TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

August 18, 1980

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Schwencer:

In the Matter of the Application of) Docket Nos. 50-327
Tennessee Valley Authority) 50-328

Reference:
1. Letter from L. M. Mills to A. Schwencer dated June 16, 1980
2. Letter from L. M. Mills to A. Schwencer dated July 28, 1980
3. Letter from L. M. Mills to A. Schwencer dated August 11, 1980

In TVA's response to NUREG-0588 for Sequoyah Nuclear Plant, references 1 and 2, TVA identified several items which lacked sufficient environmental qualification documentation. Enclosed is a revision to the safety justification submittal, reference 3, as requested by the NRC reviewer. The revision provides additional detail concerning the safety review for each item.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosure

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ENCLOSURE

NCR	Equipment Affected	Action Required for Resolution
SQNEEB8003	Foxboro Pressure Transmitters in Main Steam Valve Rooms	Transmitters have been replaced with qualified equipment.
SQNEEB8004	Miscellaneous Class 1E Equipment in Main Steam Valve Rooms (valves, transmitters, switches, and junction box wiring	Our evaluation of the equipment covered by this NCR is listed below: 1. Motor-Operated Valves (MOV) - FCV 1-15,16,17,18; FCV 3-33,47,87,100. These MOV's were originally found to have inadequate documentation to justify operation in the accident temperature environment. The vendor has now analyzed the subject equipment for the higher temperatures and has confirmed, by letter, that the valves under the postulated accident conditions will perform their intended function. 2. Solenoid Valves LSV-3-174 & 175. LSV-3-174 and -175 are used for flow control to steam generator (SG) No.1 and SG No. 4 through turbine-driven auxiliary feedwater (TDAFW) headers. Failure of these solenoids would result in one of two modes. Either the associated valve would receive air or air would be blocked resulting in valve isolation. Isolation would be an acceptable failure. If air is being received the valve is modulating and causing a less desirable situation for the faulted SG. However, manual control of AFW is available and the valve can be isolated from the main control room. Isolation to SG 1 and 4 is acceptable since at least TDAFW would be provided to intact SG's 2 and 3. A failure in the mode which would allow an air supply to the FCV is acceptable to take credit for operator action at 10 minutes after the event to remote manually close the valve to the faulted SG. 3. Transmitters PT-1-1C, 8C, 19C, & 26C. PT-1-1C, -8C, -19C, and -26C are used for auxiliary control of atmospheric relief valves on the main steam headers. These PT's are only

lined up when control is in the auxiliary mode and are not required to operate for the accident.

4. PdIS-1-17 and 18. Case 1 - Failure of the PdIS causes isolation of the associated FCV's.

   Consider the high energy line break (HELB) associated with SG No. 4 and a failure of motor-driven auxiliary feedwater (MDAFW) pump 1A-A. The result is a total loss of AFW except for the MDAFW pump 1B-B feeding the faulted SG No. 4 and intactSG #3. This is unacceptable feedwater flow.

   A similar situation would exist with a faulted SG No. 1 and failure of MDAFW pump 1B-B.

   Case 2 - Failure of the PdIS associated does not cause isolation of the associated FCV's. PDIS-1-17 and -18 are not required since they are used to indicate and isolate breaks in the TDAFW pump room or high flow in the TDAFW pump line. Therefore, TDAFW would be available to all SG's. Also a failed or faulty indication from the PdIS would not cause the operator to take improper action since it provides location indication only.

   So for case 1, TVA is pursuing resolution of the qualification of PdIS-1-17 and -18 for this isolated case. If the "in-situ" instrument cannot be qualified, it will be replaced with a qualified component. This item will be resolved before the plant exceeds 5 percent power.

5. PS-3-160A&B, 165A&B.

   Case 1 - Failure of PS's cause associated LXV's to close. TDAFW to SG 1 and 4 is lost but TDAFW to SG 2 and 3 still provided as well as MDAFW to at least SG 2 or 3. Therefore, this mode is considered acceptable.

   Case 2 - Failure of PS's do not cause

associated LCV's to close. The faulted SG would receive TDAFW as well as the other SG's. The operator can isolate flow to the faulted SG at 10 minutes. Therefore, this mode is considered acceptable.

6. PS-3-140B and 150B - These PS's are located in the other valve room. A logic similar to item 5 would apply.

5&6. The PS's of items 5 and 6 do not provide any indication or alarm, and therefore their failure would not cause improper operator action.

