LILCO LONG ISLAND LIGHTING

LONG ISLAND LIGHTING COMPANY

SHOREHAM NUCLEAR POWER STATION

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Direct Dial Number

August 15, 1983 SNRC-952

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

Equipment Environmental Qualification
SER Outstanding Issue No. 9
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Dear Mr. Denton:

This letter provides additional information requested by the NRC staff based on their review of LILCO submittal SNRC-945, dated August 3, 1983. Two topics are addressed; 1) the bases for our conclusion that 30 events in Section 15 of the Shoreham FSAR do not create a harsh environment, and 2) whether the loss of drywell coolers is an anticipated operational occurrence and, therefore, not covered by 10CFR50.49 or a design basis event which creates a harsh environment.

Of the 38 FSAR Chapter 15 events, 30 events were determined not to create a harsh environment. The following provides the basis for this determination.

Events 15.1.1 - 15.1.26 and 15.1.29 are considered Anticipated Operational Occurrences based on the 10CFR50 Appendix A definition and the frequencies as defined in Chapter 15 of the FSAR. There are no pipe ruptures and no fuel failures postulated for these events. However, for some of the events radioactivity is discharged to the suppression pool as a result of SRV actuation, as well as HPCI/RCIC operation. These discharges were anticipated in the development of the plant normal environmental conditions and are accounted for in the 40 year normal dose for the suppression pool. Therefore, it was determined that no harsh environment was created.

Event 15.1.27, Anticipated Transients without Scram, refers to NEDO 10349 which states, "since there were no calculated fuel failures

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nor any requirements for venting as a result of a transient with no scram or recirculation pump trip, no off-site radiological effects occur". Again, no pipe ruptures were postulated. Therefore, it was determined that no harsh environment was created.

Event 15.1.33, Control Rod Drop, does not create a harsh environment based on no rupture postulated and on a Stone & Webster Engineering Corp. (SWEC) calculation which results in a six month integrated gamma dose in the steam tunnel of 3.4×10^5 rads assuming no airborne source. This calculation is based on the fuel damage and fission product release described in FSAR Section 15.1.33.5.2.2, with the release assumed to be distributed instantaneously and uniformly in the steam volume including the main steam lines in the steam tunnel. This dose is less than the 40 year normal dose of 4.9×10^5 rads (EQR Rev. 5, Fig. D-2) and is therefore considered a non-harsh environment.

Event 15.1.36, Fuel Handling Accident, does not create a harsh environment based on no pipe rupture postulated and on a SWEC calculation which results in a maximum six month integrated dose in the reactor building of 2×10^3 rads. This calculation is based on the fuel damage and fission product release described in FSAR Section 15.1.36.5.2.2, with 100 percent of the released noble gas and 1 percent of the released iodine assumed airborne and 99 percent of the released iodine assumed in the fuel pool water. This dose is not significantly more severe than the 40 year normal dose of 1.8×10^3 rads (EQR Rev. 5, Fig. D-2) and therefore is considered a non-harsh environment.

The Drywell Air Cooling System (DACS) is described in FSAR Section 9.4.6, a copy of which is attached for your convenience (Attachment 2). The maximum normal temperatures given in the Environmental Qualification Report (i.e., the EQR, revised by LILCO letter SNRC-917, dated June 27, 1983) Appendix D and upon which equipment qualified lives are based, are consistent with the DACS design. Operation with temperatures exceeding these values is restricted by Technical Specifications 3/4.6.1.7 and 3/4.7.9, a copy of which is attached for your convenience (Attachment 3). (The next revision of the EQR will eliminate the discrepancy with Technical Specification Table 3.7.9-1 in the drywell head area temperature. It has been determined that this change will affect neither the qualified status of equipment located in the area nor any justifications for interim operation.)

As described in the FSAR, the drywell coolers are supplied by back-up emergency power and loss of drywell cooling is not considered an anticipated operational occurrence. Also, since operation with high drywell temperature is limited by Technical

Specifications, the loss of drywell cooling is not considered a design basis event. In addition, the loss of drywell cooling is inherently encompassed by the Shoreham Environmental Qualification Program. This is due to the fact that a LOCA automatically causes an isolation of the drywell cooling system. The resulting LOCA environment is a combination of the mass and energy release from the break, fuel damage and the loss of the drywell cooling system. In the event of a simple loss of drywell cooling with no other accident, the drywell temperature would gradually increase, but there would be no other effect on drywell atmosphere.

In conclusion, loss of drywell cooling has been adequately accounted for in the plant design and plant operational restrictions and, therefore, this circumstance is not subject to the requirements of 10CFR50.49.

It is our understanding that this information satisfies all outstanding staff requests for information needed to resolve SER Outstanding Issue No. 9. Should there be any questions, please contact this office.

