Tennessee Valley Authority, Post Office Box 2000, Spring City, TN 37381-2000

June 3, 2010

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop: OWFN P1-35
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

Subject: **WATTS BAR NUCLEAR PLANT (WBN) UNIT 2 – FINAL SAFETY ANALYSIS REPORT (FSAR) – RESPONSE TO PRELIMINARY REQUESTS FOR ADDITIONAL INFORMATION**

References:
1. TVA letter to NRC dated January 11, 2010, "Watts Bar Nuclear Plant (WBN) - Unit 2 - Final Safety Analysis Report Amendment 97"
2. TVA letter to NRC dated May 7, 2010, "Watts Bar Nuclear Plant (WBN) - Unit 2 - Final Safety Analysis Report Amendment 98"

This letter responds to a number of preliminary requests for additional information (RAIs) regarding the Unit 2 Final Safety Analysis Report (FSAR). These RAIs stem primarily from NRC Staff's review of Amendment 97 provided in Reference 1, along with the review of other previous amendments.

Enclosure 1 provides the response to preliminary RAIs involving FSAR chapters 11, 12, and 14; and subsections 2.5, 3.2.2, 3.5.1, 3.5.3, 3.8.1, 3.8.2, 3.10, 9.2.3, 9.2.6, 9.3.2, 9.4.4, 9.4.8, 11.3, and 11.4. The commitment, contained in Reference 2, to "submit a revision to Section 2.3, 'Meteorology,' by May 28, 2010, to address NRC request for information," will be provided in a separate submittal.

The electronic files of documents noted as being provided by the response to specific RAIs are contained on the enclosed Optical Storage Media (OSM). Enclosure 2 lists the electronic files and the file sizes.

A001
A053
NRR

Enclosure 3 identifies those actions committed to by TVA in this letter.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 3th day of June, 2010.

If you have any questions, please contact me at (423) 365-2351.

Sincerely,

M. Bajestani

Masoud Bajestani
Watts Bar Unit 2 Vice President

Enclosures:

1. Response to Preliminary Requests for Additional Information
2. List of Files Provided on Enclosed Optical Storage Media (OSM)
3. List of Regulatory Commitments

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ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 2.5 (taken from e-mail from NRC dated 03/23/2010)

FSAR Section 2.5

1. The WBN-2 FSAR, page 2.5-89, contains an addition to the FSAR Section 2.5.4.2.2.9.4, Monitoring Program for Differential Movement. The last sentence in this addition states that TVA had determined that "differential settlement" was no longer required at WBN based on an internal TVA memo on settlement stations dated February 6, 1984, and the TVA Calculation No. WCG-1-861, Settlement Monitoring. TVA is requested to provide a copy its 1984 memo justifying its decision to discontinue the differential settlement monitoring. The basis for this request is the statement in FSAR Section 2.5.4.2.2.9.3 that the design value of 1-inch differential settlement between adjacent rock-supported structures was not incorporated into the design of piping and electrical components passing between adjacent rock-supported Category I structures. This confirmatory request is to verify the basis for TVA's determination to discontinue differential settlement monitoring referred to in the current FSAR Amendment 95.

   Response: The enclosed OSM includes an electronic version of the February 6, 1984, letter and associated attachment.

2. Some corrections made on WBN-2 FSAR pages (pp) 2.5-150 through 2.5-251 are to fix previous entries in the FSAR, e.g., pp 2.5-165 through 168 contain corrections of formulas for dynamic soil properties. TVA is requested to report the effect of all these corrections, with special attention given to the effect of the corrections related to the dynamic soil properties previously used in the soil–structure analysis / design.

   Response: The revision in Amendment 95 was correcting typographical errors in the Unit 2 FSAR to make it the same as the Unit 1 FSAR. The Unit 1 version is correct and the Unit 2 version was intended to be the same; however, the Unit 2 version was inadvertently changed due to the electronic document conversion process.

   The pages listed provide Tables 2.5-17A, 2.5-17B, 2.5-17C, and 2.5-7D. The amendment level of all four pages was "WBNP-63" in the version of the pages issued by Amendment 92, and has remained such through Amendment 98.

   The changes correct typographical errors that occurred during the change from one electronic format to another; this happened in the version of the pages issued by Amendment 95. Thus, no change bars are provided, and the amendment level remains the same.

3. As part of the Item 2 above, TVA is also requested to discuss the effect of corrections and additions made to laboratory test data pertaining to the Essential Raw Cooling Water (ERCW) Supply pipelines, as these soil investigations pertain to the issue of liquefaction of soils supporting these pipelines, which was an important topic discussed by the NRC and TVA at the time WBN Unit 1 was licensed.

