



Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381

**JUL 21 1994**

CDR-50-390, 391/91-08

10 CFR 50.55(e)

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Gentlemen:

In the Matter of the Application of ) Docket Nos. 50-390  
Tennessee Valley Authority ) 50-391

WATTS BAR NUCLEAR PLANT (WBN) - UNITS 1 AND 2 - DEFICIENCY IN THE INTAKE PUMPING STATION AND DIESEL GENERATOR BUILDING ENVIRONMENTAL CONTROL SYSTEMS - CDR-50-390,391/91-08.

The purpose of this submittal is to revise the final report for CDR-50-390, 391/91-08 dated November 4, 1991, to reflect the corrective actions taken as a result of Violation 390/93-202-01. This deficiency was initially reported on March 7, 1991, in accordance with 10 CFR 50.55(e) as Significant Corrective Action Report (SCAR) WBP 900084SCA. Enclosures 1 and 2 provide the revised final report and a revised list of commitments, respectively, regarding this issue. The primary change being made is to provide temporary onsite capability and associated procedures during a loss of offsite power, to prevent freezing of Essential Raw Cooling Water in the Intake Pumping Station. TVA has completed the corrective actions required for WBN Unit 1 operation and will issue a revised report addressing the operation of WBN Unit 2 in accordance with the Unit 2 completion schedule.

If there are any questions, please telephone P. L. Pace at (615) 365-1824.

Sincerely,

Dwight E. Nunn  
Vice President  
New Plant Completion  
Watts Bar Nuclear Plant

Enclosures  
cc: See page 2

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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2  
DEFICIENCY IN THE INTAKE PUMPING STATION AND  
DIESEL GENERATOR BUILDING ENVIRONMENTAL CONTROL SYSTEMS  
SIGNIFICANT CORRECTIVE ACTION REPORT WBP 900084SCA  
10 CFR 50.55(e)  
REVISED FINAL REPORT

DESCRIPTION OF DEFICIENCY:

During a generic applicability review of a Sequoyah Nuclear Plant deficiency, the following deficiencies were identified.

1. The ventilation and heating systems serving the mechanical and the electrical equipment rooms of the intake pumping station were designed to ensure that the room temperatures are maintained between the allowable 110°F high temperature and the 40°F low temperature. The electric space heaters and the ventilation fans are not safety-related and are classified as non-Quality Assurance, non-seismic Category I, and non-class 1E. The continued operation of the heaters and the fans cannot be assured. As a result, the safety-related instrument sense lines and non-safety-related piping could have frozen and the environmental qualification temperature of the safety-related electrical equipment could have been exceeded during, before, or after a design basis accident.
2. The heating, ventilation, and air conditioning (HVAC) equipment for the intake pumping station, which included electric heaters purchased under Contract No. 81131 and roof ventilators under Contract No. 83105 were not qualified to Seismic Category I(L) requirements. Watts Bar Design Criteria WB-DC-40-36.1 states that this equipment must be qualified to Seismic Category I(L) requirements.
3. The minimum temperatures in the Diesel Generator Building 480V electrical board rooms could not be maintained for normal or abnormal conditions or the minimum temperature for the Diesel Generator Building rooms for abnormal conditions (i.e., loss of offsite power) upon failure of the non-safety-related electric heaters.
4. Heat generated by the potential failure of non-safety-related electric heaters in a nonconservative mode was not considered in cooling loads to prevent their adverse impact on the safety-related equipment.

SAFETY IMPLICATIONS

As a consequence of the above conditions, the mechanical piping and sense lines in the intake pumping station mechanical equipment rooms, could potentially freeze during the worst-case conditions and could cause flooding of safety-related components essential to safe shutdown.

The frozen instrument sense lines on the essential raw cooling water (ERCW) system would lose their ability to detect/signal the condition of clogged

strainers, and therefore, fail to initiate automatic operation of the ERCW backwash/backflush valves on the strainers. This could result in gradual clogging of the strainers over a period of time. However, low flow alarms in the control room would indicate reduced flow rates. The ERCW system pressure boundary integrity could be violated by potential freezing of the sense lines, but this should not impact ERCW system performance requirements.