Very truly yours,

J. L. Smith

J. L. Smith
Manager, Special Projects
Shoreham Nuclear Power Station

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Enclosure

cc: J. Higgins
All Parties Listed in Attachment 1

ATTACHMENT 1

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9.4.6 Drywell Air Cooling System

9.4.6.1 Design Bases

The drywell air cooling system circulates the atmosphere within the drywell to remove heat and maintain design temperatures. The drywell will be maintained at a maximum temperature of 146 F (avg. 127 F) during normal operation. The control rod drive area design temperature is 150 F, while maximum allowed temperature in the area is 165 F. In the proximity of electrical equipment, maximum temperature is 130 F. The system is not a safety related system.

9.4.6.2 System Description

During normal operation air is circulated as shown in Fig. 9.4.6-1 within the drywell by two unit coolers each comprised of four cooling coils, four 10,000 cfm fans, intake and discharge dampers, and supply and return ductwork. Air is supplied by three of the four fans in each unit to the lower level of the drywell and returned to the unit from the top of the drywell. Water from the reactor building closed loop cooling water system is used as the cooling medium for the coils. No control of air flow or water flow is provided for this system. However, should the requirements for cooling decrease, one or more of the operating fans can be shut down manually from the main control room.

To ensure continuous operation during loss of offsite power and no accident signal present, the drywell unit cooler fans, dampers, and valves are connected to the emergency power supply.

The units are designed to operate during all normal plant operations.

9.4.6.3 Safety Evaluation

The unit coolers are designed to meet the cooling requirements of the drywell with three fans in each unit running and one fan as a spare. Upon failure of any one of the three running fans or associated dampers in each unit, an alarm will sound in the main control room and the spare fan will be started manually from the main control room.

Upon indication of high pressure in the drywell or low reactor water level signals, the drywell unit coolers are automatically shut down, and all primary containment isolation valves in the cooling water piping are closed automatically.

The system is not safety related. However, all ductwork and equipment are seismically supported to ensure they stay in place and do not damage safety related equipment in the area.

9.4.6.4 Tests and Inspections

All components are tested and inspected as separate components and as integrated systems. After the system is completely installed, air flows are measured and adjusted to meet design flow rates. During plant normal shutdown, the system will be inspected and readjusted, if required, to meet design flow rates.

9.4.6.5 Instrumentation Application

Drywell unit cooler controls including selector switches, monitors, and system alarms are located on panels in the main control room.

Alarms are provided in the main control room for the following conditions:

1. Control Rod Drive area high temperature
2. Upper drywell exhaust high temperature
3. Drywell head area exhaust high temperature
4. Reactor building closed loop cooling water return water high temperature
5. Drywell unit cooler high supply air temperature

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DRYWELL AVERAGE AIR TEMPERATURE

LIMITING CONDITION FOR OPERATION

3.6.1.7 Drywell average air temperature shall not exceed 145°F.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

With the drywell average air temperature greater than 145°F, reduce the average air temperature to within the limit within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.7 The drywell average air temperature shall be the volume weighted average of the temperatures at the following locations and shall be determined to be within the limit at least once per 24 hours:

	Elevation	Azimuth
a.	68'-0"	13°, 320°
b.	80'-0"	190°, in CRD area
c.	83'-0"	25°, 135°, 255°
d.	110'-0"	165°, 350°
e.	145'-0"	55°, 230°
f.	162'-6"	Reactor Vessel Centerline

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3/4.7.9 AREA TEMPERATURE MONITORING

LIMITING CONDITION FOR OPERATION

3.7.9 The temperature of each area shown in Table 3.7.9-1 shall be maintained within the limits indicated.

APPLICABILITY: Whenever the equipment in an affected area is required to be OPERABLE.

ACTION:

With one or more areas exceeding the temperature limit(s) shown in Table 3.7.9-1:

a. For more than 8 hours, in lieu of any report required by Specification 6.9.1, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within the next 30 days providing a record of the amount by which and the cumulative time the temperature in the affected area exceeded its limit and an analysis to demonstrate the continued OPERABILITY of the affected equipment.

b. By more than 30°F, in addition to the Special Report required above, within 4 hours either restore the area to within its temperature limit or declare the equipment in the affected area inoperable.

SURVEILLANCE REQUIREMENTS

4.7.9 The temperature in each of the areas shown in Table 3.7.9-1 shall be determined to be within its limit at least once per 24 hours.

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TABLE 3.7.9-1

AREA TEMPERATURE MONITORING

	AREA	TEMPERATURE LIMIT (°F)
a.	Control Room	90
b.	Chiller Equipment Room (El 63')	104
c.	Relay Room	104
d.	Emergency Switchgear Rooms	104
e.	Battery Rooms	104
f.	Diesel Generator Rooms	120
g.	Screenwell House	104
h.	Reactor Building - Secondary Containment	
	1. General Areas	104
	2. Refueling Area	110
i.	Reactor Building - Primary Containment	
	1. General Areas	150
	2. Area Beneath RPV	150*
	3. Drywell Head Area	185

*165°F during Scram.