   Response: No test data was affected. As discussed in the response to item 2 (page E1-1), the changes correct errors that occurred during the change from one electronic format to another. Thus, no change bars are required, and the amendment level remains the same.

4. The WBN-2 FSAR, pp 2.5-179, 180 and 181 (shown as Amendment 40), contain some apparent changes in Amendment 95.

   a. TVA is requested to indicate if these changes pertain to Amendment 40 or 95.

   b. If these entries do pertain to Amendment 40, confirm that these were reviewed and approved by NRC staff previously. If these entries are newly added in Amendment 95, TVA is requested to correct the amendment number and also provide the response requested in Item 2 above.

   Response: A review of the redline strikeout version for Amendment 95 determined that this is the version for which the RAI comments are intended. Details are as follow:

   - p. 2.5-179 is Table 2.5-24 (Sheet 2 of 4), the header indicates "WBNP-40," and the page does indeed contain indicated changes.
   - p. 2.5-179 is Table 2.5-24 (Sheet 3 of 4), the header indicates "WBNP-40," and the page does indeed contain indicated changes.
   - p. 2.5-179 is Table 2.5-24 (Sheet 4 of 4), the header indicates "WBNP-40," and the page does indeed contain indicated changes.

   As discussed in the response to item 2 (page E1-1), the indicated changes correct errors that occurred during the change from one electronic format to another. Thus, no change bars are required, and the amendment level remains the same.

   In Amendment 98, these three pages are now on the following two:

   - p. 2.5-177 is Table 2.5-24 (sheet 2 of 3), and
   - p. 2.5-179 is Table 2.5-24 (sheet 3 of 3).

5. Similarly, FSAR pp 2.5-203 and 204 (shown as Amendment 63), also contain some apparent changes.

   a. Indicate if these changes pertain to Amendment 63 or 95.

   b. If these entries do pertain to Amendment 63, confirm that these were reviewed and approved by NRC staff previously. If these entries are newly added in Amendment 95, TVA is requested to correct the amendment number and also provide the response requested in Item 2 above.

Response: A review of the redline strikeout version for Amendment 95 determined that this is the version for which the RAI comments are intended. Details are as follow:

- p. 2.5-203 is Table 2.5-43 (Sheet 1 of 3), the header indicates "WBNP-63," and the page contains the indicated changes.

- p. 2.5-204 is Table 2.5-24 (Sheet 2 of 3), the header indicates "WBNP-63," and the page contains the indicated changes.

As discussed in the response to item 2 (page E1-1), the indicated changes correct errors that occurred during the change from one electronic format to another. Thus, no change bars are required, and the amendment level remains the same.

In Amendment 98, sheets 2 and 3 of Table 2.5-24 are now on the following pages:

- p. 2.5-201 is Table 2.5-43 (sheet 1 of 3), and

- p. 2.5-202 is Table 2.5-43 (sheet 2 of 3).

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 3.2.2 (taken from fax from NRC dated 03/23/2010)

The NRC provided a series of marked-up pages; the items below were compiled from the markups:

Section 3.2.2

p. 3.2-7 (A95): Correct alignment issues in Table 3.2-2 (Page 1 of 18).

Response: The version of this page issued by Amendment 98 corrected the alignment issues. Since these changes were administrative, no change bars were provided for them, and the amendment level was not revised.

p. 3.2-7 (A79): Correct alignment issues in Table 3.2-2 (Page 2 of 18).

Response: The version of this page issued by Amendment 98 corrected the alignment issues. Since these changes were administrative, no change bars were provided for them, and the amendment level was not revised.

p. 3.2-9 (A79): Correct alignment issues in Table 3.2-2 (Page 3 of 18).

Response: The version of this page issued by Amendment 98 corrected the alignment issues. Since these changes were administrative, no change bars were provided for them, and the amendment level was not revised.

p. 3.2-10 (A95): Correct alignment issues in Table 3.2-2 (Page 4 of 18).

Response: The version of this page issued by Amendment 98 corrected the alignment issues. Since these changes were administrative, no change bars were provided for them, and the amendment level was not revised.

p. 3.2-11 (A95): Correct alignment issues in Table 3.2-2 (Page 5 of 18).

Response: The version of this page issued by Amendment 98 corrected the alignment issues. Since these changes were administrative, no change bars were provided for them, and the amendment level was not revised.

p. 3.2-11 (A95): Correct alignment issues in Table 3.2-2 (Page 6 of 18).

