June 29, 2010

Mr. Ashok S. Bhatnagar
Senior Vice President
Nuclear Generation Development
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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 (TAC NO. ME2731)

Dear Mr. Bhatnagar:

By letter dated November 24, 2009 (Agencywide Documents Access and Management System Accession No. ML093370274), the Tennessee Valley Authority (TVA) submitted Final Safety Analysis Report (FSAR) Amendment No. 95 for Watts Bar Nuclear Plant, Unit 2. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information provided by the TVA in FSAR Amendment No. 95.

In an effort to complete the NRC staff review, enclosed is a Request for Additional Information (RAI) regarding the nuclear performance and code branch review for FSAR Sections 4.3 and 4.4.

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,

/RA/

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

cc w/encl: Distribution via Listserv

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ADAMS Accession No. ML101620006

OFFICE	LPWB/PM	LPWB/LA	SNPB/BC	OGC	LPWB/BC
NAME	JWiebe	BClayton	AMendiola	DRoth	SCampbell
DATE	6/17/10	6/17/10	6/17/10	6/24/10	06 / 29 /10

OFFICIAL AGENCY RECORD

REQUEST FOR ADDITIONAL INFROMATION

WATTS BAR NUCLEAR PLANT, UNIT 2

FINAL SAFETY ANALYSIS REPORT AMENDMENT NO. 95

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-391

By letter dated November 24, 2009 (Agencywide Documents Access and Management System Accession No. ML093370274), the Tennessee Valley Authority (TVA) submitted Final Safety Analysis Report (FSAR) Amendment No. 95 for Watts Bar Nuclear Plant (WBN), Unit 2. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information provided by the TVA in FSAR Amendment No. 95.

In an effort to complete the NRC staff review, below is a request for additional information (RAI) regarding the nuclear performance and code branch (SNPB) review for FSAR Sections 4.3 and 4.4

Nuclear Performance and Code Review (SNPB)

All references to WBN Unit 1 are from the approved FSAR Amendment No. 7. All references to WBN Unit 2 are from Amendment No. 95.

Chapter 4.3.2

1. Discuss the initial core loading strategy for WBN Unit 2.

2. In Table 4.3-1 (page 4.3-40) define the two numbers given for the following in the Fuel Assemblies section:

    a. Diameter of Guide Thimbles (upper part)
    b. Diameter of Guide Thimbles (lower part)
    c. Diameter of Instrument Guide Thimbles

3. In Table 4.3-1 (page 4.3-40) should the Clad Material under the section Fuel Rods read “ZIRLO” instead of “Zircaloy”?

4. Table 4.3-1 (page 4.3-41) in the Rod Cluster Control Assemblies section has information that looks to be carried over from WBN Unit 1, which, is no longer used in WBN Unit 2, such as the information for the boron carbide (B_4C) control rods. According to the table, B_4C control rods will not be used in WBN Unit 2, but all of the parameters are still provided in the table. Correct the table to make it consistent with the Rod Cluster Control Assemblies that will be used in WBN Unit 2.

5. In WBN Unit 2 Amendment No. 95 Section 4.3.2.2.4, the definition of axial offset (page 4.3-10) differs from the definition of axial offset from WBN Unit 1 Updated FSAR Amendment No. 7 Section 4.3.2.2.4. Which definition is correct?

Enclosure

6. In WBN Unit 2 Amendment No. 95 Section 4.3.2.2.5, show the equation used to determine the average linear power.

7. In WBN Unit 2 Amendment No. 95 Section 4.3.2.2.5, the total core power is assumed to be limited to 118 percent by a reactor trip, but WBN Unit 1 assumes the total core power to be limited by 121-percent by reactor trip. Provide an explanation for this difference.

8. In WBN Unit 2 Amendment No. 95 Section 4.3.2.2.6, describe the impacts of using BEACON with fixed incore detectors on the uncertainties listed in this section. Discuss any other impacts of using BEACON with fixed and not movable incore detectors. Has BEACON been implemented with fixed detectors in other cores?

9. In WBN Unit 2 Amendment No. 95 Section 4.3.2.3.2, when the moderator coefficient is calculated for the various plant conditions, is the moderator temperature varied by adding 5 °F to each of the mean temperatures, or by adding and subtracting 5 °F to each of the mean temperature (pages 4.3-17 – 4.3-18)?

