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

June 24, 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 LICENSEE'S FINAL SAFETY ANALYSIS REPORT AMENDMENT RELATED TO NUCLEAR PERFORMANCE AND CODE REVIEW, PLANT SYSTEMS, AND COMPONENT PERFORMANCE AND TESTING (TAC NOS. ME2731 AND ME3091)

Dear Mr. Bhatnagar:

By letters dated November 24, 2009, December 14, 2009, and January 11, 2010, Tennessee Valley Authority (TVA) submitted Final Safety Analysis Report Amendment Nos. 95, 96, and 97, respectively.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the portion related to nuclear performance and code review, plant systems, and component performance and testing, and determined that further information is required to complete its assessment of TVA's submittals. In the enclosed request for additional information (RAI), the NRC staff has listed the requested information.

A response is required within 30 days of receipt of this letter.

If you should have any questions, please contact me at 301-415-6606.

Sincerely,

Joel S. Wiebe, Senior Project Manager
Watts Bar Special Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-391

Enclosure: RAI

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REQUEST FOR ADDITIONAL INFROMATION

WATTS BAR NUCLEAR PLANT, UNIT 2

FINAL SAFETY ANALYSIS REPORT AMENDMENT NOS. 95, 96, AND 97

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-391

By letters dated November 24, 2009 (Agencywide Document Access and Management System Accession No. ML093370274), December 14, 2009 (ML093570464), and January 11, 2010 (ML100191426), Tennessee Valley Authority (TVA) submitted Final Safety Analysis Report (FSAR) Amendment Nos. 95, 96, and 97, respectively.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the portion related to nuclear performance and code review, plant systems, and component performance and testing, and determined that further information is required to complete its assessment of TVA's submittals. The following additional information is required to proceed with NRC staff review.

Nuclear Performance and Code Review (SNPB)

All references to Watts Bar Nuclear Plant (WBN), Unit 1 are from the approved FSAR Amendment No. 7. All references to WBN Unit 2 are from Amendment No. 95.

Chapter 4.4.2

NRC Information Notice 2009-23 identified that the fuel thermal conductivity experiences a 5- to 7-percent degradation for every 10-gigawatt-days per metric ton of exposure. The thermal conductivity for uranium dioxide provided in equation 4.4-1 does not take this degradation into account. All of the references that are used to generate the thermal conductivity [14, 28, 29, 30, 31, 32, and 33] predate the fuel thermal conductivity experiments performed in 1990 that demonstrate the fuel thermal conductivity degradation effects. Justify the use of equation 4.4-1 given that it will over-predict the fuel thermal conductivity at higher burnups that would lead to an under-prediction of fuel temperatures.

Plant Systems (SBPB)

Request for Additional Information (RAI) 3.6-01

Section 3.6A.2.2.2 "Blowdown Thrust Loads" contains the following equation:

$$V_E = [2g_c(P_0 - P_A)/\rho_E]^{1/2}$$

The equivalent equation in the WBN Unit 1 FSAR, Amendment No. 7 is:

$$V_E = [2g_c(P_0 - P_A)]^{1/2} / \rho_E \text{ (see page 3.6A-17)}$$

TVA is requested to clarify the differences in the two equations.

ENCLOSURE

RAI 5.2.5-01

Previously there existed an intersystem leakage path "upper head injection system (UHI)." This system is no longer described in the FSAR. TVA is requested to confirm this system is no longer included in the WBN plant and provide the basis for deleting the system.

RAI 9.2.6-1

In the Safety Evaluation Report (SER) related to the operation of WBN Units 1 and 2, NUREG-0847, Supplement 12, dated October 1993, the NRC staff wrote in Section 9.2.6, Condensate Storage Facilities:

> In Section 9.2.6 of the SER, the NRC staff indicated that the two condensate storage tanks reserved 200,000 gallons of condensate for each unit's auxiliary feedwater (AFW) system. In FSAR Amendment No. 72, TVA revised this reserved amount to 210,000 gallons. The basis for the storage capacity is not affected and this correction is made for clarification purposes only. This does not change any of the NRC staff's conclusions reached in the SER or supplements related to the condensate storage facilities or the AFW system. The NRC staff's effort was tracked by TAC M85037 and M85038.

In the proposed FSAR for WBN Unit 2, Section 9.2.6.2 System Description, TVA proposal states:

> The condensate facility, shown in Figure 10.4-7, consists of one condensate transfer pump and two condensate storage tanks connected in parallel (one tank for each unit) and associated piping, controls, and instrumentation. The tanks are located in the plant yard adjacent to the east wall of the Turbine Building. The auxiliary feedwater pumps take suction directly from the condensate storage tanks to supply treated water for cooldown of the reactor coolant system. A minimum of 200,000 gallons in each tank is reserved for the auxiliary feedwater system. This quantity is assured by means of standpipes through which other systems are supplied.

