

7.3.2 Spurious Signals Concern

The spurious signal concern is made up of 2 items:

- False motor, control, and instrument indications can occur such as those encountered during 1975 Browns Ferry fire. These could be caused by fire initiated grounds, short or open circuits.

- Spurious operation of safety related or non-safety related components can occur that would adversely affect shutdown capability (e.g., RHR/RCS isolation valves).

The team examined, on a sampling basis, the following areas to ascertain that no spurious signal concern exists:

- Current transformer secondaries
- High/low pressure interface
- General fire instigated spurious signals

No unacceptable conditions were identified except as follows:

a. Lack of Comprehensive Analysis for High/Low Pressure Interface

The licensee did not provide a complete analysis, as specified by NRC Generic Letter 81-12 (see also Paragraph 7.4.m of this report), for the high/low pressure interface concern. A partial analysis of this type in the licensee's CSAR addressed only two such valves providing a high/low pressure interface. These were Valve 1E11 *MOV047 (Inboard RHR Isolation Valve) and Valve 1E11 *MOV048 (Outboard RHR Isolation Valve), as being spuriously actuated due to a fire in the secondary containment. These two valves provide redundant isolation for the high/low pressure interface between the Reactor Coolant and RHR systems. Since spurious actuation of only one valve at a time is to be considered for the analysis, the team did not identify any concern in this case. However, there could be other valves which provide similar high/low pressure interfaces. The licensee did not perform a comprehensive analysis for all possibilities. This is an unresolved item, pending completion of license analysis and its review by NRC (50-322/84-46-03).

b. Lack of Comprehensive Analysis for General Fire Instigated Spurious Signals

The general fire instigated spurious signals concern, as specified by NRC Generic Letter 81-12, was not completely analyzed by the licensee (see also Paragraph 7.4.m of this report) to ascertain any effects for a fire which occurs

anywhere in the plant. Particularly, no analysis was made to determine spurious actions due to a fire in the control room/relay room.

During the inspection, it was determined that the diesel generator feeder breaker d.c. control power could be damaged as the result of a fire in the control room and therefore the feeder breaker may not close automatically. The licensee subsequently elected to close the feeder breaker manually in case of such eventuality. It is necessary to operate this feeder breaker to energize the service water pumps which are necessary for cooling the diesels and the suppression pool (through RHR heat exchangers). The time limit for providing cooling for the diesels and the suppression pool determines how soon the diesel generator feeder breaker must be manually closed. The licensee did not have an analysis showing an estimate of this time limit. In the absence of this analysis, the team could not assess whether the manual closing of the feeder breaker could be accomplished in a timely manner to support the cooling requirements.

In summary, the licensee did not provide an analysis for the above time limit nor did they provide a comprehensive analysis for general fire instigated spurious signals. This is an unresolved item, pending completion of licensee analysis and its review by NRC (50-322/84-46-04).

7.3.3 Common Enclosure Concern

The common enclosure concern may be found when redundant circuits are routed together in a raceway or enclosure and they are not electrically protected or when fire can destroy both circuits due to inadequate fire barrier penetrations.

A number of circuits, selected on a sampling basis, were examined for this concern. No unacceptable conditions were identified.

7.4 General Fire Protection Features

The team examined the general fire protection features in the plant provided to maintain one train of safe shutdown equipment free of fire damage. Included in the scope of this effort were fire area boundaries, including walls, floors and ceilings, and fire protection of openings such as fire doors, fire dampers, penetration seals, fire protection systems, and other fire protection features. No unacceptable conditions were identified except as follows:

a. Spacing of Fire Detectors in Reactor Building

The team observed that the design of the fire detection systems in the Reactor Building does not conform to NFPA 72D/E. Specifically, the number of detectors per square foot of floor space has not been met; the maximum distance between individual detectors is exceeded (120 feet instead of 30 feet); and the location of detectors below ceilings is nonstandard. This represents a deviation from the applicant's commitment in Paragraph E.1.a of Revision 1 (June 1982) to the FHAR, enclosure to licensee letter to NRR dated August 6, 1982, to design the fire detection system in accordance with the above-referenced standards. The net effect of this deficiency is that a fire might not be detected promptly - if at all - by the installed detectors.

