



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

JAN 31 1994

MEMORANDUM FOR: Gus C. Lainas, Assistant Director
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

FROM: Ellis W. Merschoff, Director
Division of Reactor Projects

SUBJECT: TIA 94-004 REQUEST FOR REVIEW ASSISTANCE - WATTS BAR
COMPLIANCE WITH REGULATORY GUIDE 1.75

Region II Inspection Report 50-390,391/93-74 documents inspection results regarding the licensee's (TVA) compliance with Regulatory Guide (RG) 1.75 at the Watts Bar Nuclear Plant (WBN). Two issues discussed in the inspection report pertain to (1) electrical splices in enclosed raceways, and (2) physical separation between divisional conduits and open cable trays. The Region II office requests technical assistance and review of these two issues.

(1) Electrical Splices in Enclosed Raceways

As stated in NRC Inspection Report 390,391/93-74 (paragraph 4.a, page 9), the licensee permits the installation of electrical cable splices in enclosed raceways (rigid and flexible conduits). This allowance is provided in engineering specification G-38, Installation, Modification, and Maintenance of Insulated Cables Rated Up to 15,000 Volts, Revision 12. NRC RG 1.75 recommends that the practice of splicing of cables in enclosed raceways be analyzed and submitted as part of the WBN Final Safety Analysis Report (FSAR). The WBN design of allowing such splice installations is not described in the FSAR. Since the WBN construction permit predates the issuance of RG 1.75, the licensee stated, in the response to FSAR Question 040.25, that full compliance with the recommendations of RG 1.75 was not met; however, the WBN design basically met the RG 1.75 recommendations with some exceptions. These exceptions were evaluated by the NRC as documented in the staff's 1982 SER (NUREG-0847), Section 8.3.3.3, Physical Independence. Based on inspection results discussed in Inspection Report 390,391/93-74, the licensee submitted a letter (dated December 17, 1993) describing the basis for the WBN cable splicing design and provided a discussion on why the design does not need to be described in the WBN FSAR.

Region II requests technical assistance in the evaluation of the licensee's submittal dated December 17, 1993, and referenced documents, concluding in whether the subject analysis is acceptable and whether the splicing design should be described in the WBN FSAR as recommended by RG 1.75.

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(2) Physical Separation Between Divisional Conduits and Open Cable Trays

As stated in NRC Inspection Report 390,391/93-74 (paragraph 10.e), the licensee has established minimum separation requirements between redundant division conduits and open cable trays. The established minimum separation criteria of 1-inch is documented in design drawings and design criteria document WB-DC-30-4, Separation/Isolation (Appendix C) in December 1991. This is well after the NRC completed the physical separation criteria reviews for Watts Bar in 1982 (NUREG-0847). Chapter 8 of the WBN FSAR does not describe the established criteria for physical separation between Class 1E conduits and open Class 1E redundant cable trays.

Section 4.1.2.2, Conduits Separation, of design criteria WB-DC-30-4, states that 1-inch separation is required when a conduit of one division crosses or runs parallel to a cable tray containing cables of a redundant division, provided the cable tray portion has a cover or is solid on the side adjacent to the conduit. If the 1-inch separation cannot be met, a barrier may be used between the raceways, or a case-by-case analysis shall be made to ensure that redundant Class 1E circuits are not degraded below an acceptable level. However, Appendix C of the design criteria also states that a cover (top or bottom) is not required for separation distances greater than 1 inch. Based on inspection results discussed in Inspection Report 390,391/93-74, the licensee submitted a letter (dated December 17, 1993) describing the basis for this minimum separation criteria of greater than 1-inch for conduit/open tray configurations.

Region II requests technical assistance in the evaluation of the licensee's submittal dated December 17, 1993, and reference documents, concluding in whether the subject separation criteria of 1-inch minimum is acceptable for redundancy division conduit/open tray configurations.

