



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

November 9, 2010

Mr. Ashok S. Bhatnagar  
Senior Vice President  
Nuclear Generation Development  
and Construction  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 2 – REQUEST FOR ADDITIONAL  
INFORMATION REGARDING FINAL SAFETY ANALYSIS REPORT  
AMENDMENT RELATED TO SECTION 10.4.9 (TAC NO. ME4074)

Dear Mr. Bhatnagar:

By letter dated May 27, 2010 (Agencywide Documents Access and Management System Accession No. ML101610290), the Tennessee Valley Authority (TVA) submitted Final Safety Analysis Report (FSAR) Amendment No. 99 for Watts Bar Nuclear Plant, Unit 2. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information provided by TVA in FSAR Amendment No. 99.

In an effort to complete the NRC staff review, enclosed is a request for additional information regarding FSAR Section 10.4.9 Auxiliary Feedwater.

A response is required 20 days from the date of this letter.

If you should have any questions, please contact me at 301-415-2048.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Poole", written over a horizontal line.

Justin C. Poole, Project Manager  
Watts Bar Special Projects Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-391

Enclosure:  
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION  
WATTS BAR NUCLEAR PLANT, UNIT 2  
FINAL SAFETY ANALYSIS REPORT AMENDMENT 99  
TENNESSEE VALLEY AUTHORITY  
DOCKET NO. 50-391

BOP- RAI – AFW -1

In Final Safety Analysis Report (FSAR) Section 10.4.9.2, System Description, the licensee states,

The two reactor units have separate AFW [Auxiliary Feedwater] systems, as shown in Figure 10.4-21, which share some support facilities such as parts of the Control System. As on all other engineered safety features, the independence of the two systems will be guaranteed in accordance with GDC [General Design Criterion] 5.

However, in FSAR Section 3.1.2, "WBNP [Watts Bar Nuclear Plant] Conformance with GDCs," WBNP states their intent in meeting Title 10 of the *Code of Federal Regulations* Part 50 Appendix A, GDC 5.

GDC 5 states:

"Criterion 5--Sharing of structures, systems, and components. Structures, systems, and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units."

The licensee does not provide any details on which structures and components are shared between the two units, nor does the licensee provide details on how GDC 5 is satisfied with these shared components.

The staff requests the licensee to

- a) provide details on which AFW structures and components are shared between the units,
- b) demonstrate how it satisfies GDC 5 for shared components for the AFW systems on Units 1 and 2.

BOP- RAI – AFW -2

In FSAR Table 10.4-6, Auxiliary Feedwater Flow to Steam Generators Following an Accident/Transient, the licensee states, upon a loss of normal feedwater (LONF) accident, and for a main steam sudden depression accident, the minimum required AFW flow is 820 gallons per minute (gpm). Also, in the table the licensee states, for a small break loss-of-coolant accident, two AFW pumps are required (one motor-driven and one turbine-driven) with a required minimum required flow of 1050 gpm.

In FSAR Section 10.4.9.3, Safety Evaluation, the licensee states, "Under all credible accident conditions, at least one AFW pump is available to supply two steam generators not affected by the accident with the required feedwater." This statement implies the license may only ensure a minimum of one AFW pump is available to mitigate credible accident conditions. However, one motor-driven AFW pump may not meet the minimum flow required to mitigate all accidents, as noted above.

- 1) The staff requests the licensee to justify the required number of AFW pumps are available to meet the minimum flow requirements to mitigate all accidents, assuming a worst case single active or passive failure.
- 2) The staff requests the licensee identify any passive or active failures that would result in the loss of two AFW pumps, possibly reducing the available flow rate to 410 gpm, thereby not satisfying the minimum required flow/pump requirements assumed in the design basis accidents.
- 3) The staff requests the licensee to provide an evaluation of the most limiting single failure in the AFW system to meet the requirements for the design basis accidents.

#### BOP- RAI – AFW -3

In FSAR Section 10.4.9.2, the licensee states that in the event of a flood, 1590 gpm of water can be supplied from each of the four high pressure fire protection (HPFP) system pumps. The four motor-driven pumps are supplied from normal and emergency power. The licensee states two pumps are assigned to each of the two emergency power trains and each pair of pumps on the same power train takes suction from a common sump.

This Unit 2 FSAR mimics the statement in Unit 1 FSAR. However, the FSAR section does not explain how the system configuration meets the requirements of shared components as required by GDC 5. The description provided in the FSAR does not provide sufficient information to determine how four HPFP pumps supply two headers to the two unit's four steam generators to include whether the HPFP pump power supply aligns with the power supply for the flow control valves with the associated steam generators.

The staff requests the licensee provide an explanation of how the HPFP pumps are configured to service Unit 1 and 2 steam generators, and justify the use shared components with respect to GDC 5.

#### BOP- RAI –AFW – 4

In FSAR Section 10.4.9.3, the licensee states sufficient feedwater can be provided over the required pressure range even if the failure of a feedwater line is the initiating event, any one AFW pump fails to start, and no operator action is taken for 12 minutes. However, the licensee also states in the same FSAR section that operator intervention within 10 minutes is required in order to meet maximum flow requirements for the main steamline break inside containment, or within 12 minutes (based on recent safety reanalysis) to meet the minimum flow requirements for the feed line rupture.

From the descriptions provided in the FSAR, the statements made by the licensee contradicts one another on whether operator action is credited or not credited with the first 10 to 12 minutes of an accident.

The staff requests the licensee to justify whether operator action is required, or whether no operator action is credited to mitigate design basis events. If operator action is required, provide the basis for acceptance.

BOP- RAI – AFW – 5

Regulatory Requirement from 10 CFR 50.55a specifies that inservice tests are required to verify operational readiness of pumps and valves, whose function is required for safety. Additionally, 10 CFR 50 Appendix B, Criterion XI requires a test program to demonstrate SSCs will perform satisfactorily in service, to include preoperational and operational tests.

In FSAR Section 10.4.9.4, Inspection and Testing Requirements, the licensee states, separate tests on the essential raw cooling water (ERCW) and HPFP systems will assure the availability of the alternate water supplies; and these test requirements are given in Chapter 14, the surveillance test requirements are given in Chapter 16, and the inservice inspection requirements are given in Chapter 3.

Both the ERCW and HPFP system utilize water from the river, which is not desirable quality water to put in AFW piping or the steam generators.

The licensee proposes technical specification surveillance requirement, SR 3.7.5.5, to verify AFW flow path from the nonsafety-related condensate storage tank to the steam generators. However, the licensee does not propose a technical specification surveillance for the safety-related flow path credited in the design basis, from ERCW to the AFW pumps, or from the HPFP system to the steam generators.

The staff requests the licensee provide a basis on how it intends to meet the 1) requirements for assuring a safety-related flow path is operable, and 2) provisions for a test program for the supply of water from the ERCW and HPFP systems to the AFW system to meet AFW flow requirements.

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/RA/

Justin C. Poole, Project Manager  
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|--------|----------|----------|----------|----------|-----------|
| OFFICE | LPWB/PM  | LPWB/LA  | SBPB/BC  | OGC      | LPWB/BC   |
| NAME   | JPoole   | BClayton | GCasto*  | DRoth    | SCampbell |
| DATE   | 11/08/10 | 11/08/10 | 10/28/10 | 11/05/10 | 11/09/10  |

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