Response: The version of this page issued by Amendment 98 corrected the alignment issues. Since these changes were administrative, no change bars were provided for them, and the amendment level was not revised.

p. 3.2-14 (A95): Just prior to "Containment Pit Sump Pumps" in Table 3.2-2 (Page 8 of 18): add "Component" with a carriage return prior to and after it.

Response: The version of this page issued by Amendment 98 made the noted insertion. Since this change was administrative, no change bar was provided for it, and the amendment level was not revised.

p. 3.2-15 (A95): For the third item in Table 3.2-2 (Page 9 of 18): move "B" up one line following "CDWE."

Response: The line item is now at the bottom of page 3.2-14 in the Amendment 98 version. Since this change was administrative, no change bar was provided for it, and the amendment level was not revised.

p. 3.2-18 (A95): For the last two items in Table 3.2-2 (Page 12 of 18): replace "ANSI BS1-1" with "ANSI B31.1"

Response: These line items are now at middle of page 3.2-14 in the Amendment 98 version. Since these changes were administrative, no change bars were provided for them, and the amendment level was not revised.

p. 3.2-27 (A92): NRC RAI questioned item "(10)."

Response: During subsequent face-to-face meeting with TVA on March 17, 2010, the NRC reviewer agreed that no change was required.

p. 3.2-28 (A92):

- Item "(18)": replace "Class C*" with "Class C."
- Items "(20)", "(23)", and "(24)": change unit designators from "1" to "2."

Response: The version of the equivalent page (now page 3.2-27) issued by Amendment 98 made the noted changes.

p. 3.2-29 (A95): The first sentence should read, "The Unit 2 PWST was ..." instead of "The Unit 2 PWST ws ..."

Response: The version of the equivalent page (now page 3.2-28) issued by Amendment 98 made the noted change. This section already had a change bar to reflect change per Amendment 95. Since this change was administrative, the change bar was not impacted, and the amendment level was not revised.

p. 3.2-41 (A95): Revise the verbiage for "Note 12" and "Note 13" to correct the unit designators from "1" to "2."

Response: The version of the equivalent page (now page 3.2-37) issued by Amendment 98 made the noted change.

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 3.5.1 & 3.5.3 (taken from e-mail from NRC dated 02/22/2010)

Section 3.5.1 Missile Selection and Description

1. On page 3.5-14 Second paragraph from the bottom "Siemens comment: ..."

   Please remove this comment, and then insert the original evaluation report, (Reference: WB Unit 1 FSAR from page 3.5-15 - 3.5-20).

   Response: Amendment 98 deleted the "Siemens comment: ..." verbiage; however, the "original evaluation report" verbiage was not inserted based on the "NRC guidance" referenced in the Siemens comment.

   The "NRC guidance" that Siemens referenced as the basis for deleting the affected FSAR text is NRC's March 30, 2004, letter (Accession ML040930616). This document discusses the criteria for future Siemens plant specific application.

2. On page 3.5.22, second sentence of the first paragraph stated: "In this analysis, only Unit 2 containment and the control building appear to be prominent enough to be threatened.

   Please discuss how these threats will be addressed and indicate what section of the FSAR addresses this issue?

   Response: Amendment 98 deleted the sentence since it was an intermediate issue and not the conclusion of the analysis.

Section 3.5.3 Barrier Design Procedures

1. On page 3.5-30, have references (17), (18), and (19) been approved by the staff? If yes, by whom and when; if not, please provide for the staff to review.

   Response: The response to this RAI will be provided by June 18, 2010.

2. On pages 3.5-41, 3.5-42, and page 3.5-43, Tables 3.5-11, 3.5-12, and 3.5-13, respectively, were deleted per Amendment 95. Please provide the basis for the deletion.

   Response: Tables 3.5-11 (Postulated CRDM Missile Characteristics), 3.5-12 (Typical Postulated Valve Missile Characteristics) and 3.5-13 (Postulated Piping Temperature Element Assembly Missile Characteristics) were deleted since they duplicated the information provided by Tables 3.5-1 (Summary of Postulated CRDM Missile Analysis), 3.5-2 (Typical Postulated Valve Missile Characteristics), 3.5-3 (Postulated Piping Temperature Element Assembly Missile Characteristics), and 3.5-4 (Characteristics of Other Missiles Postulated Within Reactor Containment).

3. On page 3.5-45, Typo error; change per indicated.

Response: The indicated typographical error was that the value in the "FSAR Figure" column for item "19." was actually the correct value for item "16." Additionally, the existing values for items "16." through "18." would each need to be moved down to the next item.

