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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 37 TO FACILITY OPERATING LICENSE DPR-77

AND AMENDMENT NO. 29 TO FACILITY OPERATING LICENSE DPR-79

TENNESSEE VALLEY AUTHORITY

INTRODUCTION

These amendments address four Technical Specification changes that were requested by Tennessee Valley Authority (the licensee) for Sequoyah Nuclear Plant, Units 1 and 2, which are as follows:

(1) By letter dated July 21 and supplemented July 26, 1983, the licensee proposed certain changes to Table 3.6-2, "Containment Isolation Valves," of the Technical Specifications. These proposed changes would affect the requirements for operability of containment isolation valves.

(2) In a letter dated August 20, 1984, the licensee requested an amendment to the Technical Specifications (TS) to allow the fifth vital battery to be used to satisfy limiting conditions for operations when one of the four train vital batteries (vital power channels) is out of service. Under the terms of the existing TS, four channels of 125 V DC vital power are required to be operable to provide control power for engineered safety features (ESF) equipment. If one of the four vital power channels is in an inoperable status for more than two hours, the action statement requires both units to be shutdown. The licensee states that operating experience at Sequoyah has shown there is a significant probability of exceeding this two-hour limit resulting in a costly forced two-unit shutdown. The proposed fifth vital battery system is intended to serve as a temporary replacement for any one of the four primary 125 V DC vital batteries should a channel be inoperable.

(3) By letter dated August 27, 1984, the licensee requested an amendment to the Technical Specifications so as to replace infrared-type fire detectors with thermal detectors.

(4) By letter dated August 28, 1984, the licensee requested a change related to main steam generator low-low level instrumentation that is required to start both auxiliary feedwater motor driven pumps.

EVALUATION

(1) The Technical Specification on containment isolation valves requires that the valves specified in Table 3.6-2 be operable; if one or more is inoperable, the Action Statement, section 3/4.6.3, would allow continued plant operation indefinitely if each affected penetration is isolated with either a deactivated power operated valve secured in its isolated position, a closed manual valve, or a blind flange. However, section 3.0.4 does

not allow a change in operational mode (e.g., from Mode 2 [startup] to Mode 1 [power operation]) when an Action Statement is in effect to satisfy a Limiting Condition for Operation (LCO); it only permits those changes that are directed toward cold shutdown.

The licensee submits that when a containment isolation valve is secured in its isolated position (closed), it is performing its intended safety function, and thus should not preclude mode changes for continued plant operation. Therefore, the licensee proposes to add a footnote to Table 3.6-2 to indicate that certain valves are not subject to the provisions of section 3.0.4 if the valve is secured in its isolated position, with power removed. The licensee has excluded valves which, if secured (closed) during normal plant operation, may affect plant operation or potentially affect post-accident safety functions. A separate footnote to valves FCV-62-72, FCV-62-73, and FCV-62-74, (letdown lines) will be used to assure that at least two reactor coolant letdown lines remain operable.

The staff has reviewed the proposed changes to Table 3.6-2 and the attendant justification, and finds them acceptable, with one exception. Section 4.6.3.4 requires that each containment purge/vent isolation valve be leak tested to demonstrate its operability. In order to preclude plant operation with purge/vent line isolation valves inoperable because they leak excessively, the staff recommends that the footnote be revised as follows. The proposed footnote reads: "*Provisions of LCO 3.0.4 are not applicable if valve is secured in its isolated position with power removed." The following should be added to the end of the footnote: "... and leakage limits of Surveillance Requirement 4.6.3.4 are satisfied." The licensee has agreed to adopt this recommended change. This additional change was not noticed since it further clarified the proposed change that had been noticed. The staff finds the proposed changes to T.S. Table 3.6-2 acceptable, with the footnote change as noted above.

