LILCO
LONG ISLAND LIGHTING

LONG ISLAND LIGHTING COMPANY

SHOREHAM NUCLEAR POWER STATION

P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

Direct Dial Number

May 11, 1983 SNRC-887

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

SER Issue No. 48 - High Energy Line Breaks
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Reference: (1) Letter SNRC-786 dated 11/8/82
(2) Letter NRC (A. Schwencer) to LILCO (M. S. Pollock) dated 1/24/83

Dear Mr. Denton:

In response to SER Issue No. 48, "High Energy Line Breaks" (HELB), LILCO had submitted the reference (1) letter forwarding a report entitled "High Energy Line Break/Control System Failure Analysis". This report represented a comprehensive study, including a walk-down of plant areas, that was conducted (1) to identify non-safety control systems and components that may be affected by postulated pipe breaks and then (2) to conservatively determine the state of the reactor as a result of the simultaneous failure of all affected non-safety control systems. It was concluded that all conditions resulting from the postulated pipe break events are bounded by the accident analyses contained in Chapter 15 of the FSAR, and are therefore capable of being mitigated either automatically or by operator action.

In the reference (2) letter, the staff advised that their review of the above noted report cannot be fully completed until LILCO provides additional information on the effects of humidity, pressure and temperature on the operability of these non-safety control systems.

These effects have been addressed in formulating the conclusions reached in the HELB report, although a brief clarification may be beneficial. As stated in Section 4.1 "Analysis Methodology"

B001

two general methods were used to analyze the pipe break zones utilized in the study. For small confined zones, it was assumed that any HELB would incapacitate all non-safety control components within the zone. This assumption was made even though specific components may not be affected by the jet impingement or pipe whip resulting from a specific break. Using this conservative "sarificial approach", it becomes apparent that the environmental effects on these components are directly enveloped within the scope of the report.

In large, more open zones, only the components within the range of the high energy lines were assumed to fail simultaneously with the pipe break. This is consistent with the goals of the study, to determine whether the result of FSAR Chapter 15 accident analyses are exceeded. FSAR Chapter 15 analyses primarily address short term effects where limiting values generally occur very rapidly after event initiation. Assuming a reactor scram, automatic actions would quickly take place to mitigate the immediate effects of the event. Environmental effects on components in these large spaces would tend to develop relatively slowly in comparison to the dynamic effects on the components which would lead to more rapid automatic and operator initiated mitigative actions.

In addition, the staff requested, in the reference (2) letter, that the HELB study consider an additional single failure within the systems used to mitigate the event. In response, two examples of postulated worst-case scenarios were evaluated for the Shoreham plant. These two scenarios are identified below:

<u>CASE I</u>

a) HELB occurs in Turbine Building
b) Loss of feedwater heating occurs, causing reactor power increase to 117% of rated.
c) Turbine generator trip occurs coincident with peak reactor power
d) Scram occurs as a result of turbine generator trip. Loss of offsite power also occurs.
e) HPCI fails (Single failure)
f) RCIC operates
g) Reactor water level is restored by RCIC.

<u>CASE II</u>

a) Steps a through d are the same as CASE I
e) Loss of turbine bypass to condenser (single failure)
f) HPCI operates
g) Reactor water level is restored by HPCI

The occurrence of these events is extremely unlikely. This

conclusion is based on consideration of the probability that a combination of the worst case conditions occurs concurrently:

- The worst case pipe segment breaks on the most important line;
- HELB can affect all controllers in an area and cause failures in worst case modes;
- Breaks occur at worst case locations (in reality, many of these locations have low calculated stress levels and thus are unlikely to fracture);
- Both turbine trip and reactor high power-level trip occur at appropriate (i.e. worst cases) times;
- Additional single failure occurs

Regardless, these two cases were analyzed quantitatively using conservative Chapter 15 analysis models for the two analyses and the results indicate that the short term part of the event with bypass (turbine trip at the thermal power monitor set-point power) is enveloped by the FSAR Chapter 15 Accident Analysis. In this case, the peak fuel cladding temperature is less than 900°F as compared to 2200°F limit. The second event which imposed a failure of the turbine bypass system on the initial scenarios was estimated to reach a peak cladding temperature of about 1200°F, again well within the FSAR Chapter 15 Accident limits. This further confirms the conclusions outlined in the reference (1) letter.

It should be noted that the long term plant cooldown of these two events with various system failures, such as HPCI inoperative, are addressed in the Emergency Procedure Guidelines developed for these types of concerns.

The submittal of this information should be sufficient to close SER issue No. 48.

Should you have any further questions, please contact this office.

Very truly yours,

J. L. Smith

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

RWG:bc

cc: J. Higgins
All Parties Listed in Attachment 1

ATTACHMENT 1

Lawrence Brenner, Esq.
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Peter A. Morris
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. James H. Carpenter
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Daniel F. Brown, Esq.
Attorney
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Bernard M. Bordenick, Esq.
David A. Repka, Esq.
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

James Dougherty
3045 Porter Street
Washington, D.C. 20008

Herbert H. Brown, Esq.
Lawrence Coe Lanpher, Esq.
Karla J. Letsche, Esq.
Kirkpatrick, Lockhart, Hill
Christopher & Phillips
8th Floor
1900 M Street, N.W.
Washington, D.C. 20036

Mr. Marc W. Goldsmith
Energy Research Group
4001 Totten Pond Road
Waltham, Massachusetts 02154

MHB Technical Associates
1723 Hamilton Avenue
Suite K
San Jose, California 95125

Stephen B. Latham, Esq.
Twomey, Latham & Shea
33 West Second Street
P.O. Box 398
Riverhead, New York 11901

Ralph Shapiro, Esq.
Cammer and Shapiro, P.C.
9 East 40th Street
New York, New York 10016

Matthew J. Kelly, Esq.
State of New York
Department of Public Service
Three Empire State Plaza
Albany, New York 12223