



LONG ISLAND LIGHTING COMPANY

SHOREHAM NUCLEAR POWER STATION

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

JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

NOV 18 1988

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Submission of Long Island Lighting Company's
Response to Generic Letter 88-11
NRC Position on Radiation Embrittlement Of
Reactor Vessel Materials And Its Impact
On Plant Operations
Shoreham Nuclear Power Station
Docket No. 50-322

Gentlemen:

This letter responds to the request contained in Generic Letter 88-11, entitled "NRC Position On Radiation Embrittlement Of Reactor Vessel Materials And Its Impact On Plant Operations." Long Island Lighting Company (LILCO) has reviewed and applied the new methods described in Revision 2 of Regulatory Guide 1.99, entitled "Radiation Embrittlement Of Reactor Vessel Materials," to the beltline materials in the Shoreham Nuclear Power Station (SNPS) reactor pressure vessel. Our results and proposed actions are described below.

Results of Technical Analysis

A review of the SNPS reactor vessel beltline materials shows that a beltline weld metal with an assumed copper content of 0.35% will be limiting when applying Regulatory Guide 1.99, Revision 2.

Our preliminary technical analysis, based upon the calculational methods described in Revision 2 to Regulatory Guide 1.99, indicates the following results for the design life of thirty-two (32) effective full power years (EFPY):^{1/}

1/ Thirty-two effective full power years is commonly used in the industry to represent the end of design life. It assumes a 40 year operation of the plant at an eighty (80) percent capacity factor.

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<u>Regulatory Guide</u>	<u>Initial *RT_{NDT}</u>	<u>Shift</u>	<u>**Adjusted RT_{NDT}</u>
1.99 Revision 1	-50°F	219°F	169°F
1.99 Revision 2	-50°F	266°F	216°F

*RT_{NDT} - Reference Temperature (Nil Ductility Temperature) as defined in the ASME Code.

**Adjusted RT_{NDT} - The Initial Reference Temperature as adjusted for irradiation effects by adding to RT_{NDT} the temperature shift, measured at the 30 ft-lb level, in the average Charpy curve for the irradiated material relative to that for unirradiated material.

As can be noted, the new adjusted RT_{NDT} as determined by Regulatory Guide 1.99, Revision 2 methodology is greater than 200°F. In accordance with 10 CFR 50, Appendix G, Fracture Toughness Requirements, Section IV.B, a thermal annealing treatment at a sufficiently high temperature to recover material toughness properties of ferritic materials of the SNPS reactor vessel beltline would now be required before the end-of-life. This would not be necessary under SNPS current compliance with 10 CFR 50, Appendix G as approved by the NRC.

The impact of Regulatory Guide 1.99, Revision 2 on the SNPS reactor pressure test curve is shown on a mark-up of SNPS USAR figure 5.2.4-2, as attached. At 32 EFY, the 1000 psi leak test temperature (curve A'') for Regulatory Guide 1.99, Revision 1 is 250°F. Regulatory Guide 1.99, Revision 2 methodology increases the 1000 psi leak test temperature to approximately 300°F, as shown by Curve A'''. Since the reactor vessel can normally only be heated by pump heat, this temperature (300°F) cannot presently be achieved at SNPS. Obviously, this makes a very difficult situation even worse in Shoreham's case. To achieve the required 300°F, unless alternate heating methods are permitted, SNPS would potentially require the installation of additional auxiliary boilers and major piping modifications to directly deliver steam injection into the reactor coolant or to indirectly provide similar results through the use of large bypass type heat exchangers. This would require a large commitment of resources (i.e., time, money, material, and manpower) on LILCO's part.

Based upon the foregoing, LILCO has concluded that Regulatory Guide 1.99, Revision 2 has a significant impact on the SNPS reactor pressure vessel and upon plant operations.

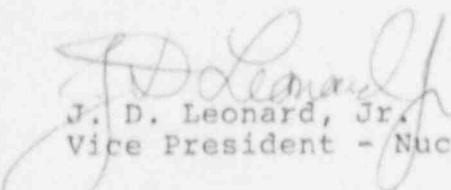
Proposed Actions and Schedule

The material upon which the SNPS analysis is based is weld material (E8018) for which the copper content was not reported. Our acquisition of information concerning the copper content could result in a reduction of adjusted RT_{NDT} at SNPS. Thus, our future plans are to determine the copper content of E8018 material through data bank research and also ascertain whether or not the material was utilized for any repairs in the beltline area. We plan to complete these activities by June 30, 1989.