(2) The existing vital 125 V DC system is a Class 1E system composed of four redundant channels (I, II, III and IV). These channels are divided into the trains, of which Train A contains vital battery channels I and III while Train B contains channels II and IV. Each channel consists of a battery for emergency DC power and a distribution board which facilitates load grouping and provides circuit protection. In addition, there are two spare battery chargers for supplemental/backup capacity. Each spare charger is connected to facilitate use on either Train A or B. Each channel is electrically and physically independent so that a single failure in one channel will not cause a failure in another channel. No automatic connections are used among the four redundant channels.

The fifth vital battery system is designed so that in the event a single primary vital battery is removed from service for any reason, the fifth battery system can be substituted for it with no impact on the unavailability of the 125 V DC vital power system. The fifth vital battery board employs a manually operated transfer switch (to preserve train separation) to permit system alignment to either Train A or B by

selecting one of two distribution panels (A or B). At the distribution panel, a similar (manually operated) transfer switch is provided which allows alignment of the fifth battery system to the primary vital battery board when a battery is inoperable. The proposed fifth vital DC battery system is Class 1E qualified, including its battery rack, battery board (fifth), two distribution panels (A and B), cabling, instrumentation and protection devices.

Because the fifth vital battery system may be substituted for any one of four redundant vital DC channels, it is subject to all the quality assurance (Class 1E) procedures for design, equipment specification, testing and installation applicable to the existing vital DC system. The following describes the design and equipment employed for the fifth vital battery system and our evaluation as to how the proposed fifth vital DC system conforms with and satisfies the existing requirements for the vital DC system.

A) REDUNDANCY/SEPARATION

Because the proposed fifth vital battery system is designed to replace an inoperable vital battery, there are actually no changes in redundancy and separation to the existing primary vital DC distribution system. The only modifications are to install a new battery board and two distribution panels to facilitate substitution. The battery board contains a manually operated break-before-make (BBM) transfer switch (mechanically interlocked to preserve Train separation) to permit system alignment to either distribution panel A or B. Also each distribution panel contains a manually operated BBM transfer switch (mechanically interlocked to preserve channel separation) to align with the selected vital battery board. The cables and conduit are installed in accordance with physical and electrical separation requirements of the previously approved TVA design criteria (SQN-DC-V-12.2) for the existing vital DC system. In addition, the licensee has developed a special procedure for the substitution operation; and there is no change in the existing redundancy or physical and electrical separation.

B) BATTERY CAPACITY

Similar to the existing vital 125 V batteries, the fifth Class 1E battery is designed to carry plant emergency loads for 30 minutes under accident conditions without the battery charger and for two hours during a loss of all AC power. Also, the battery is sized in accordance with IEEE Std 485.

According to the information provided by the licensee, the two hour discharge rating of the battery is 663 amperes at 60°F when discharged to a minimum voltage of 105 volts. The staff finds this new Class 1E battery capacity is 2.5% greater than the existing primary vital battery capacity.

C) BATTERY CHARGER

Because of the fact that the present vital DC system has a spare Class 1E battery charger on each Train (A & B), the licensee has decided to use the already tested and qualified spare battery charger while the fifth battery is in the substitution mode. Therefore, the fifth battery charger is solely used to recharge the fifth vital battery and to maintain the proper voltage during the standby mode when the fifth battery is not connected to the vital DC system. The fifth battery charger is isolated from the Class 1E system by a combination of a fuse and circuit breaker. The staff finds this arrangement of the battery charger acceptable.

D) TEST/INSPECTION

The fifth vital battery will be periodically tested and inspected according to the standard TS requirements which are currently applicable to the vital DC system. However, to ensure further the adequacy of the fifth power source, the licensee will also perform a series of post modification tests. These include a discharge test, a charger test, and separate alignment tests for each of the four vital power channels.

E) INSTRUMENTATION/ANNUNCIATION

When on standby (not substituting), the fifth vital battery system is equipped with instruments such as bus voltmeter, charge/discharge ammeter, and alarms for ground detection, to continuously monitor the DC system. When the fifth vital battery is being used as a substitute for one of the four vital batteries, the monitoring and annunciation in the main control room of the battery being substituted for is used to indicate conditions of the fifth channel. The intent is to make maximum use of the existing Class 1E circuitry and components for the condition of the fifth vital battery when it serves as a substitute for one of the four Class 1E vital batteries.