This is a deviation from the licensee commitment (50-322/84-46-05).

b. Routing of Sprinkler System Control Cables in RCIC and HPCI Areas of Reactor Building

The team observed that the control cables for the preaction sprinkler systems on elevation 8 feet of the Reactor Building are routed through the area protected by the sprinkler systems (specifically, the cables from the control panels for the systems to the deluge valves). This means that if a fire should occur, the cables could be damaged - preventing the sprinkler systems from actuating and suppressing the fire.

The licensee has stated that the cables associated with the system actuation are routed outside of the area protected. However, the team was unable to verify this statement because of lack of support information.

This is an unresolved item, pending licensee submittal of the support information for the above statement and its review by NRC (50-322/84-46-06).

c. Fire Doors Degraded Because of Security Modifications

The team observed that a significant number of fire doors and frames have been modified for security reasons. Representatives from Underwriters Laboratories have inspected these doors and concluded that certain modifications could have a significant adverse impact on the fire integrity of the doors. (Refer to U.L. report of 9/6/84.) U.L. has made recommendations to the licensee to upgrade the doors so as to restore their fire integrity. The licensee has begun to implement some of U.L.'s recommendations. The implementation program is not complete as of this date. Furthermore, some of the U.L. recommendations cannot be implemented because of their practical difficulty.

The licensee has not identified any acceptable mitigation for those U.L. recommendations that will not be implemented. This represents a deviation from a licensee commitment in Paragraph D.1.j of Revision 1 to the FHAR to provide fire doors having a resistance rating at least equal to the required rating of the barrier (50-322/84-46-07).

d. Diesel Fire Pump Cables in Electric Fire Pump Room

The team observed that the cables from the diesel fire pump controller and day tank pumps are routed through the same fire area as the electric fire pump. This represents a deviation from the licensee's commitment in Paragraph E.2.c of Revision 1 to the FHAR to separate the pumps and their associated components by a 3-hour fire wall. The effect of this condition is that a single event could cause the loss of all water for fire protection.

This is a deviation from the licensee commitment (50-322/84-46-08).

e. No Fire Damper in Duct between HVAC and Chiller Rooms

The team observed an HVAC opening in the fire wall separating the HVAC equipment room from the chiller room on elevation 44 feet. This opening is not provided with a fire damper. The FHAR, Revision 1, Paragraph D.1.j, describes the licensee's commitment to provide an adequately rated fire damper where a ventilation duct penetrates a fire wall.

This is a deviation from the licensee commitment (50-322/84-46-09).

f. Design Concentration of CO_2 in Battery Rooms and Cable Tunnel

During the inspection, the team observed that in certain fire areas that are protected by an automatic carbon dioxide fire suppression system, the floor-to-ceiling distance is large. The team was concerned that the systems would not be able to maintain the design concentration of extinguishing agent for the required "soak" time at locations high in the ceiling. The licensee provided the team with the results of the acceptance tests of all carbon dioxide and the halon fire extinguishing systems. With the exception of Battery Rooms A and B and the Cable Tunnel, design concentrations were maintained throughout the areas for the required duration. In the above-referenced rooms, the design density was not maintained at the highest test point. This represents a deviation from the licensee's commitment, to design these systems in accordance with NFPA 12, as contained in Paragraph E.5 of Revision 1 to the FHAR. This is a deviation from the licensee commitment (50-322/84-46-10).