Enclosure (1) through (6) are documents or excerpts of documents that are referenced in the above discussion. If you have any questions, your staff may wish to contact G. Walton, SRI, Watts Bar or J. Lara, RI, Watts Bar. Both can be contacted at the Watts Bar Site (615) 365-5487.



Ellis W. Merschoff

Enclosures and cc (see page 3):

Gus C. Lainas

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Enclosures:

1. Inspection Report 390,391/93-74
(Excerpt)
2. TVA Letter to NRC dated
December 17, 1993
3. FSAR Question 040.25 and TVA response
4. Engineering Specification G-38
(Excerpt)
5. Watts Bar Design Criteria WB-DC-30-4,
Separation/Isolation (Excerpt)
6. Drawings 45W883-3, 1-45W3000-1,
1-45W3000-2

cc w/encls and w/o encl 6:

A. F. Gibson, DRS/RII
R. V. Crlenjak, DRP/RII
A. R. Herdt, DRP/RII
P. E. Fredrickson, DRP/RII
C. A. Julian, DRS/RII
F. J. Hebdon, NRR
P. S. Tam, NRR
R. A. Copper, DRP/RII
E. G. Greenman, DRP/RIII
A. B. Beach, DRP/RIV
S. A. Richards, DRP/RV
C. E. McCracken, NRR
R. L. Baer, NRR

~~Document/Central Files~~
NRC Resident Inspector

040.25 Question

State the extent of conformance of the safety systems to Regulatory Guides 1.63 and 1.75. Also, for each case where the Watts Bar design does not conform to a particular recommendation contained in these Regulatory Guides, state the technical bases for the acceptability of the Watts Bar design.

RESPONSE

Regulatory Guide 1.63 "Electric Penetration Assemblies in Containment Structures for Water-Cooled Nuclear Power Plants."

See FSAR Section 8.1.5.3 for conformance statement.

Regulatory Guide 1.75 "Physical Independence of Electric Systems."

The criteria and their bases for the separation of Class 1E equipment and circuits at Watts Bar are given in sections 7.1.2.2 and 8.3.1.4. As stated in section D. "IMPLEMENTATION" of Regulatory Guide (RG) 1.75, January 1975, this guide applies to construction permit applications for which the issue date of the Safety Evaluation Report is February 1, 1974, or after. The Watts Bar Construction Permit was issued January 23, 1973. RG 1.75 was issued after the Watts Bar design was complete.

However, the Watts Bar design basically meets RG 1.75 except in the area of isolation devices and subsequent associated circuits, cable marking at intervals, and separate spreading areas.

The Watts Bar design utilizes circuit breakers and/or fuses in circuits as isolation devices. Since these devices are qualified as part of the Class 1E equipment, they are considered to provide acceptable isolation for supplying nondivisional loads. The circuits for the nondivisional loads are classified as nondivisional. The routing of nondivisional (nonsafety-related) circuits is described in Section 8.3.1.4.3. The nondivisional circuits are subject to the same requirements as Class 1E circuits such as cable derating, environmental qualification, flame retardance, splicing restrictions and raceway fill.

Conduit tags are located at conspicuous intervals (e.g., at entrance and exit points of large rooms and at terminations) showing their respective division of separation. Markers are located on exterior side surfaces of Class 1E cable trays at intervals not to

exceed 15 feet. Cables routed in Class 1E (train or channel) cable trays are identified at intermediate points. These color coded identifications (by means of marking, tagging or taping) occur near tray intersections at sufficient intervals to provide visual verification that the cable installation conforms to the separation criteria. The computer cable routing program (discussed in Section 8.3.1.4.5) ensures that proper separation of circuits is maintained on its respective tray network assignment.

The separation criteria for the cable spreading room is discussed in Section 8.3.1.4.2. Redundant cable spreading areas are not feasible at Watts Bar. The cable spreading room is shown in Figures 1.2-4 and 8.3-2. Only those power circuits that serve equipment within the Control Building are allowed in the cable spreading room. These circuits are routed in enclosed raceways.