

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

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WBRD-50-390/86-47
WBRD-50-391/86-44

U.S. Nuclear Regulatory Commission
Region II
Attention: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Dr. Grace:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - REDUNDANT OVERCURRENT PROTECTION FOR
ELECTRICAL PENETRATION NUMBER 36 - WBRD-50-390/86-47 AND WBRD-50-391/86-44 -
FINAL REPORT

The subject deficiency was initially reported to NRC-Region II Inspector
Bob Carroll on April 15, 1986 in accordance with 10 CFR 50.55(e) as
SCRs WBN EEB 8630 and 8631. Our interim report was submitted on May 15,
1986. Enclosed is our final report.

If there are any questions, please get in touch with J. A. McDonald at
(615) 365-8527.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



R. Gridley, Director
Nuclear Safety and Licensing

Enclosure

cc (Enclosure):

Mr. James Taylor, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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ENCLOSURE
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
REDUNDANT OVERCURRENT PROTECTION FOR ELECTRICAL PENETRATION NUMBER 36
WBRD-50-390/86-47 AND WBRD-50-391/86-44
SCRS WBN EEB 8630 AND 8631
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

TVA lighting drawing 45W1418-4, for Watts Bar Nuclear Plant (WBN), was revised and issued for Engineering Change Notice (ECN) 3307 in 1982 to document the corrective action for Nonconformance Report (NCR) WBN EEB 8111. NCR WBN EEB 8111 had been issued to identify the overall lack of redundant overcurrent protection of electrical penetrations. During routine circuit studies for post loss of coolant accident (LOCA) submergence analysis, it was discovered that the lighting drawing did not provide adequate design information and details to fully implement the corrective action required for NCR WBN EEB 8111. Specifically, there were no TVA mark numbers for the material, no wiring diagrams for cable connections, and no circuit designations indicated on the drawings.

Standby lighting circuit Nos. 10, 11, and 12, from lighting cabinet LS4 for WBN unit 1 and LS2 for unit 2, enter the WBN reactor building (RB) through penetration No. 36. As a result of the drawing deficiency, the "As-Installed" configuration for unit 1 is incomplete. Although the fuse box and fuseholders were installed, there are no fuses installed and there is no wiring routed through the box. Thus, these circuits do not have redundant tripping devices to protect the penetration per WBN FSAR Section 8.1.5.3. The installation of the circuits for WBN unit 2 has not been initiated. Thus, no hardware deficiency exists for unit 2.

TVA has determined the root cause of this deficiency to be a failure to provide an adequate design standard to detail and/or clarify the use of redundant overcurrent devices for penetration protection. As a result, the lighting system designer failed to provide adequate design information necessary to complete the installation of the subject redundant tripping devices. The design coordination and interface review also failed to identify the deficiency.

Safety Implications

Each of the lighting circuits in question had overcurrent protection in the form of an individual circuit breaker. If the circuit breaker failed closed, a short circuit in the lighting circuit could have allowed (because of the lack of redundant overcurrent protection) excessive current to create enough heat to cause the sealing material used in the penetration to melt. Failure of the penetration under design basis accident conditions could have compromised containment integrity, thereby adversely affecting safe plant operation.

Corrective Action

TVA issued ECNs 6263 and 6264 for WBN units 1 and 2, respectively, to revise drawing 45W1418-4. The revision was to add a wiring connection diagram, circuit designations, and mark numbers for the addition of redundant overcurrent protection devices. The drawing revisions have been completed. The necessary modifications to complete the installation of fuses and wiring, as shown on the revised drawing for WBN unit 1, have been completed. No modifications are required for WBN unit 2 since installation work had not begun on the affected circuits at the time of issue of the revised drawing.

TVA currently has a design study in progress to ensure that all electrical penetration circuits have adequate overcurrent protection as required by Regulatory Guide 1.63. TVA will perform a field verification of "As-Installed" redundant overcurrent devices for penetration protection to ensure that design and as-constructed configuration drawings are in agreement. These actions will be completed before initial fuel loading for units 1 and 2 respectively.

TVA revised WBN Design Criteria WB-DC-30-5 on June 5, 1985 to incorporate the requirements of Regulatory Guide 1.63 and to ensure adequate electrical penetration protection. Additionally, TVA's Division of Nuclear Engineering (DNE) Electrical Engineering Branch (EEB) is proceeding to issue a design standard to detail and clarify the existing design control process at the working (designer) level. The initial version of the EEB design standard is to be issued October 31, 1986 and will define the framework and content of the management control system to be applied to the EEB design process. This initial system will be further developed to provide for the management, control, and training needed to implement a more effective closed-loop management control system covering the EEB design process. These actions will prevent recurrence of the subject deficiency.

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