The licensee subsequently has provided justification for this deviation. The team is referring this issue to NRR for resolution.

g. Fire Detectors in Computer Room Located above Suspended Ceiling

The team observed that the fire detectors which initiate CO_2 discharge in the computer room are located above the suspended ceiling. The location of these detectors could prevent timely successful actuation of the system if a fire occurred. This condition represents a deviation from the licensee's commitment, to design the carbon dioxide systems in accordance with NFPA 12, as found in Paragraph E.5 of Revision 1 to the FHAR (50-322/84-46-11).

h. Damaged Structural Steel Fireproofing

The team observed that the fireproofing protection ("pyrocrete") for structural steel which forms a part of the ceiling/floor assemblies in the charcoal filter room and chiller room on elevation 63 feet was damaged. This is a deviation from the licensee's commitment, in Paragraph D.1.j of Revision 1 to the FHAR, to provide 3-hour protection for the ceiling/floor assemblies in these areas (50-322/84-46-12).

i. Lack of Fire Hazard Analysis for Control Building Corridors and Electric Manhole 1

A fire hazard analysis was not conducted for corridors in the control building and for electric manhole number 1. This represents a departure from Section D.1.b of Appendix A to BTP APCSB 9.5-1. Safety-related systems are located in these areas. However, the corridors contain no active fire protection. This represents a departure from Section III.F of Appendix R.

This item is unresolved, pending satisfactory resolution of the issue by the licensee with NRR (50-322/84-46-13).

j. Single Header Feeds Both Sprinkler and Standpipe Systems at Reactor Building, Elevation 40 Feet

The team observed that, in the Reactor Building on elevation 40 feet, a single water supply pipe feeds both the sprinkler and standpipe systems. A single failure at this point, could result in the loss of both primary and secondary fire protection for the entire Reactor Building. This represents a departure from Section A.4 of Appendix A to BTP APCSB 9.5-1 and conflicts with Revision 1 of the FHAR.

The plant Technical Specification imposes a requirement to establish a backup water supply within 24 hours if such an event occurs - but no backup capability has been identified.

This item is unresolved, pending satisfactory resolution of the issue by the licensee with NRR (50-322/84-46-14).

k. Structural Integrity of Cable Tray Penetration Seals

The penetration seals were not tested in a configuration representative of what is found in the plant. Specifically, cable trays, with unprotected supports, penetrate the fire-rated seals. If the supports fail under an actual fire, a dynamic load will be produced which could cause the seal to fail. This does not conform to the guidelines of Section D.3.d of Appendix A to BTP APCSB 9.5-1.

This item is unresolved, pending a satisfactory resolution of the issue by the licensee with NRR (50-322/84-46-15).

l. Sizing of Fire Water Storage Capacity

It appears that the water storage capacity for fire fighting was not sized on the basis of the largest sprinkler demand plus an allowance of 1000 gallons per minute for manual hose streams. This does not conform to the guidance of Section C.2.e of Appendix A to BTP APCSB 9.5-1 and conflicts with the FHAR.

This item is unresolved, pending satisfactory resolution of the issue by the licensee with NRR (50-322/84-46-16).

m. Licensee Response to Generic Letter 81-12

The licensee has not provided specific responses to the guidance in NRC Generic Letter 81-12 and its clarification. The team was not able to ascertain whether the licensee had formally been requested by the staff to provide responses.

This item is unresolved, pending resolution of the issue between the licensee and NRR (50-322/84-46-17).

In addition to the above items, the team had concerns regarding following general fire protection features. These concerns were satisfactorily resolved after discussion with the licensee as stated below:

n. Installation of Penetration Seals

The team was concerned that fire-rated penetration seals were not installed in accordance with NRC guidelines. Specifically, the team was concerned that the seals were not in sufficient

thickness to achieve the required fire rating. The team was concerned that internal conduit seals were not installed at the required locations; and that all seals were not yet installed.

However, the licensee provided test results which confirmed that the thickness of the sealant material observed was enough to achieve the required fire rating. The licensee provided specifications and drawings which confirmed that the location of seals within conduit complies with the guidelines of Section D.3 of Appendix A to BTP APCSB 9.5-1. The licensee also provided the team with documentation confirming that the installation of fire seals at Shoreham is complete. These responses were sufficient to address the concerns.

