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

MAY 27 1992

WBRD-50-390/91-38
WBRD-50-391/91-38

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 )
Tennessee Valley Authority )

Docket Nos. 50-390
50-391

WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2 - LACK OF DOCUMENTATION FOR FIRE BARRIER MATERIAL IN SEISMIC EXPANSION JOINTS - WBRD-50-390/91-38 AND WBRD-50-391/91-38 - FINAL REPORT

The subject deficiency was initially reported to NRC Region II on October 22, 1991, in accordance with 10 CFR 50.55(e) as Significant Corrective Action Report (SCAR) WBSCA910271. TVA submitted an interim report to NRC on November 21, 1991. Enclosed is TVA's final report on this subject.

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

Sincerely,

W. J. Museler

William J. Museler
Site Vice President

Enclosure
cc: See page 2

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MAY 27 1992

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ENCLOSURE

WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2
LACK OF DOCUMENTATION FOR FIRE BARRIER
MATERIAL IN SEISMIC EXPANSION JOINTS
SIGNIFICANT CORRECTIVE ACTION REPORT (SCAR) WBSCA910271
WBRD-50-390/91-38 AND WBRD-50-391/91-38

FINAL REPORT

## DESCRIPTION OF DEFICIENCY

TVA initially determined that the expansion joints between the Auxiliary Building and Shield Building (Units 1 and 2) at elevations 692.0, 713.0, 729.0, 737.0, 757.0, and 782.0 may be deficient. These expansion joints contain an asphalt coated fiberglass for which specific documentation supporting the fire resistive rating to an accepted Underwriters Laboratory or Factory Mutual standard (flame spread less than 25 feet) could not be located at the time of the initial report.

Expansion joints provide a medium which will not allow load transfer between the Auxiliary Building and Shield Building during a seismic event. These expansion joints are considered to be a fire boundary as specified in the Appendix R Compartmentation Drawings (47W420-series). The wall-to-floor/ceiling joints must constitute a three-hour rated fire barrier. Additionally, the expansion joints are required to provide a barrier for floor-to-floor and room-to-room flooding in the event of a high energy line break or moderate energy line break.

The failure of expansion joints to meet Appendix R requirements was initially identified at the Duane Arnold Nuclear Plant on July 30, 1990. Operating Experience (OE) report 4279 was issued on December 7, 1990, to document this deficient condition. Based on a review of OE 4279, the Sequoyah Nuclear Plant (SQN) determined the deficient condition to be applicable and reportable to NRC in accordance with 10 CFR 50.72 and 10 CFR 50.73. TVA reported this deficiency to NRC in Licensee Event Report 50-327/91-010. Through the generic review of SQN incident investigation II-S-91-004, "Concerning Concrete Expansion Joint Fire Barrier Appendix R Violations," the deficient condition was determined to be applicable to WBN.

## CAUSE

The requirements for fire and flood barrier were not considered in the original design of the expansion joints. Accordingly, the expansion joints were not included in the fire barrier surveillance program and subsequent Appendix R analyses. During Appendix R reviews, only penetrations through walls, floors, ceilings, etc., were considered. The expansion joints were most likely considered to be just another part of fire barrier walls, floors, and ceilings.

SAFETY SIGNIFICANCE

During initial review of this issue, the fire/flood protection afforded to plant equipment located in 32 Auxiliary Building rooms was conservatively assessed to be less than adequate. Failure of the expansion joints to constitute a three-hour rated fire barrier could have resulted in the inability to mitigate a fire in accordance with Appendix R and the subsequent inability to safely shut down the plant. Failure of the expansion joints to provide a flood barrier could have caused floor flooding or wetting of essential safety-related equipment in adjacent rooms and result in the inability to safely shut down the plant.

Subsequent fire/flood testing performed for SQN demonstrated the expansion joints to be an acceptable fire/flood barrier. These test results are applicable to WBN. The expansion joint configuration at WBN is identical to that at SQN. Therefore, this condition could not have adversely affected the safe operation of the plant had it remained uncorrected.

CORRECTIVE ACTIONS

1. Results of the fire test performed for SQN are reported in TVA Calculation SQN-00-D052/EPM-MHS-1123891. Test results confirmed that the expansion joint material and configuration represent a qualified three-hour fire barrier. These results apply to WBN since the configuration of the expansion joints at both SQN and WBN are identical.

   Results of the flood test are reported in TVA Report No. WR28-4-900-253. This test successfully demonstrated that the expansion joints are a qualified flood barrier. Specifically, no leakage was observed when the seal was subjected to a 41-inch head of water. This head is greater than the maximum depth for a moderate energy line break as defined by TVA Calculation WBN-OSG4-099 for the effected room locations.

2. Design Criteria WB-DC-20-8, "Auxiliary-Control Building Concrete Structures," has been revised to identify fire and flood barrier requirements for the expansion joints.

3. A walkdown of the accessible expansion joints located in 32 Auxiliary Building rooms has been completed. Results of the walkdown indicate that the as-built condition of the expansion joints agrees with the design configuration for fire and flood barriers. The as-built configuration is the same as that qualified by the fire and flood tests identified in Corrective Action No. 1 above.

4. Surveillance Instructions (SI)-7.27, "Visual Inspection of Fire-Rated Assemblies Located in Reactor Building, Unit 1," and SI-7.28, "Visual Inspection of Fire-Rated Assemblies Located in Reactor Building, Unit 2," have been revised to include expansion joint inspection requirements.