



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

October 20, 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 9.2.1 (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 9.2.1 Essential Raw Cooling Water.

A response is required 14 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 "Justin C. Poole".

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

RAI ERCW-1

The guidelines of NUREG-0800, Standard Review Plan (SRP), Section 9.2.1, "Station Service Water System," state that the applicant is to consider water hammer during normal plant operation and design-basis accidents in meeting the requirements of General Design Criteria (GDC) 4.

Furthermore, Nuclear Regulatory Commission (NRC) Generic Letter (GL) 96-06 dated September 30, 1996, and GL 96-06 Supplement 1 dated November 13, 1997, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," requested that licensees determine:

- Capability of cooling water systems serving the containment air coolers to withstand the hydrodynamic effects of water hammer and to satisfy system design and operability requirements.
- Capability of cooling water systems serving the containment air coolers to meet heat removal assumptions for design-basis accident scenarios, even during two-phase flow conditions.
- Capability of isolated water-filled sections of piping in containment to withstand thermally-induced overpressurization.

Explain the capability of the Essential Raw Cooling Water (ERCW) system for the proposed Watts Bar Nuclear Plant, Unit 2 (WBN 2), in meeting the guidelines of SRP Section 9.2.1 and the requested action of GL 96-06.

RAI ERCW-2

Final Safety Analysis Report (FSAR) Section 9.2.1.2 states that the normal supply for component cooling heat exchangers A and B is ERCW header 2A. With valve 2-FCV-67-81 being the supply isolation valve for the ERCW header 2A, failure of 2-FCV-67-81 can cause the loss of ERCW header 2A and, thus, loss of the normal supply of ERCW to component cooling heat exchangers A and B. FSAR Table 9.2-2, "Essential Raw Cooling Water System Failure Modes and Effects Analysis," shows that the failure of 2-FCV-67-81 has no effect on the plant because ERCW header 1B is the alternate supply.

Describe the process where ERCW header 1B becomes the supply to component cooling heat exchangers A and B after failure of the ERCW 2A header supply. Include operator actions and delay time and explain how these items are factored into the safety analysis for a design-basis accident in one unit and an orderly shutdown and cool down in the other unit.

RAI ERCW-3

The guidance in SRP 9.2.1 (Sections III.1 and III.4) states that the SAR is to provide information to identify minimum heat transfer and flow requirements for normal plant operations and minimum heat transfer and flow requirements for each accident situation for the required time spans. The information is useful in determining whether the applicant has met the requirements of GDC 44, "Cooling water."

The applicant has stated in Section 9.2.1.3 of the FSAR that, "The ERCW system provides the required flow necessary to dissipate the heat loads imposed under the design basis operating mode combination, i.e., one unit in [loss-of-coolant accident] LOCA and the other unit in hot standby, based on maximum river temperature." The applicant has not identified the minimum flow and heat transfer requirements for each load for each accident situation for the required time spans. The NRC staff does not consider this sufficient information to demonstrate adequacy with the regulatory guidance as stated above.

Provide minimum flow and heat transfer requirements for each load supplied by the ERCW for normal plant operations and for each applicable design basis accident, including a design basis accident in one unit and an orderly shutdown and cool down of the non accident unit in accordance with GDC 5.

RAI ERCW-4

10 CFR 50 Appendix A, GDC 44 states in part:

Criterion 44--Cooling water. A system to transfer heat from structures, systems, and components important to safety, to an ultimate heat sink shall be provided. The system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions.

The ERCW system functions, in part, to meet the requirements of GDC 44. The component cooling heat exchangers and the containment spray heat exchangers are components important to safety that have heat loads under accident conditions.

FSAR Section 9.2.1.3, "Safety Evaluation," states that, "During a LOCA, it may be necessary to reduce flow to the component cooling heat exchanger prior to admitting flow to the containment spray heat exchanger. The earliest that this action is required is 15 minutes."

Provide explanation to the following questions and fully describe the rationale, procedural steps, and analysis to justify the above FSAR statement:

- Why and when may this action be necessary and how will the operators know when and if to reduce flow to the component cooling heat exchanger?
- There are three component cooling heat exchangers. To which component cooling water heat exchanger and which containment spray heat exchanger does the above statement refer? Why is this statement limited to one component cooling water heat exchanger and one containment heat exchanger?

RAI ERCW-5

NUREG-0847, "Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2," Supplement 18 states:

The staff reviewed the essential raw cooling water (ERCW) system in the SER and SSERs 9 and 10. By Amendment 90 to the FSAR, Table 9.2-1, the applicant stated that the ERCW system pumps did not perform in accordance with their original design-basis. During preoperational testing, the ERCW pumps did not match the original performance curves supplied by the pump vendor. However, the original design-basis capacity and head for each of the ERCW pumps was based on two-unit operation. Because the ERCW system is a continuously shared system, even during accidents, the design is such that the pumps are designed to supply cooling water to two separate trains, one for each unit. To support single-unit operation, the applicant reanalyzed the ERCW system flow requirements to determine the minimum ERCW pump performance requirements for Unit 1 operation only [emphasis added].

.....As a result of the applicant's determination that the ERCW pumps do not conform to their original design-basis capability, the staff concludes that the ERCW system does not conform to GDC 5 for two-unit operation.

.....The staff, therefore, concludes that the ERCW system is acceptable for Unit 1 operation.

Discuss the actions taken to make the ERCW system acceptable for two-unit operation in conformance with GDC 5.

Mr. Ashok S. Bhatnagar
 Senior Vice President
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 and Construction
 Tennessee Valley Authority
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 1101 Market Street
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SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 2 – REQUEST FOR ADDITIONAL INFORMATION REGARDING FINAL SAFETY ANALYSIS REPORT AMENDMENT RELATED TO SECTION 9.2 (TAC NO. ME4074)

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Justin C. Poole, Project Manager
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OFFICE	LPWB/PM	LPWB/LA	SBPB/BC	OGC	LPWB/BC
NAME	JPoole	BClayton	GCasto*	EWilliamson	SCampbell
DATE	10 / 18 /10	10 /18 /10	10 / 14 /10	10 / 20 /10	10 / 20 /10

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