The NRC staff requests TVA to justify why the change to 210,000 gallons was not incorporated.

RAI 9.3.1-1

TVA provided a document titled, "FSAR Cross Referenced to SER sorted by SER, then by FSAR." In this document under the line item SER Section 9.3.1, "Compressed Air System," the scope identified new essential air compressors were installed. The compressed air system is a shared system between WBN Units 1 and 2. During a review of the proposed FSAR for WBN Unit 2, the NRC staff did not detect any changes.

The NRC staff requests TVA to explain whether there were any changes needed to be made to the proposed FSAR for WBN Units 1 and 2, based upon the installation of new essential air compressors.

RAI 10.3.0 Main Steam System

TVA provided a document titled, "FSAR Cross Referenced to SER sorted by SER, then by FSAR." In this document under SER Section 10.3.0, "Main Steam Supply System," TVA identifies that this section includes a review of the following FSAR sections:

- 10.3 MAIN STEAM SUPPLY SYSTEM
- 10.3.0 Main Steam Supply System 10.3.1 Design Bases
- 10.3.0 Main Steam Supply System 10.3.4 Inspection and Testing Requirements
- 10.3.0 Main Steam Supply System 10.4.11 Steam Generator Wet Layup System

During a review of the FSAR, the NRC staff noted that Section 10.4.11, "Steam Generator Wet Layup System," was not included.

The NRC staff requests TVA to justify the omission of the FSAR Section 10.4.11, to include disposition of safety-related components that were a part of this system (e.g., containment isolation valves, piping and components).

RAI 10.4.7 Condensate and Feedwater Systems

TVA provided a document titled, "FSAR Cross Referenced to SER sorted by SER, then by FSAR." In this document under SER Section 10.4.7, "Condensate and Feedwater System," TVA identifies that this section includes a review of the following FSAR sections:

- FSAR 5.5.9 Main Steam Line and Feedwater Piping
- FSAR 10.4.7 Condensate and Feedwater Systems
- FSAR 10.4.10 Heater Drains and Vents

During a review of the FSAR, the NRC staff noted that Section 10.4.10, "Heater Drains and Vents," shows up in the table of contents, but the text section is not included.

The NRC staff requests TVA to justify the omission of the FSAR Section 10.4.10, to include disposition of any safety-related components that were a part of this system.

<u>Component Performance and Testing (CPTB)</u>

RAI- Inservice Testing

Title 10 of the *Code of Federal Regulations*, Section 50.55a (10 CFR 50.55a), requires that inservice testing (IST) of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 pumps and valves be performed in accordance with the ASME Code for Operation and Maintenance of Nuclear Power Plants (OM Code) and applicable addenda.

Paragraph 10 CFR 50.55a(f)(4)(i) requires:

"Inservice tests to verify operational readiness of pumps and valves, whose function is required for safety, conducted during the initial 120-month interval must comply with the requirements in the latest edition and addenda of the Code incorporated by reference in paragraph (b) of this section on the date 12 months before the date of issuance of the operating license under this part, or 12 months before the date scheduled for initial loading fuel under a combined license under part 52 of this chapter (or the optional ASME Code cases listed in NRC Regulatory Guide 1.192, that is incorporated by reference in paragraph (b) of this section), subject to the limitations and modifications listed in paragraph (b) of this section."

In Amendment No. 97 to the Watts Bar Unit 2 FSAR, TVA states that IST of ASME Code Class 1, 2, and 3 pumps and valves will be conducted to the extent practical in accordance with 2001 Edition of ASME OM Code with Addenda through 2003. Justify how 10 CFR 50.55a(f)(4)(i) is met.

TVA also indicates in Amendment No. 97 that exceptions to the OM Code requirements are noted in the IST program submittal made to NRC. Exceptions to the Code requirements are allowed by NRC regulations, but they must be identified in the IST program specifically for WBN Unit 2 along with proposed alternatives and relief requests. In proposing alternatives or requesting relief, TVA must demonstrate that: (1) the alternatives will provide an acceptable level of quality and safety, (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, or (3) conformance would be impractical for its facility. The regulations in 10 CFR 50.55a authorize the Commission to approve alternatives and to grant relief from OM Code requirements upon making the necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, "A Guidance on Developing Acceptable Inservice Testing Programs," provides alternatives to Code requirements that are acceptable to the NRC staff. Further guidance for developing an IST program is given in NUREG-1482, Revision 1, "A Guidance for Inservice Testing at Nuclear Power Plants," GL 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," and GL 95-07, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves."

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