

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

October 21, 1985

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WBRD-50-390/85-41  
WBRD-50-391/85-40

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

Dear Dr. Grace:

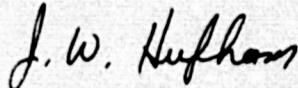
WATTS BAR NUCLEAR PLANT UNIT 2 - AUXILIARY FEEDWATER APPENDIX R ANALYSIS  
DEFICIENCY - WBRD-50-390/85-41, WBRD-50-391/85-40 - FIRST INTERIM REPORT

The subject deficiency was initially reported to NRC-OIE Inspector  
Al Ignatonis on September 18, 1985 in accordance with 10 CFR 50.55(e) as  
SCR WBN NEB 8516. Enclosed is our first interim report. We expect to submit  
our next report on or about November 14, 1985.

If you have any questions concerning this matter, please get in touch with  
R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



J. W. Hufham, Manager  
Licensing and Risk Protection

Enclosure

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

Records Center (Enclosure)  
Institute of Nuclear Power Operations  
1100 Circle 75 Parkway, Suite 1500  
Atlanta, Georgia 30339

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ENCLOSURE  
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2  
AUXILIARY FEEDWATER APPENDIX R ANALYSIS DEFICIENCY  
WBRD-50-390/85-41, WBRD-50-391/85-40  
SCR WBN NEB 8516  
10 CFR 50.55(e)  
FIRST INTERIM REPORT

Description of Deficiency

The component list in revision 7 of TVA's Office of Engineering (OE) calculation, "Equipment Required for Safe Shutdown Per 10 CFR 50 Appendix R," (B45 850521 218) for Watts Bar Nuclear Plant (WBN) lists the components required for safe shutdown following a fire. The component list allows for aligning one motor-driven auxiliary feedwater (AFW) pump to two steam generators ten minutes after main feedwater (MFW) is isolated. This condition has not been specifically analyzed. However, discussions with Westinghouse and an examination of the WBN FSAR Chapter 15 analyses for MFW line breaks indicate that delaying the AFW supply for ten minutes and aligning only one motor-driven AFW pump will result in a water solid pressurizer and subsequent water relief through the pressurizer safety valves. The design criteria of section 2.2.2 of the Appendix R shutdown logic calculation requires that for plant shutdown following a fire, reactor coolant system (RCS) process variables must be within those predicted for a normal loss of AC power event as described in WBN FSAR section 15.2.9. The shutdown scenario described above does not meet this criteria.

This condition was discovered during review of the WBN Vital Equipment List.

TVA has determined the cause of this deficiency to be a design oversight. When originally prepared, the Appendix R safe shutdown component list did not consider a specific timeframe for availability of the AFW system. As a result, the shutdown logic requires alignment of either one of the motor-driven AFW pumps or the turbine-driven AFW pump to supply AFW. This is consistent with the design basis of the system. During the evaluation of cable interactions, it was noted that the motor-driven AFW pump back pressure control valves fail closed and operator action would be required to reopen the valves. However, when providing for a local means of opening the valves, the timeframe in which the valves need to be opened was not adequately considered. In addition, the timeframe in which steam generator level control valves must be opened was not adequately addressed. The resulting design configuration does not meet the Appendix R design criteria requirements.

Safety Implications

As identified above, the subject deficiency could result in a plant configuration, as a result of a postulated single-exposure fire, which has not been specifically analyzed. During a normal loss of ac power event, the RCS temperature remains sufficiently low that the RCS pressurizer does not go water solid. However, with a 10-minute delay in initiation of any AFW supply, the RCS parameters will basically follow those predicted for a major feedwater line rupture event. An exception is that the WBN FSAR analysis for major feedwater line rupture assumes a 201-second supply from the turbine-driven AFW pump early in the event. This does not occur in the postulated Appendix R scenario. As such, the RCS temperature will increase enough to

cause the pressurizer to go water solid. This could complicate the reactor shutdown. Thus, it is considered that the subject deficiency, a 10-minute delay in AFW supply as a result of a fire, could adversely affect the ability to achieve and maintain a safe plant shutdown during a fire. This could adversely affect the safety of operations of the plant.

#### Interim Progress

TVA is presently performing an evaluation to determine which of two options will be used to correct this deficiency. The work required for implementation of each option must be identified and the impact on plant design bases and plant operations must be evaluated. There are two options which are being considered.

Option 1: TVA will ensure that for any plant fire either (a) one motor-driven AFW pump will supply two steam generators with 470 gal/min within one minute of MFW isolation, or (b) the turbine-driven AFW pump supplies 940 gal/min to two steam generators within ten minutes.

Option 2: TVA will reanalyze the subject deficiency using more realistic assumptions to verify that the RCS pressurizer will not go water solid during the aforementioned Appendix R scenario.

TVA has determined that this deficiency is an isolated occurrence resulting from design oversight. Also, the deficiency is applicable to the AFW system operation only at WBN. All other safety-related functions which require manual actuation to achieve a safe shutdown per Appendix R will be provided in timeframes which meet WBN Appendix R design criteria. TVA has instructed all responsible design engineers to provide a more detailed review when system design bases may be in question.

TVA will provide the next report to the NRC on this item on or about November 14, 1985.