

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

5N 157B Lookout Place

OCT 09 1990

WBRD-50-390/86-17  
WBRD-50-391/86-13

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 ADEQUATE CALCULATIONS  
TO DOCUMENT ELECTRICAL SYSTEM DESIGN BASIS - WBRD-50-390/86-17 AND  
WBRD-50-391/86-13 - REVISED FINAL REPORT

The subject deficiency was initially reported to NRC Inspector Art Johnson on  
December 23, 1985, in accordance with 10 CFR 50.55(e) as Significant Condition  
Report WBN EEB 8571. Interim reports were submitted on January 28 and July 15,  
1986. Our final report was submitted November 3, 1986.

Enclosure 1 provides our revised final report. Enclosure 2 identifies  
commitments made in this submittal.

Please note that this report supersedes the commitments previously made with  
regard to this deficiency.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY



E. G. Wallace, Manager  
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Enclosures  
cc: See page 2

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U.S. Nuclear Regulatory Commission

OCT 09 1990

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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT - UNITS 1 AND 2  
LACK OF ADEQUATE CALCULATIONS TO DOCUMENT  
ELECTRICAL SYSTEM DESIGN BASIS  
WBRD-50-390/86-17 AND WBRD-50-391/86-13  
SCR WBN EEB 8571  
10 CFR 50.55(e)  
REVISED FINAL REPORT

Description of Deficiency

The Watts Bar Nuclear Plant (WBN) Institute of Nuclear Power Operations (INPO) review and TVA's Office of Quality Assurance audit identified specific electrical design calculations that have not been evaluated and documented. Due to these findings/deviations, Problem Identification Reports (PIRs) WBN EEB 8527 and WBN EEB 8528 were initiated to correct the problems. In pursuing the corrective actions to resolve the PIRs, it was discovered that other calculations were also missing. This Significant Condition Report (SCR WBN EEB 8571) was written to address the fact that for WBN, TVA had failed to identify the minimum set of electrical calculations (calculations on safety-related systems required to shut down the plant); failed to revise existing calculations to incorporate subsequent design changes, and had issued design documents and drawings without preparing or before completing supporting calculations. These calculations are necessary to ensure the technical adequacy and compliance with the plant design basis. Affected systems include: auxiliary and control power distribution, communications, instrument and control, lighting, raceway, switchyard, and transformers.

This condition resulted primarily from inadequately defined requirements to formally document supporting design calculations and studies. At the time the deficiencies occurred, no procedures were in place to define the required minimum set of calculations and studies for the electrical systems. Some calculations were completed and kept in an informal status. Those calculations that were formalized were not updated to support document and drawing revisions.

Safety Implications

All system designs must be supported by design calculations. Without a minimum set of calculations to support the safety-related electrical system design basis and technical adequacy, inadequate assurance exists that the components and systems will function as required. This deficiency represents a condition which could adversely affect the safe operation of the plant.

Corrective Action

A preliminary minimum set of calculations necessary to ensure the technical design adequacy and compliance with the plant design basis has been identified and compared to existing calculations. This resulted in the identification of additional calculations that need to be performed, and existing calculations that need to be revised before fuel loading.

TVA obtained an independent assessment to ensure that the calculations for the electrical and instrumentation and control systems necessary to support the design basis had been identified, that all the necessary calculations existed and were current, and that they were retrievable. This effort has been completed.

As a result of the independent assessment, TVA has prepared a complete listing of all electrical calculations necessary to document the design basis of a standardized TVA nuclear plant and established requirements that design changes be reviewed to determine if calculation revisions or new calculations are necessary. This effort will also include baselining existing calculations and preparing a change review checklist for all design changes that involve the electrical discipline to determine if electrical calculations are impacted.

TVA has established a "long-term electrical calculation program" and purchased the tools to perform electrical calculations. This program consists of (1) procedures, standards, guides, practices for calculation preparation, and computer programs, and (2) training employees on these procedures and how to perform calculations.

Those calculations necessary to ensure that plant safety and support systems can mitigate the results of a design basis event will be performed under the "long-term electrical calculation program" before fuel loading. Any deficiencies identified by the performance of these calculations will be handled separately and evaluated in accordance with TVA's corrective action program.

In order to prevent recurrence, the change review checklist has been incorporated into the Watts Bar Engineering Project (WBEP) Manual. In addition, a computer-based "Calculation Cross-Reference Information System" (CCRIS) will be utilized to provide essential information about TVA's calculations and to provide cross reference capability to other supporting design documents.

ENCLOSURE 2

LIST OF COMMITMENTS

1. Baseline existing calculations and prepare a change review checklist for all design changes that involve the electrical discipline to determine if electrical calculations are impacted.
2. Those calculations necessary to ensure that plant safety and support systems can mitigate the results of a design basis event will be performed under the "long-term electrical calculation program" before fuel loading.
3. Any deficiencies identified by the performance of these calculations will be handled separately and evaluated in accordance with TVA's corrective action program.
4. A computer-based "Calculation Cross-Reference Information System" (CCRIS) will be utilized to provide essential information about TVA's calculations and to provide cross reference capability to other supporting design documents.