

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

5N 157B Lookout Place

DEC 17 1987

WBRD-50-390/86-25  
WBRD-50-391/86-21

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

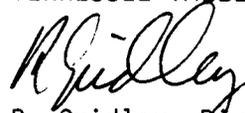
WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2 - NONQUALITY ASSURANCE DATA USED  
IN CALCULATIONS FOR CABLE LOADING - CABLE TRAY OVERFILL - WBRD-50-390/86-25  
AND WBRD-50-391/86-21 - REVISED FINAL REPORT

The subject deficiency was initially reported to NRC Region II Inspector Bob Carroll on January 2, 1986, in accordance with 10 CFR 50.55(e) as NCRs WBN EEB 8589 and EEB 8590. Interim reports were submitted on February 20 and June 20, 1986. A schedule change for the final report was submitted on October 15, 1986. A final report, which also addressed related deficiency, SCR WBN ECB 8601, concerning cable tray overfill problems, was submitted on January 29, 1987. The enclosed revised final report is a result of deficiencies identified in CAQRs WBP 870632 and WBP 870694 involving the spare cable program.

If there are any questions, please telephone R. D. Schulz at (615) 365-3527.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



R. Gridley, Director  
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Regulatory Affairs

Enclosure  
cc: See page 2

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U.S. Nuclear Regulatory Commission

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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2  
NONQUALITY ASSURANCE DATA  
USED IN CALCULATIONS FOR CABLE LOADING  
WBRD-50-390/86-25 AND WBRD-50-391/86-21  
NCRs WBN EEB 8589 AND WBN EEB 8590  
CAQRs WBP 870632 AND WBP 870694  
CABLE TRAY OVERFILL  
SCR WBN ECB 8601  
10 CFR 50.55(e)

REVISED FINAL REPORT

DESCRIPTION OF DEFICIENCY

As a result of a design review, it was determined that the source of weights and outside diameters for class 1E and nonclass 1E cables used in performing calculations were not documented in accordance with quality assurance requirements. Unverified values were used for the calculations of conduit and cable tray seismic loadings, and calculations on conduit and cable tray cross-sectional area fill. Verified values are required for all of these calculations.

Also, during the WBN cable routing system evaluation review, violations were discovered concerning cable tray overfilled conditions. Cable tray fill design criteria WB-DC-30-5 has been violated on several occasions when cables have been routed on full cable trays resulting in overfilled conditions. These overfilled trays have not been evaluated according to the requirements of the design criteria. The apparent cause of this deficiency was inadequate procedures that allowed the assignment of maximum allowable cross-sectional areas being entered into the cable tray update program that violated the requirements of design criteria WB-DC-30-5.

In addition to the deficiencies described in our final report of January 29, 1987, the NRC resident inspector identified a deficiency in the Watts Bar spare cable program, which was documented in NRC Inspection Report 390/87-11 as a violation. Input to the spare cable program had not been developed in accordance with quality assurance requirements. Information from the spare cable program is used to develop raceway loading calculations to assure that seismic loading requirements are met. As a result, it cannot be assured that the raceway loading calculations would have considered all spare cable in the raceways. The apparent cause of this deficiency was failure to obtain verified design input data.

SAFETY IMPLICATIONS

Since cable weights, outside diameters, and identification of the location of spare cables within the tray were not obtained from verified sources, incorrect values may have been used in the calculations. If erroneous information was used to determine conduit fill and tray fill, limits could have been exceeded. These potential overfilled conditions and the

nonjustified overfilled conditions could result in potential overheating of power cables and/or seismic overloading. Overheating of power cables could reduce the useful life of affected safety-related cables, resulting in possible open circuits or short circuiting due to insulation breakdown. Excessive physical loading due to incorrect cable weights, nonidentification of spare cable, and/or overfilled conditions could also affect the seismic qualification of the cable tray supports. These conditions could have adversely affected the safe operation of the plant if not corrected.

#### CORRECTIVE ACTIONS

The corrective action for NCRs WBN EEB 8589 and WBN EEB 8590 and SCR WBN ECB 8601 is as follows: QA verified values for weights and outside diameters for class 1E and nonclass 1E cables have been established and documented. These verified values will be entered into the "resident-data base" of the computer, as part of the conduit and cable tray update program, to be used for the calculation of conduit and cable tray cross-sectional area fill and seismic loading. In addition, these values have been incorporated into Engineering Design Standards DS-E12.1.13 and DS-E12.1.14 and must be used in performing future calculations. Conduit and cable tray raceway fill will be evaluated based on these verified values. Acceptable fill and weight will be documented in a DNE calculation. Deficiencies may require the addition of supports or rerouting of cables to bring the actual fill and/or weight to or below the allowable values. Any problems identified will be reworked before fuel loading of each respective unit.

To prevent recurrence of the deficiencies described in NCRs WBN EEB 8589 and WBN EEB 8590 and SCR WBN ECB 8601, TVA will modify the cable tray update program to prohibit assignment of maximum allowable cross-sectional area which violates Design Criteria WB-DC-30-5. Exceptions to this restriction will be permitted only if the lead engineer approves an overfill justification. This justification document will be maintained as a QA document. The structure of the conduit and tray network file, part of the conduit and cable tray update program, is being modified to add a data field that provides traceability to the justification document for overfill conditions. This is an alphanumeric field that uniquely identifies the justification document.

The corrective action and action required to prevent recurrence for CAQRs WBP 870632 and WBP 870694, involving deficiencies in the spare cable program, is described in the response to Notice of Violation 390/87-11-02 (TVA letter to NRC dated October 16, 1987).