

## WBN2Public Resource

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**From:** Lamb, John  
**Sent:** Friday, May 21, 2010 9:24 AM  
**To:** Arent, Gordon; wdcrouch@tva.gov  
**Cc:** Casey, Kevin E; Raghavan, Rags; Milano, Patrick; Haag, Robert; Wiebe, Joel; WBN2HearingFile Resource  
**Subject:** For Your Review - Preliminary RAI Questions - Watts Bar Unit 2  
**Attachments:** Prelim RAIs 05 2010.docx

Gordon and Bill,

Attached, for your review, are preliminary Request for Additional Information (RAI) questions regarding Watts Bar Nuclear Plant (WBN), Unit 2. Please review to ensure that the RAI questions are understandable, the regulatory basis is clear, there is no proprietary information contained in the RAI, and to determine if the information was previously docketed. Please also let me know how much time Tennessee Valley Authority (TVA) needs to respond to the RAI questions.

Thanks.  
John

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**From:** Lamb, John

**Created By:** John.Lamb@nrc.gov

**Recipients:**

"Casey, Kevin E" <kecasey@tva.gov>  
Tracking Status: None  
"Raghavan, Rags" <Rags.Raghavan@nrc.gov>  
Tracking Status: None  
"Milano, Patrick" <Patrick.Milano@nrc.gov>  
Tracking Status: None  
"Haag, Robert" <Robert.Haag@nrc.gov>  
Tracking Status: None  
"Wiebe, Joel" <Joel.Wiebe@nrc.gov>  
Tracking Status: None  
"WBN2HearingFile Resource" <WBN2HearingFile.Resource@nrc.gov>  
Tracking Status: None  
"Arent, Gordon" <garent@tva.gov>  
Tracking Status: None  
"wdcrouch@tva.gov" <wdcrouch@tva.gov>  
Tracking Status: None

**Post Office:** HQCLSTR01.nrc.gov

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PRELIMINARY REQUEST FOR ADDITIONAL INFORMATION

FOR WATTS BAR NUCLEAR PLANT, UNIT 2

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-391

Below, for your review, are preliminary Request for Additional Information (RAI) questions regarding Watts Bar Nuclear Plant (WBN), Unit 2. Please review to ensure that the RAI questions are understandable, the regulatory basis is clear, there is no proprietary information contained in the RAI, and to determine if the information was previously docketed. Please also let me know how much time Tennessee Valley Authority (TVA) needs to respond to the RAI questions.

Reactor Systems (SRXB)

Question 1:

Section 5.2.2.4.2 of WBNP-97, Pressure Transient Analyses, includes an evaluation of low temperature overpressure transients (Section 5.2.2.4.2.1); but no evaluation of at-power overpressure transients. Please provide an evaluation of at-power overpressure transients, consistent with the guidelines of Section 5.2.2 of NUREG-0800.

Question 2:

As an incident of moderate frequency, the Inadvertent Operation of Emergency Core Cooling System event (reported in Section 15.2.14 of WBNP-90), must not generate a more serious plant condition without other faults occurring independently. To meet this requirement, Section 15.2.14 states that, "Westinghouse currently uses the more restrictive criterion that a water-solid pressurizer condition be precluded when the pressurizer is at or above the set pressure of the pressurizer safety relief valves (PSRVs). This addresses any concerns regarding subcooled water relief through the plant PSRVs which are not qualified for this condition. Should water relief through the pressurizer power-operated relief valves (PORVs) occur, the PORV block valves would be available, following the transient, to isolate the RCS."

This approach, described in Westinghouse NSAL 93-013, is not acceptable to the NRC staff. The staff's position is outlined in RIS 2005-29. Please provide an evaluation of the Inadvertent Operation of Emergency Core Cooling System event that is consistent with RIS 2005-29 and the guidelines of NUREG-0800, Rev 3.

