LONG ISLAND LIGHTING COMPANY

Operating License NPF-36
Docket 50-322
License Change Application 7

This License Change Application requests modification to Operating License NPF-36 for the Shoreham Nuclear Power Station to achieve consistency with the anticipated physical condition of the plant. LILCO plans to implement a design change that will equip Shoreham's Standby Liquid Control System with slightly more than twice the "equivalent control capacity" required by 10 CFR 50.62 (c)(4). This will be accomplished by the use of eighty-five (85) atom percent Boron-10 enriched sodium pentaborate, a minimum injection rate of 41.2 gpm, and a proposed concentration range of 9.8 to 12.0 percent.

An in-plant test of the Standby Liquid Control System was performed September 1986 to determine the feasibility of meeting the requirements of the above mentioned rule with two pump operation. Based upon the results of this test and a subsequent calculation, LILCO proposes to change the discharge pressure in Section 4.1.5c from 1190 psig to 1220 psig.

These requests and supporting documentation are contained in the Attachment to this License Change Application.

Long Island Lighting Company

By John D. Leonard Jr.
John D. Leonard, Jr.
Vice President - Nuclear Operations

Subscribed and sworn to before me this 4th day of February 1987.

Linda A. Cratty
Notary Public of New York

LINDA A. CRATTY
NOTARY PUBLIC, State of New York
No. 4816267
Qualified in Suffolk County
Commission Expires March 30, 1988

My Commission Expires: March 30, 1988

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of

Long Island Lighting Company) Docket No. 50-322

SHOREHAM NUCLEAR POWER STATION - UNIT 1

CERTIFICATE OF SERVICE

I hereby certify that copies of License Change Application 7 to the Operating License for Shoreham Nuclear Power Station - Unit 1, dated February 4, 1987, have been served on the following by hand delivery or by deposit in the United States mail, first class, this 4 day of February 1987:

Mr. Jay Dunkleberger
New York State Energy Office
2 Rockefeller Plaza
Albany, New York 12223

L F Britt

L. F. Britt, Manager
Nuclear Licensing and
Regulatory Affairs

Subscribed and sworn to before me this 4th day of February 1987.

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Attachment
To License Change Application 7

1.0 DESCRIPTION OF CHANGE

Shoreham Technical Specification 4.1.5 and Figure 3.1.5-2 will require the proposed changes as identified in Exhibits A through C. Upon implementation, these changes will provide reasonable assurance that Shoreham's Standby Liquid Control System has slightly more than double the equivalent control capacity required by 10 CFR 50.62(c)(4).

In addition, Technical Specification bases section 3/4.1.5 requires revision as identified in Exhibit D.

2.0 REASON FOR CHANGE

LILCO letter SNRC-1205, dated October 10, 1985, stated that two pump injection was the preferred method of compliance with 10 CFR 50.62(c)(4), subject to the results of a test. The two pump injection test was performed in September 1986 under cold shutdown conditions; and, as subsequently described in this section, the results of the test showed that two pump operation would not be viable for compliance with the rule. Hence, another method of compliance had to be selected. For Shoreham, boron enrichment was chosen.

In order to satisfy the equivalent control capacity requirements of 10 CFR 50.62, the Shoreham 218 inch (internal diameter) reactor pressure vessel would require a boron-10 sodium pentaborate enrichment of approximately forty (40) atom percent. As part of the effort to find a suitable alternative to two pump operation, a study was performed to determine the effect of greater sodium pentaborate enrichments on the magnitude of the ATWS core melt frequency estimate as presented in the Shoreham Probabilistic Risk Assessment which was submitted by letter dated June 24, 1983. As expected, the higher enrichments allow additional time for Standby Liquid Control initiation because less time is required for injection of the amount (weight) of sodium pentaborate necessary to achieve a hot shutdown condition. This results in a decrease in the human error probability estimate for Standby Liquid Control System injection and to a lesser extent, a reduction in the ATWS core melt frequency.

After the Standby Liquid Control System (SLCS) two-pump test yielded higher than anticipated discharge line losses, the derivation of the pump discharge surveillance pressure was reviewed. The actual two-pump test results were analytically manipulated to develop a calculated discharge line pressure drop for one-pump operation (at 43 gpm). The maximum pump discharge pressure (for one-pump operation) is the sum total

of the discharge line losses plus the maximum vessel injection pressure. These maximum values are assumed to occur during a postulated full power ATWS with MSIV closure. The maximum vessel pressure is the sum of the lowest setpoint of Safety Relief Valves (SRVs) (1115 psig) and the pressure due to the head of the water in the reactor vessel. The derivation of the pressure at the SLCS sparger based on the lowest SRV setpoint and a water filled reactor vessel is a conservative calculation. The calculation has recommended a Standby Liquid Control System pump discharge surveillance pressure of 1220 psig.

3.0 BASIS FOR NO SIGNIFICANT HAZARDS FINDING

The proposed changes to the Standby Liquid Control System do not involve a significant hazards consideration because operation of the Shoreham Nuclear Power Station Unit 1, in accordance with this change, would not:

(1) involve a significant increase in the probability or consequences of an accident previously evaluated. The probability of an accident previously evaluated in the Shoreham Updated Safety Analysis Report (USAR) will not be increased as the use of 85 atom percent boron-10 enriched sodium pentaborate is chemically the same as natural pentaborate and does not have any effect on these accident initiators. The consequences of any accident previously evaluated in the FSAR will not be increased, based on a review of the Chapter 15 and Chapter 3 analyses. The use of the Standby Liquid Control System as a diverse means to shutdown the reactor is discussed in USAR Section 15.1.27, "Anticipated Transients Without Scram." This section states that up to 10 minutes are available to initiate SLC system. As discussed in NEDO-10349, the offsite radiological dose consequences calculated for this event are within the 10 CFR 100 dose limits. The analysis assumes the use of natural pentaborate (twenty atom percent B-10).

