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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO AMENDMENT NO. 98 TO FACILITY OPERATING LICENSE NO. DPR-36

MAINE YANKEE ATOMIC POWER COMPANY

MAINE YANKEE ATOMIC POWER STATION

DOCKET NO. 50-309

1.0 INTRODUCTION

In a telephone conference on September 2, 1986, the licensee, Maine Yankee Atomic Power Company (MYAPCO), for the Maine Yankee plant informed the staff of a non-conservatism in their large break LOCA analysis. Appendix K to 10 CFR 50 requires that the axial power shape which results in the most severe consequences should be used in the ECCS evaluation model LOCA calculations. It was determined that the most severe power shape for the Maine Yankee plant was a flattened power shape rather than the highly peaked axial power distribution that had been used in the LOCA evaluations. During Cycle 9 operation of the Maine Yankee plant, the licensee imposed administrative limits on power peaking factors to assure compliance with 10 CFR 50.46.

To support Cycle 10 operation of the Maine Yankee plant, the licensee proposed changes in their approved ECCS evaluation model (EM). These changes consisted of a method for selecting the appropriate power shapes to be used in the analysis and a modification to the injection delta P penalty for steam-water interaction effects. These changes to the EM were approved by the staff in Reference 1. The EM calculation method remains valid for the full spectum of breaks. However, since a full break spectrum was not analyzed for each axial power shape selected, the staff required the licensee to justify the spectrum of breaks analyzed for each reload.

In Reference 2, the licensee provided the results of the LOCA limit calculations performed for Cycle 10 operation. Included in the submittal were associated Technical Specification changes. Within Reference 3, the licensee provided justification for the break spectrum analysis which was performed for the axial power shapes chosen with the approved methodology. These submittals are the subject of this evaluation.

2.0 EVALUATION

2.1 Break Spectrum

In Reference 3, the licensee provided the results of the break spectrum analysis which was performed to support Cycle 10 operation. Using its approved EM methodology, the licensee selected worst case axial power shapes at the 52%, 65%, 73% and 85% core elevations for ultimate use in calculating LOCA limits at these elevations. The licensee performed separate break spectrum analysis for each of these power shapes to determine the worst case break size at each elevation. The analysis was performed using a combination of the previous (Cycle 5) break spectrum analysis and new analysis for the upper (73% and 85%) power shapes. Six break sizes were analyzed for the 68%

shape; four breaks were analyzed for the 85% shape; three breaks were analyzed for the 52% and 73% shapes. The licensee provided justification to demonstrate that the cases selected were adequate to determine the worst case break for each shape.

As a result of the analysis, the licensee concluded that the worst case break for the 52% and 65% shapes was a cold leg guillotine break with a discharge coefficient of 0.8. A split break in the cold leg, with area equal to twice the cross-sectional area of the pipe, with a discharge coefficient of 1.0 was determined to be the limiting break size for the 73% and 85% power shapes.

The staff reviewed the information supplied by the licensee and determined that the approach used by the licensee to determine the worst case break was reasonable. However, additional information was requested to confirm the licensee's judgment that the more limited break spectrum analysis performed for the 52%, 73% and 85% power shapes was sufficient to identify the worst case break. This information was provided in Reference 4. Using this additional information, the staff independently confirmed the licensee's judgment that the more limited break spectrum was adequate. Therefore, the staff finds that the licensee's analysis complies with the break spectrum requirements in Section I.C.1 of Appendix K to 10 CFR 50.

2.2 LOCA Limits

In Reference 2, the licensee provided the results of the LOCA Limits evaluation performed for Cycle 10. Separate analysis were performed for the 52%, 65%, 73% and 85% core elevations. Allowable linear heat generation rates were calculated for each elevation to assure compliance with the requirements of 10 CFR 50.46. The break size analyzed at each elevation was the worst case break determined by the break spectrum analysis discussed above. For all cases, peak cladding temperatures were less than 2200° F, local cladding oxidation was much less than the allowed 17% of cladding thickness, and less than one percent hydrogen generation was calculated.

The staff finds that these analyses were performed using an approved EM in conformance with Appendix K to 10 CFR 50, and the results all satisfy the requirements of 10 CFR 50.46. Thus, the staff finds the calculated LOCA limits acceptable.

2.3 Technical Specification

As a part of Reference 2, the licensee proposed changes to the Maine Yankee plant Technical Specifications (TS) to reflect the results of the new LOCA analyses. These changes included modifications to TS 3.10.C.1, 3.10.C.3.1.1, 3.10.C.3.1.2 and the addition of Figure 3.10-12 to TS 3.10.

The staff has reviewed these changes and find them acceptable. Specifically, the addition of Figure 3.10-12 simply reflects the results of the new LOCA limits evaluation found acceptable above. The remainder of the changes are editorial in nature, either reflecting the addition of the figure or clarifying text.

The staff finds that the revised LOCA limits for the Maine Yankee plant satisfy the requirements of 10 CFR 50.46. Additionally, the modifications to the Technical Specifications appropriately reflect the results of the analysis. Therefore, the staff concludes that Cycle 10 operation with the proposed changes 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. 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 the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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REFERENCES

1. Letter from P. Sears (NRC) to J. Randazza (MYAPCO), "ECCS Evaluation Model Modifications Related to Axial Power Shape Issue, Phase I," January 6, 1987.

2. Letter from J. Randazza (MYAPCO) to Document Control Desk (NRC), "Proposed Change No. 130 - Technical Specification 3.10 LOCA limits," February 24, 1987.

3. Letter from G. Whittier (MYAPCO) to A. Thadani (NRC), "Maine Yankee LOCA Analysis," February 23, 1987.

4. Letter from G. Whittier to Document Control Desk (NRC) "Maine Yankee LOCA Analysis", June 8, 1987.