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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 31 TO FACILITY OPERATING LICENSE NO. DPR-3

YANKEE ATOMIC ELECTRIC COMPANY

YANKEE NUCLEAR POWER STATION (YANKEE-ROWE)

DOCKET NO. 50-29

Introduction

By application dated August 17, 1976, Yankee Atomic Electric Company (the licensee) proposed specific changes in the Technical Specifications relating to the maximum potential ejected rod worth permitted during the life of Core XII. This proposal involves replacement of certain pages in the performance analysis for the current reload core (Core XII) which is incorporated by reference in the present Technical Specifications. The proposal also involves a concurrent change in Section 3.1.3.1 "Movable Control Rods - Control Rod Operability" in the new format Technical Specifications (issued on July 14, 1976, with Amendment No. 27) which will become effective as of January 1, 1977.

Discussion

The licensee reported recently (initially by telephone on July 30, 1976) that they had discovered an error in the methodology that was previously used for calculating the ejected rod worth of the highest worth rod at zero power and Beginning of Life (BOL) conditions. This error was found in the Core XI rod ejection analysis using the CHICKIN code which was the reference analysis for the Core XII rod ejection analysis. The licensee reported that the limiting rod worth should be 0.75 percent $\Delta\rho$ instead of the presently specified value of 1.0 percent $\Delta\rho$. The licensee also reported that the measured potential ejected rod worth never exceeded 0.75 percent $\Delta\rho$. Based on our review of the shutdown margin at BOL and the reduction in the excess reactivity due to depletion in the fuel as Core XII burns, we found that Core XII has been operated safely and could continue to be operated safely. However, we requested that the licensee provide us a revised rod ejection analysis to support the necessary change in the Technical Specifications before the end of the present Core XII life. Responding to our request the licensee submitted the revised analysis and the associated proposed change in the Technical Specifications with its August 17, 1976 application for license amendment.

Evaluation

The licensee's ejected rod worth analysis for Core XI (which was said to contain an error in methodology) considered only the hot channel to determine the reactivity transient. Because of this, reactivity feedback effects from the rest of the core were not accounted for. This resulted in a less conservative calculation. The revised calculations were done in two steps. First the rod ejection for the average core was calculated, then the reactivity effects on the hot channel were superimposed and the limiting ejected rod worth was computed. The results of the revised rod ejection accident analysis are shown in the following table.

Parameter	Calculated at Full power	Calculated at Zero power	Damage Threshold
Maximum Average Enthalpy at hot spot (clad damage threshold)	134 cal/gm	183 cal/gm	200 cal/gm
Maximum Fuel Center Line Enthalpy at hot Spot	209 cal/gm	213 cal/gm	250 cal/gm

We agree with the calculational method used by the licensee in the revised analysis and find that the procedure is more correct and results in an acceptable conservative calculation. We also find that the revised analysis supports the change in the specified limiting potential ejected rod worth (from 1.0 percent $\Delta\rho$ to 0.75 percent $\Delta\rho$) for the worst Core XII initial condition for this accident, viz. zero power at BOL. We therefore conclude that the changed potential ejected rod worth limit provides an acceptable safety margin for operation of Yankee-Rowe during the life of the present Core XII.

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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.

Date: November 23, 1976