Currently, the Shoreham Nuclear Power Station is operationally restricted to a 5% power level. Specific proposed actions and associated schedules cannot be established at this time. However, with the completion of the above cited activities, LILCO would expeditiously plan to meet with the NRC Staff to identify and discuss all necessary actions (hardware, procedures, and/or modifications) required to be completed within the two (2) plant outages as cited in the Generic Letter.

If additional information is required, or if LILCO can be of further assistance, please do not hesitate to contact this office.

Very truly yours,



J. D. Leonard, Jr.
Vice President - Nuclear Operations

MP/ap

Attachment

cc: W. T. Russell
F. Crescenzo
S. Brown

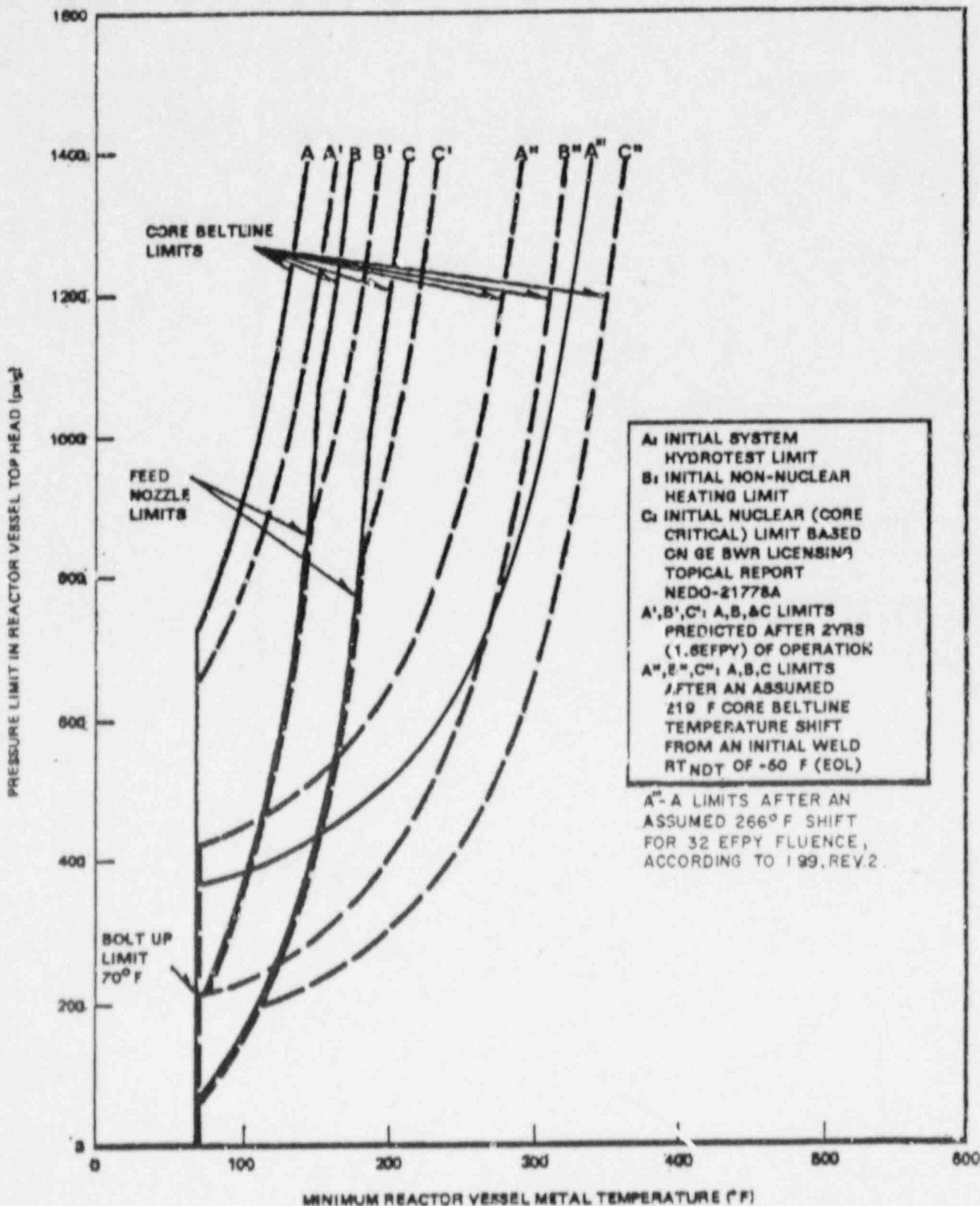


FIGURE 5.2.4-2
SNPS-1 MINIMUM TEMPERATURES
REQUIRED vs REACTOR PRESSURE
SHOREHAM NUCLEAR POWER STATION
UPDATED SAFETY ANALYSIS REPORT

REVISION 1 - DECEMBER, 1987