Nuclear Performance and Code Review (SNPB)

All references to Watts Bar Unit 1 (WB1) are from the approved UFSAR Amendment 7. All references to Watts Bar Unit 2 (WB2) are from Amendment 95 which is currently under review.

Chapter 4.1

1. Why is the density of fuel pellets different between WB1 and WB2 (compare table 4.4-1 in each FSAR).
2. Identify which control rods are being used, WB2 FSAR makes multiple reference to both Ag-In-Cd control rods and B<sub>4</sub>C with Ag-In-Cd tips. If WB2 is transitioning from B<sub>4</sub>C with Ag-In-Cd tips (as approved in WB1) to solely Ag-In-Cd control rods, provide justification for such a transition.

#### Chapter 4.2.1

1. Why is the yield strength correlation appropriate for irradiated cladding if the irradiated properties are attained at low exposures and the fuel/clad interactions which lead to minimum margin occur at much higher exposures?
2. In WB2 Amendment 95 section 4.2.1.2.2 under the heading 'Guide Thimble and Instrument Tube' (p 4.2-8), should paragraph 3 read "ZIRLO" instead of "Zircaloy"?
3. Should the references given in section 4.2.1.1.1 for WB2 match those for WB1?
  - a. Why is reference [25] removed from WB1 FSAR, but used in WB2 FSAR?
  - b. Why aren't [31], [32], and [35] referenced for WB1 and not WB2?
4. In WB2 Amendment 95 section 4.2.1.2.2 under the heading 'Grid Assemblies' (p 4.2-9), should paragraph 5 read "ZIRLO" instead of "Zircaloy"?
5. In WB2 Amendment 95 section 4.2.1.3.1 under the heading 'Materials – Fuel Cladding' (p 4.2-10), should paragraph 3 read "ZIRLO" instead of "Zircaloy"?
6. In WB2 Amendment 95 section 4.2.1.3.2 under the heading 'Stresses and Deflections' (p 4.2-17), should paragraph 1 read "ZIRLO" instead of "Zircaloy"?

#### Chapter 4.2.2

1. In WB2 Amendment 95 section 4.2.2.2 under the heading 'Upper Core Support Assembly' (p 4.2-25), do the support columns also contain the thermocouple supports?
2. Have the changes to WB2 Amendment 95 Table 3.9-5 been reviewed and approved?

#### Chapter 4.2.3

1. Confirm that the burnable absorber rods will be designed so that the absorber material will be maintained below 1492°F and that the structural elements will be designed to prevent excessive slumping.
2. Does Watts Bar Unit 2 have any part-length CRDMs?
3. Amendment 95 for WB2 Table 4.1-1 (page 4.1-6) indicates the control rods for WB2 are Ag-In-Cd. UFSAR Amendment 7 for WB1 Table 4.1-1 indicates the control rods WB1 are B<sub>4</sub>C with Ag-In-Cd tips. Amendment 95 for WB2 Section 4.2.3.2.1 under the heading 'Rod Cluster Control Assembly' indicates the control rods are identical to WB1, B<sub>4</sub>C pellets which are stacked on top of the extruded Ag-In-Cd slugs. Are the control rods in

WB1 and WB2 the same, B<sub>4</sub>C with Ag-In-Cd tips, or does WB2 have different control rods as indicated in Table 4.1-1 of its FSAR? Additionally, make the appropriate updates to WB2's FSAR.

4. In WB2 Amendment 95 section 4.2.3.3.1, significant discussion is removed from the FSAR which describes the general methods of analysis, specific methods for analyzing the control rods, and specific methods for analyzing the burnable absorber rods. Provide justification for the reason of this removal, specifically addressing the removal of each paragraph.
5. In WB2 Amendment 95 section 4.2.3.3.1 (p 4.2-44), should paragraph 1 read "ZIRLO" instead of "Zircaloy"? If so, should the following calculation be performed for ZIRLO instead of Zircaloy?
6. WB2 Amendment 95 section 4.2.3.4.1 (p 4.2-52) states:

*The rod cluster control assemblies were functionally tested, following initial core loading but prior to criticality to demonstrate reliable operation of the assemblies. Each assembly was operated one time at no flow/cold conditions and one time at full flow/hot conditions. The assemblies were also trip tested at full flow/hot conditions. Those assemblies whose trip times fall outside a certain tolerance were tested an additional 3 times at full flow/hot conditions. Thus each assembly was adequately tested to verify that the assemblies are properly functioning.*

WB2 Amendment 95 section 4.2.3.4.2 (p 4.2-52) states:

*These tests include verification that the trip time achieved by the control rod drive mechanisms meet the design requirement from start of rod cluster control assembly motion to top of dashpot. This trip time requirement was confirmed for each control rod drive mechanism prior to initial reactor operation, as required by Technical Specifications.*

Was there an initial core loading for WB2 such that this testing was completed? If not, address these two sections.

### Plant Systems (SBPB)

#### RAI 10.4.1-1

In the 1982 Safety Evaluation (SE) for Watts Bar (NUREG-0847), the staff observed that the three pressure zones for the main condenser are designed to produce a turbine back pressure of 1.5 (low pressure – LP), 2.15 (intermediate pressure – IP), and 3.065 (high pressure – HP) inches of mercury for Units 1 and 2. In the recent version (Amendment 7) of the Watts Bar FSAR for Unit 1, those values are changed to 1.63 LP, 2.38 IP, and 3.40 HP. For the proposed FSAR for Unit 2, the values for the three pressure zones are 1.92, 2.70, and 3.75 respectively. The staff requests that the licensee clarifies the variation of the values for Unit 1 and the proposed Unit 2 pressure zones for the main condenser from the values indicated in the original SE.

#### RAI 10.4.1-2

In Amendment 7 to the Unit 1 FSAR, the licensee shows the Birmingham Wire Gauge (BWG) for the balance of tubes to be 22 BWG, whereas in the proposed Unit 2 FSAR, this value is shown as 12 BWG. The staff requests that the licensee explain why Unit 2 has a lower BWG value than Unit 1.

#### RAI 10.4.1-3

In the original SE for Watts Bar Unit 1 and 2, copper-nickel tubes were used to minimize corrosion and erosion of condenser tubes. In amendment 7 to the Unit 1 FSAR and the proposed Unit 2 FSAR, the material is listed as SEACURE for tubes. The staff requests that the licensee confirm that the SEACURE material is the replacement for the copper-nickel tubing that was originally used for the condenser tubes.

#### RAI 10.4.1-4

In the original SE, the staff noted that the main condenser design allows for water storage capacity for approximately 3 ½ minutes of full-load operation. In the proposed Unit 2 FSAR, this value is the same. However, in amendment 7 of the Unit 1 FSAR, the condenser is shown to handle water storage capacity of 3 minutes at full-load operation. The staff requests that the licensee explain the deviation of the Unit 1 storage capacity from the proposed Unit 2 storage capacity for the main condenser.

#### RAI 10.4.2-1

In the original SE (NUREG-0847), the licensee listed three mechanical vacuum pumps, an electrical heating coil, a HEPA filter, and a carbon absorber to comprise of the main condenser evacuation system (MCES). In amendment 7 of the Unit 1 FSAR and proposed FSAR for Unit 2, the licensee does not provide the full description of the components of the MCES, nor clarifies if the MCES still comprises of the same components as listed in the original SE, with the exception of the vacuum pumps. The staff requests that the licensee provide a description of the components for the MCES for both Units.

#### RAI 10.4.2-2

In Amendment 7 to the Unit 1 FSAR, the licensee indicates that there are two types of radiation monitors for the vacuum pump exhaust. However, the licensee describes the vacuum pump exhaust in the proposed Unit 2 FSAR as having three types of radiation monitors. The staff requests that the licensee explain the reasoning for Unit 2 having three radiation monitors versus Unit 1 only having two radiation monitors.