This item is closed.

o. Cable Trays in Common Fire Wall of Redundant Switchgear Rooms

The team observed that cables in trays which originated in one switchgear room passed through the common fire wall between the other switchgear rooms. The team was concerned that cables from more than one shutdown division may be located in a single fire area. However, the licensee provided us the drawings which showed that the observed cables were not shutdown related.

This item is closed.

p. Fire Detectors for Relay Room Cabinets

The team observed that certain cabinets in the relay room were not provided with fire detection per NRC guidelines. However, the licensee demonstrated that these cabinets (1H21-RK-24; 1H21-RK-23; 1H21-RK-21) were not safety related. The absence of fire detectors is therefore acceptable.

This item is closed.

q. Electrical Supervision of Fire Protection Water Supply Valves

The team observed that certain valves which control the water supply for fire protection were not electrically supervised or locked open as specified by the licensee in Revision 1 to the FHAR. The valves were sealed open instead, which is an acceptable alternative.

Moreover, the applicant committed to inspect the sealed valves weekly - effective immediately. This commitment conforms to the guidelines of Section C.3.b of Appendix A to BTP APCSB 9.5-1 and to NFPA Standards 13 and 26 and is therefore acceptable.

This item is closed.

r. Fire Protection for Contaminated Equipment Storage Room

The team observed an area on elevation 150 feet of the Reactor Building identified as the Contaminated Equipment Storage Room. This area has no active fire protection. The team was concerned that combustible material would be stored in this unprotected area.

However, the licensee stated that this area will only be used for storage of noncombustible materials, the area will be posted accordingly, and that plant fire protection inspections will assure compliance. The team found this response acceptable.

This item is closed.

s. Electric Fire Pump Controller

The team observed that the controller for the electric fire pump is not U.L. listed.

However, the licensee provided documentation which indicates that the controller conforms to the guidelines of NFPA 20 for electric fire pump controllers which is an acceptable alternative. Based on this response, the team considers this item closed.

t. Alternate Shutdown Capability for Relay Rooms

Based on a review of previous licensee correspondence, the team was concerned that an alternate shutdown capability may not be available for the relay room if complete loss of function of all shutdown systems in the relay room was assumed.

However, the team subsequently confirmed that an alternate shutdown capability is available which is electrically and physically independent of the relay room.

This item is closed.

8.0 Emergency Lighting

Eight-hour battery pack emergency lights are required for areas of the plant necessary for safe shutdown. The licensee is committed to install self-contained eight-hour battery pack emergency lighting in all areas of the plant which could be manned to bring the plant to a safe cold shutdown and in access and egress routes to and from all fire areas (see Supplement 1 to the SER, Section 9.5.4).

The team examined the plant emergency lighting system to ascertain the licensee's compliance with the above commitment. The team did not identify any unacceptable conditions except as follows:

a. Nameplate Ratings of Emergency Lighting Battery Packs

There are two types of battery packs for emergency lighting evident in the plant: Exide F-100 6VDC packs with 2 bulbs and B-200 12VDC packs with 3 bulbs. The nameplate rating is 1.5 hours based on 4-bulb operation.

The licensee performed a test on one unit of each type which indicated that voltage decay was very minimal after 8 hours of testing (i.e., less than 0.5V for the 6V packs and slightly more than 1.0V for the 12V packs).

However, since it could not be ascertained that none of the battery packs have 4 bulbs, the licensee will review all of the emergency battery pack lighting to certify that it is capable of 8-hour operation.

This remains as an unresolved item, pending the above licensee action and its review by NRC (50-322/84-46-18).

b. No Emergency Lighting Available in Specific Locations

In the course of walking through the procedure for Shutdown From Outside the Control Room, SP 29.022.01, several areas were discovered which require local operator actions from outside of the Remote Shutdown Panel and do not contain any 8-hour emergency battery pack lighting.

The specific locations, all in the Reactor Building, are:

1. Elevation 150' North Side - area of the Reactor Building Closed Loop Cooling Water (RBCLCW) Pumps and also the Fuel Pool Cooling Pump area.

