

400 Chestnut Street Tower II

December 10, 1980

Mr. James P. O'Reilly, Director  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Region II - Suite 3100  
101 Marietta Street  
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

SEQUOYAH NUCLEAR PLANT UNIT 2 - ENVIRONMENTAL QUALIFICATION OF CLASS IE  
INSTRUMENTS IN THE VALVE ROOM - NCR'S SQN EEB 8003 AND SQN EEB 8004 -  
FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector  
M. Thomas on April 7, 1980, in accordance with 10 CFR 50.55(e). Interim  
reports were submitted on May 7, July 7, September 12, and October 13,  
1980. Enclosed is our final report.

If you have any questions, please get in touch with D. L. Lambert at  
FTS 857-2581.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager  
Nuclear Regulation and Safety

Enclosure

cc: Mr. Victor Stello, Director (Enclosure) ✓  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

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## ENCLOSURE

SEQUOYAH NUCLEAR PLANT UNIT 2  
ENVIRONMENTAL QUALIFICATION OF CLASS IE INSTRUMENTS IN THE VALVE ROOM  
NCR NO. SQN EEB 8003 AND NCR NO. SQN EEB 8004  
10 CFR 50.55(e)

### FINAL REPORT

#### Description of Deficiency

Nonconforming condition SQN EEB 8003 concerns the steam generator pressure transmitters (Foxboro Model E11GM) which are located in the valve rooms at Sequoyah Nuclear Plant. According to the latest revision of the FSAR, the transmitters are not qualified for the worst case environment resulting from a high energy line break in the valve room. The detrimental environmental aspect is the temperature. FSAR Table 3.11-2 indicates that a peak temperature of 296° F inside the valve room is possible, while the transmitters in question are qualified to only 130° F.

As a result of this condition, all other instrumentation inside the valve rooms has been evaluated. Those instruments that are not qualified which might pose a safety concern are documented in NCR No. SQN EEB 8004. These are:

1. Main steam pressure transmitters (one per loop)
2. Level solenoid valves which route control air to level control valves which regulate water from the turbine-driven auxiliary feedwater pump to steam generators 1 and 4 (total of two)
3. Steam flow control valve to auxiliary feed pump turbine (total of four) and corresponding handswitches
4. Steam generator main feedwater isolation valve (total of four) and corresponding handswitches
5. Pressure switches for flow to auxiliary feed pump turbine
6. Pressure switches which detect an auxiliary feedwater pipe break (total of six)
7. Cable types CPJ, CPJJ, and PJJ used in the valve rooms

#### Safety Implications

SQNEEB8003 These steam generator pressure transmitters are designated as post-accident monitoring (PAM) equipment. Because loss of PAM instrumentation is detrimental to the operator's ability to take appropriate action to mitigate an accident, this condition could have affected plant safety.

SQNEEB8004 TVA's evaluation of the equipment covered by this NCR is listed below.

1. Transmitters PT-1-1C, -8C, -19C, and -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. Therefore, this condition could not have adversely affected plant safety.
2. Solenoid valves LSV-3-174 and -175. LSV-3-174 and 5 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. 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.
- 3 & 4. 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 postulated accident conditions will perform their intended function. Therefore, this condition could not have adversely affected plant safety.

Handswitches: HS-1-15B, 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. However, spurious signals caused by failure of these switches could cause the valves to go to an undesirable position which could affect plant safety.

5. PDIS-1-17 and 18.

Case 1 - Failure of the PDIS is postulated to cause isolation of the associated FCV's for the auxiliary feed pump turbine.

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 intact SG No. 3. This is unacceptable feedwater flow which could adversely affect plant safety.

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

Case 2 - Failure of the PDIS is postulated to not cause isolation of the associated FCV's for the auxiliary feed pump turbine.

PDIS-1-17 and -18 are not required to operate since they are used only 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 local indication only. This failure mode could not have adversely affected plant safety.

6. PS-3-160A&B, 165A&B, 140B, and 150B

Case 1 - Failure of PS's is postulated to cause associated LCV's to close. 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 intact SG No. 3. This is unacceptable feedwater flow which could adversely affect plant safety. This is the same result as described above in Case 1 of Item 5.

Case 2 - Failure of PS's is postulated to 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.

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

7. Internal wiring (cable types CPJ, CPJJ, and PJJ) to junction boxes 3042, 3061, 3066, 3063, 3062, 3069, 2890, 2891, 2857, and 2358.

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

Cable type PJJ is not qualified to the expected environment. Failure of this cable could cause the loss of safety-related equipment which could adversely affect plant safety.

#### Corrective Action

SQNEEB8003 The steam generator pressure transmitters will be replaced with transmitters which have been qualified for operation in the expected environment.

Item 3&4: The handswitches will be removed from service during normal operation so that failure will not affect operation of the valves.

SQNEEB8004 Item 5: The differential pressure switches will be modified to upgrade the level of qualification to meet the calculated accident environment.

Item 6: Two of the pressure switches will be moved out of the harsh environment. This will result in acceptable AFW flow for the postulated event.

Item 7: The cables which are not qualified to the expected environment (type PJJ) will be replaced.

All corrective actions will be completed before fuel load.