UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 82 TO FACILITY OPERATING LICENSE NO. DPR-35

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

1.0 Introduction

In a letter from W. D. Harrington to D. B. Vassallo dated July 30, 1984, the Boston Edison Company (BECo) requested changes to the pressure temperature limits and surveillance capsule withdrawal schedule for the Pilgrim Nuclear Power Station (PNPS). BECo has provided five sets of pressure-temperature limit curves (Leak and Hydrostatic Test, Heat-up and Cooldown, Critical Core Operation) which they indicate meet the safety margins of Appendix G, 10 CFR 50, for a period of time corresponding to 6.68 effective full power years (EFPY), 8.0 EFPY, 10.0 EFPY, 12.0 EFPY and 14.3 EFPY, respectively. BECo indicates that the revised withdrawal schedule meets the requirements of Appendix H, 10 CFR 50.

2.0 Evaluation

Pressure-temperature limits must be calculated in accordance with the requirements of Appendix G, 10 CFR 50, which became effective on July 26, 1983. Pressure-temperature limits that are calculated in accordance with the requirements of Appendix G are dependent upon the initial RT_{NDT} for the limiting materials in the beltline and closure flange regions of the reactor vessel and the increase in RT_{NDT} resulting from neutron irradiation damage to the limiting beltline material.

The PNPS reactor vessel was procured prior to the issuance of the Appendix G. However, the PNPS reactor vessel materials must meet the safety margins and testing requirements of the regulation. Appendix G requires that samples from each reactor vessel material be fracture toughness tested to determine their initial (unirradiated) RT_{NDT}.

In order to determine the RT_{NDT} of a material, both drop weight and Charpy V-notch (CVN) tests are required. For base metal, the CVN test specimen must be oriented perpendicular to the principal working direction of the plate. The materials in the PNPS reactor vessel were tested to an ASME Code edition and addenda that did not require sufficient testing to determine each material's RT_{NDT}. However, the licensee has used the available test results and the method of estimating RT_{NDT} recommended in Branch Technical Position MTEB 5-2, "Fracture Toughness Requirements," to

determine the initial RT_{NDT} for weld and base metal in the closure flange and beltline regions of the PNPS reactor vessel. The licensee's analysis is documented in Teledyne Engineering Services Technical Report TR-6052-1, Rev. 2, July 19, 1984, which was submitted with the requested change in the Technical Specifications. The unirradiated RT_{NDT} for the beltline welds and limiting plate were estimated as 0°F and -3°F respectively. The RT_{NDT} for the limiting plate in the closure flange region was estimated as -5°F.

The Pilgrim surveillance material data is documented in the Southwest Research Institute Report SWRI Project No. 02-5951, "Pilgrim Nuclear Power Station Unit 1 Reactor Vessel Irradiation Surveillance Program," dated July 1981. The amount of copper in the plate and weld surveillance material was reported as .14 percent and .16 percent, respectively. The increase in RT_{NDT} resulting from neutron irradiation damage was estimated by the licensee by extrapolating the test data points from the Pilgrim surveillance program at the rate of embrittlement reported in Regulatory Guide (R.G.) 1.99, Rev. 1, "Effects of Residual Elements on Predicted Radiation Damage to Reactor Vessel Materials," dated April 1977. This is the method recommended by R.G. 1.99, Rev. 1, when the surveillance material is judged most likely to be controlling with regard to radiation damage.

The pressure temperature limit curves proposed by the licensee are more conservative than those in the existing technical specification. Hence, the proposed curves provide more margin against brittle fracture of the reactor vessel than the curves presently in the Pilgrim technical specification. This additional margin permits us to conclude that the Pilgrim reactor vessel may be operated using the proposed curves marked 8 EFPY until the next refueling outage; i.e., shutdown following the end of cycle. Additional closure flange and beltline region materials data must be provided by the licensee prior to the next refueling outage to permit us to complete our evaluation of the remaining curves proposed by the licensee.

Appendix H of 10 CFR 50 requires that the surveillance capsule withdrawal schedule comply with ASTM E-185-82. The withdrawal schedule proposed by the licensee for the remaining two capsules meets the withdrawal schedule requirements of ASTM E-185-82. Hence, it satisfies Appendix H and may be incorporated into the Pilgrim Technical Specification.

3.0 Environmental Consideration

This amendment involves changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes in surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding.

Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 Conclusion

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: October 10, 1984