TENNESSEE VALLEY AUTHORITY
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JAN 29 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
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attention: Dr. J. Nelson Grace

WATTS BAR NUCLEAR PLANT (WBN) - UNITS 1 AND 2 - NON-QUALITY ASSURANCE DATA FOR CABLE WEIGHTS AND OUTSIDE DIAMETERS USED IN CALCULATIONS - CABLE TRAY OVERFILL - WBRD-50-390/86-25, WBRD-50-391/86-21 - 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 this report was submitted on October 15, 1986. A related deficiency, SCR WBN ECB 8601, is included in this report to address cable tray overfill problems. Enclosed is our final report.

If there are any questions, please get in touch with R. D. Schulz at (615) 365-8527.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Domer

R. Gridley, Director
Nuclear Safety and Licensing

Enclosure
cc: See page 2

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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
NON-QUALITY ASSURANCE DATA FOR CABLE WEIGHTS AND
OUTSIDE DIAMETERS USED IN CALCULATIONS
WBRD-50-390/86-25, WBRD-50-391/86-21
SCR WBN EEB 8589 AND SCR WBN EEB 8590
CABLE TRAY OVERFILL
SCR WBN ECB 8601
10 CFR 50.55(e)
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 (QA) 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. The apparent cause of this deficiency was failure by the designers to obtain verified design input data.

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 have been violated on several occasions when cables have been intentionally 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 in the cable tray update program that violated the requirements of design criteria WB-DC-30-5.

Safety Implications

Since cable weights and outside diameters were not available from verified sources, incorrect values may have been used in the calculations. If erroneous outside diameter values were 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 and/or overfilled conditions could also affect the seismic qualification of the cable tray supports. These conditions could adversely affect the safe operations of the plant.

Corrective Actions

Verified values for weights and outside diameters for Class 1E and nonclass 1E cables have been established and documented. These values have been incorporated into Engineering Design Standards DS-E12.1.13 and DS-E12.1.14 which must be used in performing calculations for cable minimum bend and training radius and side wall pressure. Project procedures will be revised to reiterate the use of these Engineering Design Standards for any future engineering calculations. In addition, 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. Verified values for new cable mark numbers and/or outstanding cable mark numbers will be established and documented.

TVA will evaluate and document all conduit and cable tray raceways in Category 1 structures for overfilled conditions. This will involve either documentation in a DNE calculation that the overfilled and/or overweight condition is technically acceptable, 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, TVA will modify the conduit and cable tray update program before fuel load of unit 1 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 the overfill justification in a justification document which will be maintained as a QA document. The structure of the conduit and tray network file which is part of the conduit and cable tray update program will be modified to add a data field that will provide traceability to the justification document for overfill conditions. This will be an alphanumeric field that will uniquely identify the justification document.