

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.122 TO DPR-65

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

1.0 INTRODUCTION

By letter dated August 28, 1987 (Ref. 1), the Northeast Nuclear Energy Company (NMEC) requested changes to Technical Specifications (TS) for Millstone Nuclear Power Station, Unit 2. The TS are proposed for modification in such a way as to allow operation with a minimum reactor coolant system (RCS) flow rate of 340,000 gpm during extended operation (coastdown) for Cycle 8.

Reload analyses performed for Cycle 8 (Ref. 4 and 5) were approved by the Staff (Ref. 3) for a minimum RCS flow rate of 340,000 gpm during the predicted end of core life for Cycle 8. However, Ref. 3 states:

"Extended cycle operation beyond the projected end of cycle (EOC) 8 is, however, based on a previous assumption of 350,000 gpm RCS flow rate. Accordingly, should you desire to operate Millstone Unit 2 beyond the projected EOC 8 please provide a supplemental evaluation and proposed TS, as needed, at least 90 days prior to the projected EOC 8."

This safety evaluation addresses the above referenced "supplemental evaluation and proposed TS" submitted by the licensee (Ref. 1) for extended operation.

2.0 EVALUATION

Analyses of Cycle 8 operation was approved for a minimum RCS flow of 340,000 gpm; but extended operation for Cycle 8 was not presented at the reduced flow rate. Extended operation is now scheduled for Millstone 2 in the form of a coastdown which is characterized by a decrease in core average coolant temperature and power decrease. The previously predicted assembly average burnup of 9500 MWD/MTU has extended to 10,500 MWD/MTU, with the coastdown in temperature to begin at 9500 MWD/MTU and the corresponding power decrease to begin at about 9760 MWD/MTU.

The 1000 MWD/MTU duration of extended operation for coastdown involves operation at the same conditions as in Cycle 8 or of less severity than Cycle 8. The bounding core parameters for all non-LOCA (loss of coolant accident)

transients are the same Cycle 8 conditions that exist at the beginning of the coastdown. This includes transients of concern due to departure from nucleate boiling (DNB) effects which are bounded by the existing analyses due to the lower temperature, pressure, and power conditions during extended operation. Also, fuel rod internal gas pressure in the Westinghouse fuel will not exceed RCS system pressure during Cycle 8 extended operation (Ref. 6).

Availability of equipment and operability requirements remain the same during extended operation. The reduction in power is expected to go from 100% to about 85%, thereby remaining in the same operational mode as before. Therefore, system availability and operability requirements reflected in TS are unchanged for the coastdown condition.

Evaluations of the current transient analyses by Westinghouse, the vendor, shows that accidents for the extended operation condition are bounded by the existing Cycle 8 analyses, except for the LOCA analyses. For a LOCA, the peak clad temperature (PCT) increases as a result of the initial decrease in RCS temperature while average power is held constant. Once average power begins its descent, the PCT no longer increases. Therefore the limiting condition, for both the small and large break LOCA is the point in the extended burnup when core average power begins to decrease which is about 260 MWD/MTU after EOL. For the large break LOCA case, the Westinghouse evaluation (Refs. 2) shows a small PCT increase above the Cycle 8 PCT value of 2142° F, but remains within the 2200°F PCT limit. For the small break LOCA case, however, the PCT increase above the Cycle 8 PCT value of 2135° F could exceed 2200° F unless compensatory measures are taken as described below.

The licensee has proposed to reduce the allowable a maximum linear heat rate (LHR) and total planar radial peaking factor ($F_{\rm X}$, T) by 11.5% for extended operation, as reflected in proposed TS Figure 3.2.1, "Allowable Peak Linear Heat Rate vs. Burnup." These reductions allow the average LHR to remain unchanged while increasing restrictions on boundary conditions during extended operation. Using known sensitivities of the LHR that have been used in previous Millstone 2 operating cycles, the proposed maximum allowable values for LHR and $F_{\rm X}$, " would compensate for the effect of extended operation on the bounding LOCA transients. These sensitivities were determined using NRC staff-approved, ECCS evaluation models. Additional conservativeness is assumed in the evaluation. Steam generator tube plugging is assumed at 23.4% when the actual value is about 17.6%. Beginning-of-life fuel temperatures were used in the evaluation without taking credit for the lower end-of-life temperatures. Therefore, the results of the evaluation level that remain within the values for Cycle 8, which satisfy the requirement of 10 CFR 50.46.

The final change to the TS addressed herein involves the proposed deletion of the equations for total planer and integrated radial peaking factors from TS Figure 3.2-3b; these equations already appear in TS 3.2.2.1 and 3.2.3, respectively. The proposed deletion of the subject equation would have no effect on the TS other than to delete an unnecessary repetition of the equations. Accordingly, the proposed deletion of the equations in TS Figure 3.2-3b is acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change 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 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.

4.0 CONCLUSION

We have concluded, based on the considerations discussed above, that (7) 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 the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 REFERENCES

- Letter from E. J. Mroczka (NNEC) to USNRC Document Control Desk, August 28, 1987.
- Letter from E. J. Mroczka (NNEC) to USNRC Document Control Desk, November 6, 1987.
- 3. Letter from D. H. Jaffe (NRC) to J. F. Opeka (NNEC), December 8, 1986.
- Letter from J. F. Opeka (NNEC) to USNRC Document Control Desk, October 27, 1986.
- 5. Letter J. F. Opeka (NNEC) to USNRC Document Control Desk, August 29, 1986.

6. "Millstone Unit 2 Basic Safety Report", Docket No. 50-335, March 6, 1980.

Dated: 0 18 1987

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