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

ENCLOSURE 3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 134 TO FACILITY OPERATING LICENSE NO. DPR-77

AND AMENDMENT NO. 121 TO FACILITY OPERATING LICENSE NO. DPR-79

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

1.0 INTRODUCTION

By letters dated January 12, February 9, and March 1, 1990, the Tennessee Valley Authority (TVA) proposed a change to Section 3/4.9.8, Residual Heat Removal and Coolant Circulation, of the Technical Specifications (TSs) for Sequoyah Nuclear Plant, Units 1 and 2. The proposed change to TS 3/4.9.8.1 and the associated Bases 3/4.9.8 will reduce the minimum allowed residual heat removal (RHR) system flowrate during Mode 6 operation. TVA proposed to add a Surveillance Requirement SR 4.9.8.1.2 to reduce the minimum allowed flowrate for a RHR loop from 2,500 gpm to 2,000 gpm. The loop flowrate could be greater than the 2,000 gpm. This is TVA TS Change Request 89-02.

In the submittal dated January 12, 1990, TVA originally proposed reducing the minimum allowed RHR loop flowrate from 2,500 gpm to 2,000 gpm only after at least 278 hours following core subcriticality during unit shutdown for refueling. Because Mode 6 operation is restricted to reactor coolant system (RCS) temperatures less than 140°F and TS 3/4.9.8.1 only requires that the minimum RHR loop flowrate can not be below a value but may be above that value to keep RCS temperatures below the 140°F, there is no need to restrict the minimum allowed RHR loop flowrate to a certain time period after core subcriticality. The RCS temperature must be kept below 140°F and the plant has two RHR loops and an allowed flowrate of at least at 2,000 gpm to do this. At least one RHR loop is required to be in operation in Mode 6 and this is not being changed by the proposed changes to TS 3/4.9.8.1.

In its submittal dated February 9, 1990, TVA revised its TS Change Request 89-02 to remove the 278 hours and the restriction on when the RHR loop flowrate could be reduced to the 2,000 gpm. As explained below, this would allow the plant to operate sooner at a reduced loop flowrate when there would be a greater margin against RHR pump vortexing and loss of RHR decay heat removal. SR 4.9.8.1.1 would be revised to allow a minimum RHR loop flowrate of 2,000 gpm. A new SR 4.9.8.1.2 would not be added to TS 3/4.9.8.1.

In its submittal dated March 1, 1990, TVA stated that although there is no TS requirement on minimum RHR loop flowrate for Mode 5, as there is in TS 3/4.9.8.1 for Mode 6, the flowrate is maintained generally above the minimum flow rate

for Mode 6 to keep the RCS temperatures below 200°F, the maximum temperature allowed for Mode 5 operation. Since the flowrate will continue to be limited by the RCS temperature, these submittals, including the revision to SR 4.9.8.1.1, do not change the substance of the proposed action in the Federal Register Notice (55 FR 4279) published on February 7, 1990 for the proposed amendments and do not affect the staff's initial determination of no significant hazards consideration in that notice.

2.0 EVALUATION

Generic Letter (GL) 88-17, "Loss of Decay Heat Removal", was issued by the staff on October 17, 1988 to address the potential loss of RHR decay heat removal during nonpower operation including reduced RCS inventory. The staff's concerns included the loss of RHR pumps due to vortexing at high flowrates. The GL was based in part on the Diablo Canyon event which was reported in NUREG-1269 (Reference 4).

At the currently required loop flowrate of 2,500 gpm, the RHR system could be susceptible to vortexing at the RHR pumps suction piping during reduced RCS inventory operation. Vortexing can lead to RHR system air entrainment and pump cavitation and subsequent loss of RHR system flow. TVA has proposed a reduction of the RHR loop flowrate to 2,000 gpm in SR 4.9.8.1.1. By letter dated March 1, 1990, TVA stated that there is no TS requirement for flowrate for operation in Mode 5, while the RCS is partially drained. However, the flowrate for Mode 5 is maintained by procedures, the same as for Mode 6, to keep RCS temperatures below 200°F, the maximum allowed RCS temperature for Mode 5.

Operation with the RCS partially drained in Mode 6 is necessary for required inspection and maintenance of RCS components such as reactor coolant pumps and steam generators. As indicated in NUREG-1269 (Reference 4), reduced RHR flowrate would provide a greater margin against vortexing and preclude an inadvertent loss of RHR decay heat removal capability due to air entrainment and cavitation of the RHR pumps. As the time after plant shutdown increases, decay heat removal requirements for the RHR system are reduced since decay heat decreases as a function of time after initial reactor shutdown. The TS change proposed by TVA will provide sufficient flowrate to maintain the RCS less than 140°F as required for Mode 6 operation because TVA can increase the RHR loop flowrate above the 2,000 gpm minimum allowable. In addition, a minimum RHR flowrate is required to prevent boron stratification to minimize the potential for localized variation in boron concentration in the RCS. For Sequoyah, Westinghouse has recommended a minimum flowrate of 2,000 gpm. The 2,000 gpm value is limited by the potential for cavitation in the control valve and chattering in the 10-inch check valve. The proposed TS change will require that the RHR loop flowrate is maintained at least equal to or greater than 2,000 gpm. The actual flowrate must be sufficient to maintain RCS temperature less than 140°F, as required for Mode 6 operation.

The text that TVA proposes to add to the Bases for TS 3/4.9.8.1 is correct and consistent with the basis for the proposed change to SR 4.9.8.1.2. Therefore, these proposed changes are acceptable.

The proposed TS change is a reduction in the minimum allowed RHR loop flowrate from 2,500 gpm to 2,000 gpm during Mode 6 operation, for which the RCS temperature is maintained below 140°F. The changes are consistent with the staff's positions in GL 88-17 and, as discussed above, on technical requirements for RHR decay heat removal. Therefore, the revision of SR 4.9.8.1.1 proposed for both units in TS Change Request 89-02 is acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendments involve 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendments meet 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 nor environmental assessment need be prepared in connection with the issuance of these amendments.

4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (55 FR 4279) on February 7, 1990 and consulted with the State of Tennessee. No public comments were received and the State of Tennessee did not have any comments.

The staff has 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 amendments will not be inimical to the common defense and security nor to the health and safety of the public.

5.0 REFERENCES

1. Letter, M. J. Ray, Tennessee Valley Authority, to USNRC, Subject: Technical Specification (TS) Change 89-02, dated January 12, 1990.

2. Letter, M. J. Ray, Tennessee Valley Authority, to USNRC, Subject: Technical Specification (TS) Change 89-02, Additional Information, dated February 9, 1990.

3. Letter, E. G. Wallace, Tennessee Valley Authority, to USNRC, Subject: Technical Specification (TS) Change 89-02, Additional Information, dated March 1, 1990.

4. NUREG-1269, "Loss of Residual Heat Removal at Diablo Canyon, Unit 2, April 10, 1987", dated June 1987.

Principal Contributor: H. Balukjian

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