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3/4.6.1.5 PRIMARY CONTAINMENT STRUCTURAL INTEGRITY

This limitation ensures that the structural integrity of the containment will be maintained comparable to the original design standards for the life of the unit. Structural integrity is required to ensure that the containment will withstand the maximum pressure of 48 psig in the event of a LOCA. A visual inspection in conjunction with Type A leakage tests is sufficient to demonstrate this capability.

3/4.6.1.6 DRYWELL AND SUPPRESSION CHAMBER INTERNAL PRESSURE

The limitations on drywell and suppression chamber internal pressure ensure that the containment peak pressure of 46.0 psig does not exceed the design pressure of 48 psig during LOCA conditions or that the external pressure differential does not exceed the design maximum external pressure differential of 5.7 psid. The upper limit of Figure 3.6.1.6-1 will limit the total pressure to 46.0 psig which is less than the design pressure and is consistent with the safety analysis. The lower limit of Figure 3.6.1.6-1 ensures that the peak LOCA temperature will not exceed the safety analysis value and the containment external pressure requirements are satisfied.

3/4.6.1.7 DRYWELL AVERAGE AIR TEMPERATURE

The limitation on drywell average air temperature ensures that the containment peak air temperature does not exceed the design temperature of 340°F during LOCA conditions and is consistent with the safety analysis.

3/4.6.1.8 DRYWELL AND SUPPRESSION CHAMBER PURGE SYSTEM

The 18-inch drywell and suppression chamber purge supply and exhaust isolation valves are required to be sealed closed during plant operation since these valves have not been demonstrated capable of closing during a LOCA or steam line break accident. Maintaining these valves sealed closed during plant operations ensures that excessive quantities of radioactive materials will not be released via the containment purge system. To provide assurance that the 18-inch valves cannot be inadvertently opened, they are sealed closed in accordance with Standard Review Plan 6.2.4, which includes mechanical devices to seal or lock the valve closed or prevent power from being supplied to the valve operator.

The use of the drywell and suppression chamber purge lines is restricted to the 4-inch and the 6-inch purge supply and exhaust isolation valves since, unlike the 18-inch valves, the 4-inch and the 6-inch valves will close during a LOCA or steam line break accident and therefore the SITE BOUNDARY dose guidelines of 10 CFR Part 100 would not be exceeded in the event of an accident during PURGING operations. The design of the 4-inch and the 6-inch purge supply and exhaust isolation valves meets the requirements of Branch Technical Position CSB 6-4, "Containment Purging During Normal Plant Operations."

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3/4 7.7 FIRE SUPPRESSION SYSTEMS

The OPERABILITY of the fire suppression systems ensures that adequate fire suppression capability is available to confine and extinguish fires occurring in any portion of the facility where safety related equipment is located. The fire suppression system consists of the water system, deluge, CO_2 systems, Halon systems and fire hose stations. The collective capability of the fire suppression systems is adequate to minimize potential damage to safety related equipment and is a major element in the facility fire protection program.

In the event that portions of the fire suppression systems are inoperable, alternate backup fire fighting equipment is required to be made available in the affected areas until the inoperable equipment is restored to service. When the inoperable fire fighting equipment is intended for use as a backup means of fire suppression, a longer period of time is allowed to provide an alternate means of fire fighting than if the inoperable equipment is the primary means of fire suppression.

The surveillance requirements provide assurances that the minimum OPERABILITY requirements of the fire suppression systems are met. An allowance is made for ensuring a sufficient volume of Halon in the Halon cylinders by verifying the weight and pressure of the tanks.

In the event the fire suppression water system becomes inoperable, immediate corrective measures must be taken since this system provides the major fire suppression capability of the plant.

3/4.7.8 FIRE RATED ASSEMBLIES

The OPERABILITY of the fire barriers and barrier penetrations ensure that fire damage will be limited. These design features minimize the possibility of a single fire involving more than one fire area prior to detection and extinguishment. The fire barriers, fire barrier penetrations for conduits, cable trays and piping, fire windows, fire dampers, and fire doors are periodically inspected to verify their OPERABILITY.

3/4.7.9 AREA TEMPERATURE MONITORING

The area temperature limitations ensure that safety-related equipment will not be subjected to temperatures in excess of their environmental qualification temperatures. Exposure to excessive temperatures may degrade equipment and can cause loss of its OPERABILITY.

3/4.7.10 MAIN TURBINE BYPASS SYSTEM

The main turbine bypass system is required to be OPERABLE consistent with the assumptions of the feedwater controller failure analysis for FSAR Chapter 15.