2. Elevation 78' at the RPV local instrumentation panels.

3. Elevation 63' at RHR Valve Room for the vent valves 01V-3124 and 01V-3125 associated with RHR valves MOV-47 and MOV-48.

4. Elevation 40' NW corner near the elevator for the condensate transfer loop fill valve (04V-0016).

In addition, the installed battery pack in the 101 Diesel-Generator Room cannot be aimed at the control panel because of its location.

This is a deviation from the licensee commitment, to install self-contained 8-hour battery pack emergency lighting in all areas of the plant which could be manned to bring the plant to a safe cold shutdown condition, as documented in Supplement 1 to the SER, Section 9.5.4 (50-322/84-46-19).

The licensee has agreed to review all of the emergency procedures to determine if there are any other areas which may require emergency lighting not now provided. The licensee is considering, as a possible resolution, procedural changes, as opposed to provision of lighting.

9.0 Oil Collection System for Reactor Coolant Pump

An oil collection system for reactor coolant pumps is required if the containment is not inerted during normal operation. As Shoreham containment is inerted during normal operation, the above requirement does not apply to this plant. Therefore, no inspection was performed in this area.

10.0 Quality Assurance

During the course of the inspection, the team reviewed several drawings, fire hazard analysis, fire protection modification packages, procedures, and other fire protection documents. The scope of review included verification of their technical adequacy, appropriate reviews, design and procurement controls, and other Quality Assurance requirements for the licensee's fire protection program. Except as noted in the previous sections of this report, the team did not identify any other unacceptable conditions.

11.0 Unresolved Items

Unresolved items are matters for which more information is required in order to ascertain whether they are acceptable, violations, or deviations. Unresolved items are discussed in Sections 7.1, 7.2.2, 7.3.2, 7.4, and 8.

12.0 Conclusions

The significant findings of this inspection are summarized in Attachment 3 and are categorized as follows:

1. Deviations from specific licensee commitments.

2. Departures from BTP APCSB 9.5-1, Appendix A.

3. Departures from 10 CFR 50, Appendix R.

With respect to the findings under Category 1, the licensee immediately instituted acceptable compensatory measures for lack of adequate fire protection features until permanent corrective actions are in place. These measures were documented in licensee letter to NRC, SNRC-1122, Mr. John D. Leonard, Jr., Vice President, Nuclear Operations, LILCO, to Dr. Thomas R. Murley, Regional Administrator, NRC Region I, dated December 7, 1984 and confirmed by NRC Confirmatory Action Letter CAL 84-25, Dr. Murley to Mr. Leonard, Jr., dated December 7, 1984.

With respect to the findings under all the categories, a meeting between the licensee and NRC is planned for the week of January 14, 1985, to discuss resolution of the issues.

13.0 Exit Interview

The inspection team met with the licensee representatives, denoted in Paragraph 1, at the conclusion of the inspection on December 7. 1984. The team leader summarized the scope and findings of the inspection at that time.