Cooling for each of the intake pumping station (IPS) mechanical and electrical equipment rooms is provided by nonsafety-related roof ventilators. If these fans failed, temperatures in these rooms could exceed the maximum temperature for which the safety-related equipment contained in these rooms is qualified.

The minimum temperatures could not be maintained in the Diesel Generator Building 480V electrical board rooms if the electric heaters failed; however, there are no water piping or instrument sense lines in the room which could be damaged from freezing temperatures, and the electric equipment should not be adversely affected by the decrease in room temperatures. Therefore, the failure of electric heaters should not have a detrimental effect on the safety-related Diesel Generator Building 480V electrical board rooms.

In a seismic event, parts of the heaters and the fans located in the intake pumping station, which are not qualified to seismic requirements, could become disengaged and fall, thus impacting the required functions of the safety-related equipment underneath.

The current upper temperature limits for the safety-related equipment areas, as specified on the Environmental Data (ED) drawings, could be exceeded through the potential failure of these nonsafety-related heaters in the energized state through the action of nonqualified thermostats or internal damage.

#### CORRECTIVE ACTIONS:

TVA has completed the corrective actions required for WBN Unit 1 operation, as described below, and will issue a revised report addressing the operation of WBN Unit 2 in accordance with the Unit 2 completion schedule.

#### Intake Pumping Station (IPS)

To address the low temperature conditions, both offsite and onsite electrical power (portable electric generators) is available to supply electrical heating to ensure that the environmental conditions necessary for reliable operation of the safety-related mechanical and electrical equipment are maintained.

This corrective action requires a combination of preventive and compensatory measures through operators' involvement to prevent freezing of ERCW and other piping and components. Specific requirements include ventilation systems shutdown during freezing weather as required, surveillance monitoring of building space temperatures during freezing weather, and compensatory actions to provide temporary heating through the usage of portable generators and heaters during loss of heating conditions. TVA has completed time-dependent temperature analysis for the IPS and has determined that sufficient time exists to provide supplemental heating to prevent freezing conditions within the equipment rooms.

TVA has revised the plant operating instructions and emergency operating procedures necessary to implement these required actions.

TVA has revised the IPS HVAC System Description document to specify requirements for temperature surveillance and operator compensatory actions required to provide supplementary heating for loss of heating in the IPS during site freezing weather conditions.

TVA has revised the Final Safety Analysis Report (FSAR) to address these commitments for temperature surveillance requirements and operator compensatory actions necessary to satisfy the design basis.

TVA has revised procedures to monitor the temperatures inside the equipment rooms or manually shut down nonessential heat loads upon loss of offsite power during summer conditions to address the high temperature conditions.

TVA has performed an analysis to qualify the existing heaters and roof ventilators to Seismic Category I(L) requirements.

#### Diesel Generator Building

TVA has performed an analysis to determine the minimum and maximum temperatures in the safety-related spaces of the diesel generator building. Existing safety-related equipment is qualified to the calculated minimum and maximum temperatures.

TVA has performed a safety analyses by revising/generating the Failure Modes and Effects Analyses (FMEA) to include the effects of credible failure modes of nonsafety-related HVAC components on the safety-related systems.

TVA has revised design criteria WB-DC-40-36, "Classification of Piping, Pumps, Valves, and Vessels," and WB-DC-40-36.1, "Classification of HVAC Systems," to add guidelines to assist the system engineer in the determination of limited seismic qualification requirements for equipment and components. Training was conducted for personnel involved with the specification and procurement of new equipment.

#### Other Areas

TVA has generated or revised calculations as required for all other safety-related equipment areas to determine the worst-case minimum and maximum space temperatures, and the effect of nonsafety-related heater failure on safety-related equipment. In accordance with single failure criteria WB-DC-40-64, the calculations conclude that nonsafety-related heater failures in the other plant areas do not have an adverse effect and thus do not affect the maximum space environmental temperatures for qualification of equipment. This action fulfilled the commitment WBN made to resolve generic conditions identified by Sequoyah Nuclear Plant Independent Design Inspection Deficiency D2.2-7.

ENCLOSURE 2

LIST OF COMMITMENTS

TVA will issue a revised report addressing the operation of WBN Unit 2 in accordance with the Unit 2 completion schedule.