7. Handswitches: HS1-15B,16B,17B,18B, HS3-33B,47B,87B,100B

These handswitches are used for testing purposes and are not required to operate in the accident environment.

8. Internal wiring (cables types CPJ, CPJJ, and PJJ) to junction boxes 3042, 3061, 3066, 3063, 3062, 3069, 2890, 2891, 2857, and 2858.

These cables were originally suspected to be not qualified for the accident environment. We have since determined, from review of vendor information, that the cables are adequately qualified.

SQNEEB8006	Wide Range Steam Generator Level Trans-	Transmitters have been replaced with qualified equipment.
SQNEEB8007	Miscellaneous HVAC and EGTS Solenoid Valves	Information received from the equipment vendor confirmed that exposure to temperatures somewhat higher than the solenoid qualification specifications will not result in immediate solenoids failure. However, the effective service life of this equipment will be shortened. Prior to initial criticality, TVA reviewed the solenoids identified in this NCR and replaced solenoids in the EGT and HVAC systems inside containment with qualified solenoids for maintenance considerations. The remaining solenoids

		are associated with ventilation systems in the auxiliary building. In this location, the solenoids can be maintained without risking undue exposure of personnel to adverse plant conditions. TVA will be replacing the auxiliary building solenoids with qualified solenoids. However, due to procurement lead times and installation schedules, this cannot be accomplished prior to full-power operation. We expect to have the qualified solenoids installed in the auxiliary building by January 1, 1981.
SQNEEB8008	Local Control Station Selection Switches (C-H type 10250T), located in the following areas: 1. Vertical pipe chase EL 653,699,690, and 714. 2. Aux feedwater pump turbine room EL 690. 3. RHR heat exchanger room EL 690 4. Gas stripper room EL 669. 5. RHR pump room EL 653.	This equipment was identified as nonconforming under the criteria provided in section 2.1.6(b) of NUREG-0578. The failure of this equipment to function in an adverse environment does not affect any associated or related plant safety function. Therefore, this equipment, using NUREG-0588 guidelines, meets category "C" requirements.
SQNEEB8009	Pressure Switches (tag Nos. PS-30-46A & B, -47A & B, and -48A & B)	Unqualified components have been replaced with qualified components.
SQNEEB8010	Class 1E motors: Emergency Gas Treatment Air Handling Unit (AHU) Spent Fuel Pit AHU RHR Pump Cooler SIS Pump Cooler AHU Cent. Charging Pump AHU AFW and Boric Acid Pump AHU CCS Pump and AFW Pump AHU Pipe Chase AHU Penetration Room Coolers 480-Volt Board Room AHU Containment Spray Pumps Containment Spray Pump AHU Component Cooling Water Pumps	Preliminary vendor test data in addition to analysis by TVA provides justification for continued plant operation until additional vendor data has been received. Final verification of equipment qualification will be accomplished within the time schedules provided in NUREG-0588. The approach which TVA used to establish that the motors are functionally operable and to determine aging effects for their given operating and accident environments combined partial test data with information on motor materials to support analytical assumptions and conclusions reached. The environments considered were temperature, humidity, and radiation.

Component Cooling Water
Booster Pumps

Temperature - Temperature rise test data is available for some motors. For those motors which we did not have temperature rise test data, we assumed a maximum rise as specified by the contract. Using this value and the most severe temperature condition the motor would experience, the maximum operating temperature of the motor was determined. This temperature was compared to a normal ambient of 40°C at which all motors are rated (NEMA MG-1). The 10°C rule (an approximation of Aerhenuis's Law as applied to insulation materials) was used to establish the operating life of the motor. (We assumed a five-year life for the motors based on 40°C ambient and motor temperature rise.) The 10°C rule states that for each 10°C rise in temperature above some reference temperature at which the material is able to operate without degradation (in our case 40°C plus the allowable temperature rise) the useful life of the material is halved. Therefore, a 10°C temperature rise above the maximum allowable temperature of the material would reduce the life to 2.5 years. Using this approach we can establish the motor aging due to temperature effects.