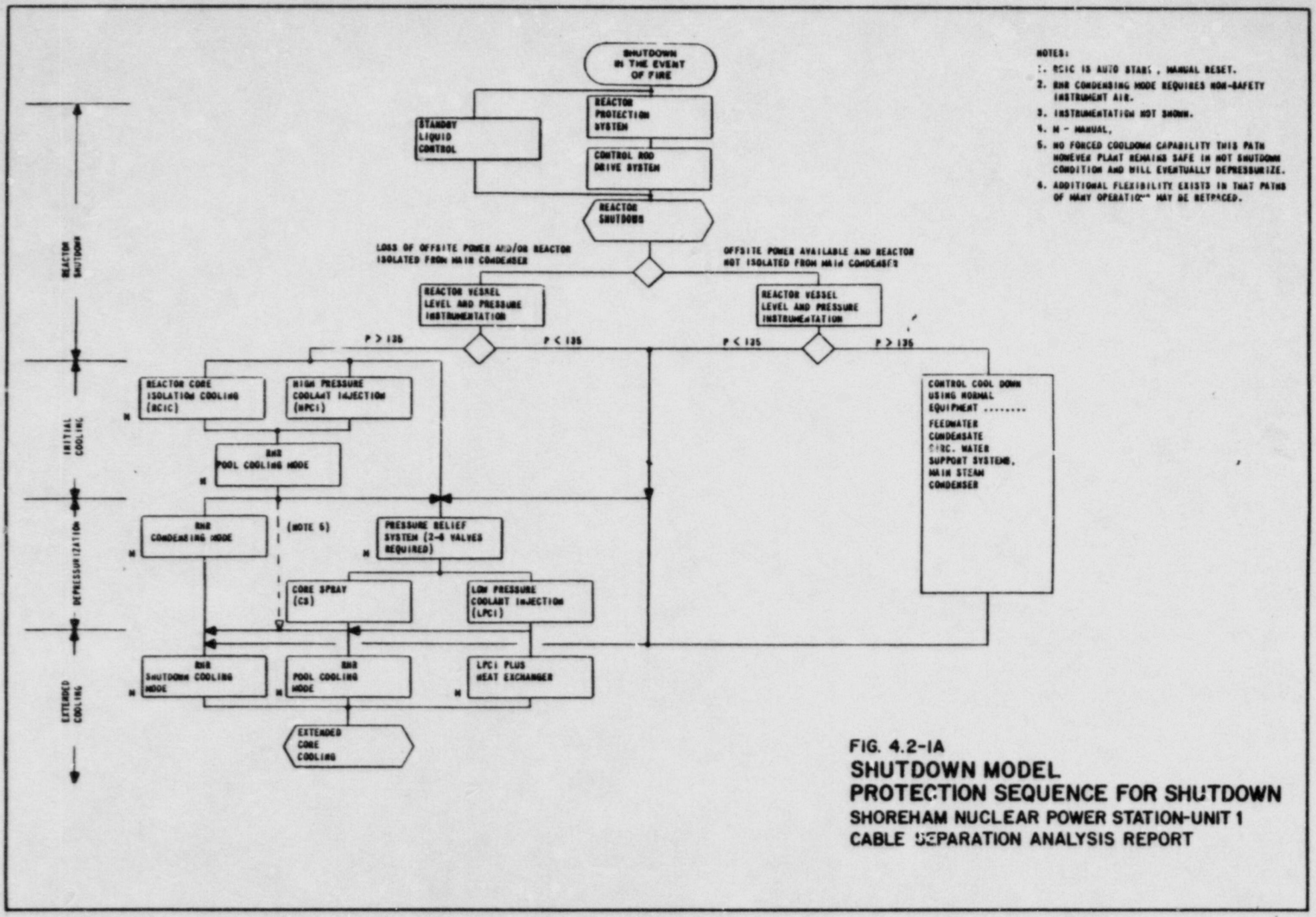
The team leader also confirmed with the licensee that the documents reviewed by the team did not contain any proprietary information. The licensee agreed that the inspection report may be placed in the Public Document Room without prior licensee review for proprietary information (10 CFR 2.790).

At no time during this inspection was written material provided to the licensee by the team.

