



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 48

TO FACILITY OPERATING LICENSE NO. NPF-49

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

DOCKET NO. 50-423

INTRODUCTION

By application for license amendment dated October 20, 1989, Northeast Nuclear Energy Company, et al. (the licensee), requested changes to Millstone Unit 3 Technical Specifications (TS).

The proposed amendment would change Millstone Unit 3 Technical Specifications (TS) Table 4.4-5, "Reactor Vessel Material Surveillance Program - Withdrawal Schedule" to provide a revised in-vessel material capsule withdrawal program and revised capsule lead factors.

DISCUSSION AND EVALUATION

The Reactor Coolant System pressure/temperature limit curves for plant heatup, cooldown, and inservice leak and hydrostatic pressure testing operations are provided in the Technical Specifications. These curves define limits to ensure the prevention of nonductile failures of materials incorporated within the reactor coolant system (RCS). The allowable pressure/temperature for specified heatup and cooldown rates are calculated in accordance with Appendix G of Section III of the ASME Boiler and Pressure Vessel Code and 10 CFR 50, Appendix G. The heatup and cooldown limit curves are calculated using the most limiting value of the RT_{NDT} (reference nil-ductility transition temperature) inherent in the reactor vessel material. The initial value of RT_{NDT} is determined from material tests made at the time of the vessel fabrication. During the service life of the reactor vessel, the RT_{NDT} increases above the initial value because of neutron irradiation. The amount of change (ΔRT_{NDT}) depends upon the neutron fluence and material chemical composition. The transition temperature shift is determined from fluence measurements, calculations, and trend curves based on tests of irradiated specimens that predict the effects of neutron irradiation. The irradiated specimens are actual (or archive) reactor vessel material specimens and are positioned around the reactor vessel to provide surveillance of the irradiation levels to which the reactor vessel is subject. The specimens are maintained in an inert environment within a corrosion-resistant capsule to prevent deterioration of the surface of the specimens during radiation exposure.

Associated with each surveillance capsule location is a lead factor, the ratio of the instantaneous neutron flux density at the location of the specimens in a surveillance capsule to the maximum calculated neutron flux density at the inside surface of the reactor vessel wall. The lead factor is thus used to extrapolate the surveillance measurement from the specimens to the reactor vessel wall, thereby the material property changes of the reactor vessel are monitored through its life. The in-vessel capsule irradiation program is described in Section 5.3.1.6 of the Millstone Unit 3 Final Safety Analysis Report. Each surveillance capsule is also subject to a withdrawal schedule, per TS 4.4.9.1.2, as specified in TS Table 4.4-5. The specimens within the withdrawn capsule are subjected to various inspections and tests to determine the delta RT_{NDT} and any needed changes in the heat-up and cooldown limit curves. The number of capsules to be withdrawn over the life of the reactor pressure vessel is required by Appendix H to 10 CFR Part 50 to meet the requirements of ASTM E185.

The licensee has proposed a change to the number of surveillance capsules to be withdrawn (and the associated withdrawal schedule) and the lead factors as specified in TS Table 4.4-5. The proposed changes result from analysis of the first capsule which was withdrawn during the first refueling outage. At the present time, TS Table 4.4-5 describes a capsule program containing four capsules. The first capsule was withdrawn during the first refueling outage and subsequent capsules are to be withdrawn at 5, 9 and 15 effective full power years (EFPY). The requirements of ASTM E185 allow a program to contain only three capsules if the end-of-life (EOL) RT_{NDT} is less than 100°F. Based upon the evaluation of the first capsule to be removed, the licensee has projected that the EOL RT_{NDT} will be less than 100°F and has proposed a change to TS Table 4.4-5. The revised capsule program would have three capsules. The first capsule would be withdrawn during the first refueling outage (already accomplished) and subsequent capsules at 9 and 16 EFPY. Changes to the TS Bases have also been proposed.

We concur with the licensee's evaluation that the EOL RT_{NDT} projection of less than 100°F permits the irradiation capsule program to be reduced from four to three capsules. The proposed irradiation capsule program conforms to ASTM E185 and, in this regard, meets the requirements of Appendix H to 10 CFR Part 50. Accordingly, the proposed changes to TS Table 4.4-5 are acceptable.

ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. We have 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 staff has previously published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the 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 the amendment.

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 (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: March 6, 1990

Principal Contributor: D. Jaffe

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