September 16, 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 CHAPTERS 4, 5, 6 and 9 (TAC NO. ME4074)

Dear Mr. Bhatnagar:

By letters dated November 24 and December 14, 2009, and January 11, May 7, and May 27, 2010, Tennessee Valley Authority submitted Amendments 95, 96, 97, 98, and 99, respectively, to the Final Safety Analysis Report for Watts Bar Nuclear Plant, Unit 2.

The U.S. Nuclear Regulatory Commission staff has reviewed the information provided and determined that further information is required to complete its assessment of your submittals. The specific questions are discussed in the enclosed request for additional information.

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

If you should have any questions, please contact me at 301-415-1457.

Sincerely,

/RA/

Patrick Milano, Senior Project Manager
Watts Bar Special Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-391

Enclosure:
RAI

cc w/encl: Distribution via Listserv

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OFFICIAL AGENCY RECORD

Request for Additional Information

Watts Bar Nuclear Plant, Unit 2

Final Safety Analysis Report, Sections 4, 5, 6, and 9

Tennessee Valley Authority

Docket No. 50-391

By letters dated November 24 and December 14, 2009, and January 11, May 7, and May 27, 2010, Tennessee Valley Authority submitted amendments 95, 96, 97, 98, and 99, respectively, to the Final Safety Analysis Report (FSAR) for Watts Bar Nuclear Plant, Unit 2. The U.S. Nuclear Regulatory Commission staff has reviewed the information provided and determined that the following information is required to complete its review.

1. Safety Evaluation Report (SER) 4.4.1, Performance in Safety Criteria" (FSAR 4.4.1).

   FSAR Table 4.4-1 provides the design limit departure from nucleate boiling ratio (DNBR) values. Provide:

   a. The safety limit DNBR values for typical and thimble cells, for use with the Revised Thermal Design Procedure, and the Standard Thermal Design Procedure methods.

   b. The DNBR uncertainty allowances and margins.

   c. A discussion about how the uncertainty allowances and margins are added to the design DNBR values to develop the DNBR safety limit values.

2. SER Section 5.0, "Reactor Coolant System and Connected Systems."

   a. SER 5.2.2, "Overpressurization Protection" (FSAR 5.2.2).

   (1) General Design Criterion 15 states, in part, that the reactor coolant is designed with sufficient margin to assure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, including anticipated operational occurrences. Provide an evaluation of at-power overpressure transients, consistent with the guidelines of Section 5.2.2 of NUREG-0800.

   (2) Describe the evaluations of the heat and mass input events at low temperature, to support conclusion that "the allowable limits will not be exceeded and therefore will not constitute an impairment to vessel integrity and plant safety." Discuss which event (the mass addition event or the heat input event) is more limiting, and why.

b. SER 5.4.3, “Residual Heat Removal System [RHR]” (FSAR 5.5.7).

Provide a justification for the difference between Units 1 and 2 in the time to cool the reactor coolant system from 350 °F to 140 °F (i.e., Unit 2 RHR time period for cool down is 16 hours, which is 3 hours shorter than in Unit 1).

3. SER Section 6.3, “Emergency Core Cooling System [ECCS]” (FSAR 6.3).

a. FSAR 6.3.1, “Design Bases.”

FSAR Section 6.3.1.3, “Reactivity Required for Cold Shutdown” states that “[d]uring a steam line break outside containment, the refueling water storage tank (RWST) is assumed to rupture. This could be due to a tornado induced steamline break.”

Describe the treatment of the assumption of RWST rupture in the steamline break analyses.

b. FSAR 6.3.2.2, “Equipment and Component Design.”

Describe the process (inputs, assumptions, methods) used to determine the 3-hour time, at which hot-leg recirculation is started.

c. FSAR 6.3.3, “Performance Evaluation” (SER 6.3.2 and 6.3.4).

(1) FSAR Section 6.3.3.3, “Alternate Analysis Methods,” for a steamline break states that “the ECCS adequately fulfills its shutdown reactivity addition function.” Specify the shutdown reactivity addition function.

(2) Also, the FSAR states that “[t]he delivery of the borated water from the charging pump results in a negative reactivity change to counteract the increase in reactivity caused by the system cooldown.” Chapter 15 steamline break analysis transient plots show the effect of accumulator injection on core reactivity; but the effect of charging pump flow is not evident. Quantify the negative reactivity insertion of the charging pump flow and discuss how it counteracts the increase in reactivity caused by the system cooldown.

(3) FSAR 9.2.7, “Refueling Water Storage Tank [RWST],” discusses the two basic requirements for the RWST. In this regard, one requirement is to provide borated water in the event of a loss-of-coolant accident. However, this requirement does not discuss a steamline break accident response. How are steamline break reactivity requirements met by the RWST? How is the boron concentration requirement for the RWST determined?