ATTACHMENT 1

LIST OF CORRESPONDENCE

January 31, 1978	-	Letter from Licensee to NRC - Information Relating to FHA
June 27, 1978	-	Letter from NRC to Licensee - Additional Questions for the Licensee
August 7, 1978	-	Letter from NRC to Licensee - Additional Requests for Information Pertaining to Electrical Issues
December 11, 1978	-	Letter from Licensee to NRC - Responses to Questions
September 24, 1980	-	Letter from Licensee - Appendix R Comparison
April 1981	-	Shoreham Safety Evaluation Report (SER)
May 21, 1981	-	Letter from Licensee to NRC - Appendix R Comparison
July 10, 1981	-	Letter from Licensee to NRC - Understanding of Resolution Reached with NRC Staff
September 25, 1981	-	Letter from Licensee to NRC - Regarding Training
September 1981	-	Shoreham Safety Evaluation Report, Supplement No. 1
October 13, 1981	-	Letter from Licensee to NRC - Responses to SER Concerns
February 1982	-	Shoreham Safety Evaluation Report, Supplement No. 2
August 6, 1982	-	Letter from Licensee to NRC - Enclosing FHAR, Revision 1
February 1983	-	Shoreham Safety Evaluation Report, Supplement No. 3
April 13, 1983	-	Cable Separation Analysis
June 21, 1983	-	Letter from Licensee to NRC, Regarding SER Confirmatory Item 62 on Remote Shutdown Panel
September 1983	-	Shoreham Safety Evaluation Report, Supplement No. 4



NOTES:

1. RCIC IS AUTO START, MANUAL RESET.
2. RHR CONDENSING MODE REQUIRES NON-SAFETY INSTRUMENT AIR.
3. INSTRUMENTATION NOT SHOWN.
4. M - MANUAL.
5. NO FORCED COOLDOWN CAPABILITY THIS PATH HOWEVER PLANT REMAINS SAFE IN HOT SHUTDOWN CONDITION AND WILL EVENTUALLY DEPRESSURIZE.
6. ADDITIONAL FLEXIBILITY EXISTS IN THAT PATHS OF MANY OPERATIONS MAY BE REPLACED.

FIG. 4.2-1A

SHUTDOWN MODEL
PROTECTION SEQUENCE FOR SHUTDOWN
SHOREHAM NUCLEAR POWER STATION-UNIT 1
CABLE SEPARATION ANALYSIS REPORT

ATTACHMENT 3

SUMMARY OF SIGNIFICANT FINDINGS FROM

SHOREHAM FIRE PROTECTION INSPECTION 84-46

Item No.	Summary of Finding	Deviation/ Departure From	For Details Refer to Para.
	1. Deviations from Specific Licensee Commitments:		
84-46-05	Spacing of Fire Detectors in Reactor Building		
	Spacing of fire detectors not per NFPA 72 D/E as committed in FHAR	FHAR, Rev. 1, Para. E.1.a	7.4.a
84-46-06	Routing of Sprinkler System Control Cables in RCIC and HPCI Areas of Building		
	Reactor Building, RCIC and HPCI Area: sprinkler system control cables routed through the areas they are designed to protect. The system will not actuate for a fire in the areas. (Note: Licensee subsequently stated that the cables are outside the areas. The item is unresolved, pending confirmation.)	FHAR, Rev. 1, Para. E.3.c	7.4.b

Item No.	Summary of Finding	Deviation/ Departure From	For Details Refer to Para.
84-46-07	Fire Doors Degraded Because of Security Modifications		
	Degraded fire doors because of security modifications. Fire rating not per commitment.	FHAR, Rev. 1, Para. D.1.j	7.4.c
84-46-08	Diesel Fire Pump Cables in Electric Fire Pump Room		
	Cables for the diesel fire pump are routed through the electric fire pump room. This voids the 3-hour separation between the pumps, committed in FHAR.	FHAR, Rev. 1, Para. E.2.c	7.4.d
84-46-09	No Fire Dampers in Duct Between HVAC and Chiller Rooms		
	HVAC Room-Chiller Room: No fire dampers provided in the HVAC opening as stated in FHAR.	FHAR, Rev. 1, Para. D.1.j	7.4.e
84-46-10	Design Concentration of CO_2 in Battery Rooms and Cable Tunnel		
	Battery Rooms A & B and Cable Tunnel: Acceptance Test results indicate that design concentration (per NFPA 12) for CO_2 is not achievable.	FHAR, Rev. 1, Para. E.5	7.4.f