10. In WBN Unit 2 Amendment No. 95 Section 4.3.2.4.2, what is 4EF (page 4.3-20)?

11. In WBN Unit 2 Amendment No. 95 Section 4.3.2.8.5 and section 4.3.3.2, LEOPARD is referenced as Reference 17, however, according to the references section, Reference 17 was deleted by Amendment No. 92. Why was the amendment deleted?

Chapter 4.3.3

1. In WBN Unit 2 Amendment No. 95 Section 4.3.3.2, should Reference 57 from WBN Unit 1 Chapter 4.3 be added to identify which ENDF/B-VI files are being specified (page 4.3-34)?

2. In WBN Unit 2 Amendment No. 95 section 4.3.3.3, should the reference to Section 4.3.2.2.7 be to Section 4.3.2.2.6 instead?

Chapter 4.4.1

1. In WBN Unit 2 Amendment No. 95 Section 4.4.1.1 under the heading ‘Discussion’ (page 4.4-1), change ‘DBN’ to ‘DNB.’

2. In WBN Unit 2 Amendment No. 95, Table 4.4-1 is inconsistent with Table 4.1-1. Why are the tables inconsistent?

Chapter 4.4.2

2. In WBN Unit 2 Amendment 95 page 4.4-11, there are multiple locations on the right-hand side of the page where equation numbers are pasted in the middle of paragraphs blocking the view of the words. Correct these errors.

3. Confirm that WBN Unit 2 is limited to cores with only RFA-2 fuel and will not use any other type of fuel until an approved transition core methodology is submitted.

4. In WBN Unit 2 Amendment No. 95 section 4.4.2.5, the conclusion is drawn that the minimum departure from nucleate boiling ratio in the hot channel is relatively insensitive to variations in void models. This conclusion is based on a sensitivity study using the THINC-IV code (which is Reference 52 of the FSAR). The THINC-IV sensitivity study (Section 5.5 in Reference 52) uses void models that will be used in VIPRE. What, then, is the basis for assuming that the sensitivity study remains applicable to the VIPRE-01 code?

5. In WBN Unit 2 Amendment No. 95 page 4.4-18, there are multiple locations on the right hand side of the page where equation numbers are pasted in the middle of paragraphs blocking the view of the words. Correct these errors. Additionally, the changes to this page were not captured and the page is marked 'WBNP-73,' which signifies it is from Amendment No. 73 and it is not.

Chapter 4.4.3

1. In WBN Unit 2 Amendment No. 95 section 4.4.3.1.3, clarify the first sentence that references the 'VIPRE-01 THINC-IV computer code.'

2. In WBN Unit 2 Amendment No. 95 section 4.4.3.2.1 on page 4.4-23, the definition of '$F^{N}_{\Delta H}$' should be the definition of '$F^{RTP}_{\Delta H}$'.

3. In WBN Unit 2 Amendment No. 95 page 4.4-25, there is one location on the right-hand side of the page where equation numbers are pasted in the middle of paragraphs blocking the view of the words. Correct this error.

Chapter 4.4.5

1. In WBN Unit 2 Amendment No. 95 Section 4.4.5.1, the figure referred to is Figure 4.4-5. In WBN Unit 2 Amendment No. 98 Section 4.4.5.1 the figure referred to is Figure 4.4.6. While there is a change in the figure number between the two amendments, Amendment No. 98 has the page marked as 'WBNP-95,' which means there have been no changes since Amendment No. 95. What are the criteria that would signify a change and cause the page to be marked 'WBNP-98'?

Quality Assurance RAI

1. The NRC staff has identified multiple inconsistencies, discrepancies, and factual errors in review of WBN Unit 2 Amendment No. 95. Most of the errors identified were inconsistencies (referring to Zircaloy instead of ZIRLO), but some were quite substantial (references to both Ag-In-Cd control rods and B_4C with Ag-In-Cd tips, reference to startup testing performed on the rod cluster control assemblies of WBN Unit 2, discrepancies between Table 4.4.1 and Table 4.1.1). TVA submitted Amendment No. 98 to correct the errors in Amendment Nos. 95 and 97, but none of the substantial errors identified by the NRC staff were identified or corrected by Amendment No. 98. Please describe the quality control and assurance process applied to the information contained in Amendment No. 95 (and Amendment No. 98). Explain what assurance TVA can provide the NRC staff that the information contained in the Amendments is factually correct, given the number and magnitude of identified discrepancies and errors identified by the NRC staff. If left uncorrected (especially the discrepancies between Table 4.4.1 and Table 4.1.1) what would the impact of the errors be?