F) VENTILATION/ENVIRONMENTAL CONDITIONS

To maintain hydrogen concentration below 2% of room volume, the fifth vital battery room is equipped with ventilation provided by redundant Class 1E exhaust fans. All components of the fifth vital battery system are designed to operate continuously within specified tolerances of expected environmental conditions and all control system components are safety-related, seismic category I and are powered where necessary from redundant, Class 1E power sources.

Based upon our evaluation of all the requirements to be implemented, we find that the fifth vital battery is designed and constructed to comply with IEEE Std 308-1971 criteria, to which the existing Class 1E vital 125 V DC system is designed. Also, the proposed DC system conforms with the redundancy and separation requirements for the plant. The testing will be in accordance with the standard technical specification (STS) and with IEEE Std 450. Additionally, post modification tests will be performed to demonstrate adequacy.

The staff concludes that the proposed change which allows the fifth vital battery to satisfy LCOs 3.8.2.1, 3.8.2.2, 3.8.2.3 and 3.8.2.4 when one of the vital batteries is inoperable, is acceptable.

(3) The infrared detectors at Sequoyah have been experiencing a relatively high failure rate attributed, in part, to the high radiation environment. The licensee proposes to replace these detectors with Underwriter's Laboratories (U.L.) listed thermal detectors. The detectors will be installed in accordance with the guidelines contained in NFPA Standard 72E, Standard on Automatic Fire Detectors. This change will increase the reliability and availability of the fire detection systems in the subject areas and conforms to the guidelines contained in Section C.1 of Appendix A to BTP APCSB 9.5-1. The staff finds this change acceptable.

(4) This change is related to main steam generator low-low level instrumentation (3 channel) required to start both AFW motor driven pumps (Table 3.3.3, "Engineered Safety Feature Actuation System Instrumentation," Item 6.c.1) and the main steam generator low-low level instrumentation to start the AFW turbine driven pump (Table 3.3.3, Item 6.c.ii). The change specified by the licensee was to add an asterisk to each of the Action Statements for these items, making the provisions of Limiting Condition for Operation (LCO) Specification 3.0.4 inapplicable. Specification 3.0.4 states:

> "Entry into an OPERATIONAL MODE or other specified condition shall not be made unless the conditions for the Limiting Condition for Operation are met without reliance on provisions contained in the Action requirements. This provision shall not prevent passage through OPERATIONAL MODES as required to comply with ACTION requirements. Exception to these requirements are stated in the individual specifications."

This change would permit either unit, as applicable, to enter operating modes 1, 2 or 3 (Power Operation Mode, Startup Mode, or Hot Standby Mode, respectively) with one of the total of three instrumentation channels inoperable. The action statement, which would not otherwise be altered by this change, permits continued operation with two channels in Modes 1, 2 or 3, should a channel become inoperable while in these states, until the next required channel functional test, provided the inoperable channel is placed in the tripped condition within one hour. This change will

bring the Sequoyah Technical Specifications into agreement with the Westinghouse Standard Technical Specifications (NUREG-0452) which have been previously approved. Therefore, we find the licensee's proposal acceptable.

III. ENVIRONMENTAL CONSIDERATION

These amendments involve changes in the installation of facility components located within the restricted area as defined in 10 CFR Part 20. 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 Sec 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 these amendments.

IV. CONCLUSION

The Commission made proposed determinations that the amendments involve no significant hazards consideration which were published in the Federal Register on October 12, 1983 (48 FR 46460) and November 21, 1984 (49 FR 45979) and consulted with the state of Tennessee. No public comments were recieved, and the state of Tennessee did not have any comments.

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 these amendments will not be inimical to the common defense and security or to the health and safety of the public.

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AMENDMENT NO. 37 TO FACILITY OPERATING LICENSE NO. DPR-77 - Sequoyah Nuclear Plant
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