Humidity - All the motors listed on NCR SQNEEB8010 operate in environments of 80 percent humidity or less. Years of motor operating experience and assurances from motor manufacturers attest to the fact humidity at these low levels will not cause the motors to be functionally inoperable nor degrade motor performance. The one motor addressed on NCR SQNEEB8015 must operate in a 100 percent humidity environment. Since this motor is of open dripproof construction, measures must be taken to ensure that moisture is not absorbed into the winding insulation. No problem exists when the motor is operating. However, to prevent moisture absorption when the motor stands idle for long periods an administrative procedure will

		be established that causes the motor to be operated at regular intervals to drive out excess moisture. Radiation - The materials for all motors in environments greater than 10^3 rads were identified and their radiation damage threshold compared to the operating and accident environments. In all cases the radiation damage threshold of the materials was higher than the combined 40 years normal dose and the integrated accident dose. The motors were therefore considered acceptable for the radiation environments in which they were to operate.
	Aux Building Gas Treatment Fan Emergency Gas Treatment Fan	TVA has analyzed this equipment and determined that, as a minimum, they will perform the required safety functions under the postulated harsh environments through the first fuel cycle (see above discussion on analysis). Additional vendor data is being obtained to verify the actual equiment service life. By November 1, 1980, TVA will determine the actual equipment service life and, if required, a schedule for replacement.
	Lower Compartment AHU CRD Mechanism AHU	See response to NRC SQNEEB8008.
SQNEEB8011	Solenoid Valve FSV-70-85	See response to NRC SQNEEB8008.
SQNEEB8012	Solenoid Valves PSV-65-81 and -83	Valves have been replaced with qualified solenoids.
SQNEEB8013	I/P Transducers PSM-65-80 and -82	Equipment will be relocated in nonhostile environment. This work is presently in progress and has a milestone completion requirement to be finished before the plant prepares to exceed 5% power. Present schedules require completion by August 20, 1980.
SQNNEB8014	Hydrogen Monitoring System (Annulus Area Only)	The radiation environment for this equipment has been evaluated to consider plant-specific equipment locations. The radiation environment was calculated using assumptions and methodologies which encompass current NRC guidelines, including NUREG-0588.

		Using this data, we have determined that the "in situ" equipment is qualified for the environment. However, autoclave testing on similar components is being pursued to further verify acceptability of equipment. It should be noted that this equipment is qualified for the other environmental parameters (pressure, temeratures, etc.) addressed by NUREG-0588.
SQNEEB8015	Components	
	1. DC Vent Fan Motor and Starter	See response to NRC SQNEEB8008.
	2. Auxiliary Air Compressor Motor and Instrument Rack	The equipment vendor has confirmed that that the components are designed to perform their intended function in the hostile environment. Vendor confirmation was based on comparison of this equipment with similar components that are qualified for the subject environment. In addition, TVA is pursuing equipment testing to further verify acceptability of equipment.
	3. 6900V RCP PT and Relay Boards 1&2 4. Pressurizer Heater Transformers 5. Pressurizer Heater Distribution Cabinet CVRL	See response to NRC SQNEEB8008.
	6. Turbine-Driven Auxiliary Feedwater Instrument Panel	See response to NRC SQNEEB8008
	7. EL734 A/C Circulation Pump Motors	Preliminary vendor test data in addition to analysis by TVA provides justification for continued plant operation until additional vendor data has been received (see response to NCR SQNEEB8010 for discussion on analysis). Final verification of equipment qualification will be accomplished within the time schedules provided in NUREG-0588.
	8. FSV-81-12 (Solenoid Valve)	See respone to NRC SQNEEB8008.
	9. Rotork MOB Model 7A/1RP	This component has been determined to be a "Limitorque" operator. Adequate

		qualification documentation exists for this equipment. Therefore, this component is qualified for the plant environment.
SQNQEB8002	Exposed Safety-Related Cables Inside Containment	When reviewing Table 3.11.2 of SQNP FSAR TVA decided to recalculate doses to be expected inside primary containment and to extend the calculations to post-accident times up to two years. The post-accident environment corresponds to the assumptions of Reg. Guide 1.4 which result in the most severe radiation environment of all design basis accidents. Therefore, this work meets or exceeds the requirements of NUREG-0588. The integrated gamma dose to uncovered cables was calculated taking account of the finite space. The beta dose is based on a very conservative average beta energy of 2 MeV. The additional shielding provided for the cables (1/16" of lead) is sufficient to prevent 2 MeV betas from reaching the cable; the calculated gamma dose is less than that for which the cable was qualified. Accordingly, this modification to the exposed safety-related cables results in the cables being qualified for the subject accident environments.