Item No.	Summary of Finding	Deviation/ Departure From	For Details Refer to Para.
84-46-11	Fire Detectors in Computer Room Located above Suspended Ceiling		
	Computer Room: Fire detectors which initiate CO_2 are located above false ceiling and as such, could prevent successful initiation (not per NFPA-12).	FHAR, Rev. 1, Para. E.5	7.4.g
84-46-12	Damaged Structural Steel Fireproofing		
	Structural steel fireproofing ("pyrocrete") damaged in charcoal filter room and chiller room. Does not conform to provide 3-hour protection for structural steel.	FHAR, Rev. 1, Para. D.1.j	7.4.h
84-46-19	No Emergency Lighting Available in Specific Locations		
	Lack of emergency lighting in certain areas required for safe shutdown for control room fire.	SSER 1, Section 9.5.4	8.b
	2. Departures from BTP APCSB 9.5-1, Appendix A:		
84-46-13	Lack of Fire Hazard Analysis for Control Building Corridors and Electric Manhole 1		
	A fire hazard analysis was not conducted for Control Building corridors and Electric Manhole 1	BTP APCSB 9.5-1, Appendix A, Sec. D.1.b	7.4.i

Item No.	Summary of Finding	Deviation/ Departure From	For Details Refer to Para.
84-46-14	Single Header Feeds Both Sprinkler and Standpipe Systems at Reactor Building, Elevation 40 Feet		
	Reactor Building, Elevation 40 feet: a single header feeds both sprinkler and standpipe systems. A single pipe break will disable both primary and secondary fire protection (not per the BTP).	BTP APCSB 9.5-1, Appendix A, Sec. A.4	7.4.j
84-46-15	Structural Integrity of Cable Tray Penetration Seals		
	Cable tray penetration seal may be damaged by imposition of dynamic load imposed on the seal by failure of "unprotected" cable tray support in case of a fire. Does not conform to the BTP.	BTP APCSB 9.5-1, Appendix A, Sec. D.3.d	7.4.k
84-46-16	Sizing of Fire Water Storage Capacity		
	Fire water storage capacity may not be sized on the basis of largest sprinkler demand plus an allowance of 1000 gpm for manual hose systems. This is not per the BTP or the FHAR, pages 1-20, para. E.	BTP APCSB 9.5-1, Appendix A, Sec. C.2.e	7.4.l

Item No.	Summary of Finding	Deviation/ Departure From	For Details Refer to Para.
	3. Departures from 10 CFR 50, Appendix R:		
84-46-17	Licensee Response to Generic Letter 81-12		
	The licensee has not provided specific response to the guidance in Generic Letter 81-12 and its clarification. The team is not able to ascertain if the staff had formally requested such response.	Appendix R, Sec. III.G.3 & Sec. III.L (via GL 81-12)	7.4.m
84-46-03	Lack of Comprehensive Analysis for High/Low Pressure Interface		
	The licensee did not have a comprehensive analysis.	Appendix R, Sec. III.G.3 & Sec. III.L (via GL 81-12)	7.3.2.a
84-46-04	Lack of Comprehensive Analysis for General Fire Instigated Spurious Signals		
	The licensee did not have a comprehensive analysis.	Appendix R, Sec. III.G.3 & Sec. III.L (via GL 81-12)	7.3.2.b

Item No.	Summary of Finding	Deviation/ Departure From	For Details Refer to Para.
84-46-01	Backup Information for CSAR		
	The backup information to evaluate the licensee Cable Separation Analysis Report (CSAR) was not available at the site for the team's review.	Appendix R, Sec. III.G.2	7.1.a
84-46-02	Locations of Certain Remote Shutdown Components Not Specified		
	The locations are not specified in the Safe Shutdown procedure (SP 29.010.01). If specified, it will facilitate an orderly and timely shutdown.	Appendix R, Sec. III.G.3 & Sec. III.L	7.2.2.a
84-46-18	Nameplate Rating of Emergency Lighting Battery Packs		
	The licensee to confirm that the battery packs are of 8-hour capacity.	Appendix R, Sec. III.J	8.a