The use of eighty-five atom percent B-10 enriched sodium pentaborate at the minimum technical specification required flow rate of 41.2 injection rate will reduce the time required to bring the reactor to hot shutdown by approximately a factor of four. This will allow increased time for operator action and result in a higher probability that the SLC system will be initiated in a timely manner. Additionally, the use of enriched pentaborate does not require substantial modification of the SLC system. Pump redundancy will be maintained. The SLC tank level instrumentation setpoints will be reset to accommodate the smaller liquid poison volume associated with the use of eighty-five percent enriched pentaborate. The new setpoints will account for instrument accuracy to ensure that the required quantity of pentaborate is injected into the vessel.

Although this request will also result in an increase in the pump discharge surveillance pressure of the system, it is still well below the system design pressure and the relief valve setpoint. The capability of the relief valve to prevent system overpressure and maintain system integrity remains intact. The margin between the relief valve setpoint and the proposed pump discharge surveillance pressure is sufficient to prevent flow diversion through the relief valves, which will be verified during the pump surveillance.

Additionally, the change in system pressure does not change the system classification. The system remains moderate energy due to the limited time the SLC discharge piping is pressurized. Since the moderate energy analysis still remains valid, a significant increase in the probability and consequences of pipe break accidents, as previously evaluated for Shoreham, is precluded. The proposed SLC pump surveillance pressure increase will ensure vessel injection at sufficient flow rates for anticipated ATWS conditions. Therefore, this change does not compromise the safety of the plant.

(2) create the possibility of an accident that is different than any already evaluated in the USAR. The use of highly enriched pentaborate will not cause core power oscillations even with the assumption of no core flow during SLC injection. Based on the results of tests conducted in the Vallecitos Nuclear Center 1/6 Scale 3D Boron Mixing Test Facility as applied to the specific conditions of Shoreham, General Electric concluded that the dispersion of the boron following the restart of core flow is gradual enough that there is no danger of maldistribution of the boron in the water in the vessel.

The SLC system provides a diverse means of a reactor shutdown. It is an accident mitigator and the change in pump discharge pressure will not cause the SLC system to initiate any type of accident or malfunction not previously evaluated. The higher pressure will not cause any adverse conditions greater than those caused by the ATWS, nor will the surveillance itself cause any adverse conditions since a sufficient relief valve margin is maintained and the piping design pressure is not exceeded.

(3) involve a significant reduction in the margin of safety as defined in the bases to Technical Specification 3/4.1.5. The present bases primarily discusses the

technical issues associated with the shutdown requirement. The enriched pentaborate net tank volume and concentration ranges have been specified to adhere to the shutdown basis. The use of enriched pentaborate will increase the margin of safety associated with the injection rate. The ATWS Rule requires an injection rate equivalent in control capacity to 86 gpm of natural pentaborate based on a 251 inch internal diameter vessel. The proposed SNPS Technical Specification will ensure an injection capacity that is 200% of this requirement based on Shoreham's 218 inch internal diameter reactor pressure vessel.

The increased pump discharge surveillance pressure will still allow sufficient relief valve setpoint margin to ensure a minimum pentaborate injection rate of 41.2 gpm to the reactor under ATWS conditions. Since the relief valve setpoint will not be readjusted outside the present range of 1340 $\pm$ 60 psig, the system design pressure will not be exceeded. The proposed increase in the SLC pump discharge surveillance pressure maintains the margin of safety by requiring a technical specification flow rate verification at a pressure that is more representative of what the system could experience during an ATWS.

CONCLUSION

The proposed Technical Specification change to allow the use of eighty-five atom percent boron-10 enriched sodium pentaborate in the SLC tank at a concentration range of 9.8-12.0 percent does not increase the probability of an accident, nor does it cause a reduction in any safety margin. The enriched boron option was specified as part of LILCO's ATWS compliance program. A study indicated an ATWS core melt frequency reduction of a factor of 5 was associated with the use of highly enriched sodium pentaborate in comparison to the present SLC system configuration (natural pentaborate). As stated above, the use of highly enriched sodium pentaborate will not result in core power oscillations, even with the assumption of zero core flow during SLC injection.

The reduction of the concentration range was motivated by a desire to reduce the probability of equipment failures caused by pentaborate crystallization. The revised minimum required solution temperature reflects the lower saturation temperature associated with a maximum concentration of 12.0 percent.

The Commission has provided guidance concerning the application of standards for determining whether a significant hazards consideration exists by providing certain examples (48 FR 14870) of amendments that are considered not likely to involve significant hazards consideration. Example (ii) relates to a change that constitutes an additional limitation, restriction or control not presently included in the technical specifications: for example, a more stringent surveillance requirement. Example (vii) relates to a change to make a license conform to changes in the regulations.

In this case, the proposed changes described above are similar to both Example (ii) and Example (vii). First, the proposed change is needed for compliance with a change in the regulations (i.e., 10 CFR 50.62(c)(4)). Second, as stated above, the proposed changes constitute a more stringent surveillance requirement than that required by the rule since compliance with the rule can be accomplished with an enrichment of approximately forty atom percent boron-10 enriched sodium pentaborate.

Therefore, based upon the above considerations and analyses, LILCO has determined that this proposed change does not involve a significant hazards consideration.

4.0 TIMING OF CHANGE

Since this proposed technical specification change will require extensive numbers of station procedure changes and operator training, LILCO requests that it become effective upon implementation of modification and operator training.