The version of this page issued by Amendment 98 corrected the alignment issues. Since these changes were administrative, no change bars were provided for them, and the amendment level was not revised.

4. On pages 3.5-46 and 3.5-47 for Tables 3.5-15 and 3.5-16, respectively, it is stated that these tables are recommended for deletion per NRC guidance. Please, provide the guidance for the staff to review and/or put them back per Amendment 51.

Response: The "NRC guidance" that Siemens referenced as the basis for deleting the affected FSAR text is NRC's March 30, 2004, letter (Accession ML040930616). This document discusses the criteria for future Siemens plant specific application.

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 3.8.1 & 3.8.2 (taken from e-mail from NRC dated 02/23/2010)

Section 3.8.1 - Concrete Shield Building

1. On page 3.8-1, top second paragraph: First sentence; change Figure 3.8.11 through 3.8.17 to read Figure 3.8.1-1 through 3.8.1-7, third sentence from the bottom, change Figure 3.8.11 to read Figure 3.8.1-1, and second paragraph from the bottom: Move it up, next to the above sentence.

   Response: The noted discrepancies were corrected in Amendment 97.

   Note that the page number was changed from "3.8-1" to "3.8.1-1" on the version of this page issued by Amendment 98; the amendment level remained at Amendment 97.

2 On page 3.8-2, first paragraph under Sub-section 3.8.1.1.1; change Figure 3.8.18 to read Figure 3.8.1-8.

   Response: The noted discrepancy was corrected in Amendment 97. Since this change was administrative, no change bar was provided for this change.

   Note that the page number was changed from "3.8-2" to "3.8.1-2" on the version of this page issued by Amendment 98; the amendment level remained at Amendment 97.

3. On page 3.8-4, under item (4); change AWS D1.172 to read AWS D1.1-72, AWS D12.161 to read AWS D12.1-61, and item (11) Is this Amendment for Unit 1 only?

   Response: For item (4), the noted discrepancies were corrected in Amendment 97. Since these changes were administrative, no change bars were provided for these changes.

   Note that the page number was changed from "3.8-4" to "3.8.1-4" on the version of this page issued by Amendment 98; the amendment level remained at Amendment 97.

   The verbiage for Item (11) was deleted by Amendment 89. At that time, the FSAR was for both Unit 1 and Unit 2. Thus, the deletion applied to both units. Amendment 98 deleted the remainder of item (11) {i.e., the numbering "(11)"} and renumbered the remaining two items in this section; these were administrative changes.

4. On page 3.8-5, under item (13); change CEB 86-12Study to read CEB 86-12 Study and CEB 86-19-CConcrete to read CEB 86-19-C Concrete.

   Response: The noted discrepancies were corrected in Amendment 97. Due to deletion of item (11), this item is now item (12). Since these changes were administrative, no change bars were provided for these changes.

   Note that the page number was changed from "3.8-5" to "3.8.1-5" on the version of this page issued by Amendment 98.

5. On page 3.8-6, top first paragraph change 185degree to read 185 degree, under (LOCA); change Figure 3.8.19 to read Figure 3.8.1-9, and under Normal Temperature Gradient; change 35EF and 85EF to read 35°F and 85°F.

   Response: The noted discrepancies were corrected in Amendment 97. Since these changes were administrative, no change bars were provided for these changes.

   Note that the page number was changed from "3.8-5" to "3.8.1-5" on the version of this page issued by Amendment 98. Additionally, the amendment level was corrected from "WBN-97" to "WBN-92."

6. On page 3.8-7, under Tornado change Figure 3.31 to read Figure 3.3-1 and under Construction Loads; change 9inch to read 9 inch.

   Response: Amendment 97 corrected "Figure 3.31" to "Figure 3.3-1," and replaced "9inch" with "9-inch." No change bar was provided for the second change.

   Note that the page number was changed from "3.8-7" to "3.8.1-7" on the version of this page issued by Amendment 98.

7. On page 3.8-8, under Creep and Shrinkage Effects; change Report 7045 to read Report 70-45, on the bottom of the page; change ACI 31871 to read ACI 318-71.

   Response: The noted discrepancies were corrected in Amendment 97. Since these changes were administrative, no change bars were provided for these changes.

   Note that the page number was changed from "3.8-8" to "3.8.1-8" on the version of this page issued by Amendment 98.

8. Top of the page 3.8-10: please explain why these values (of the Accelerations) were changed (where everything else was kept the same)?

Response: The values noted by the reviewer were incorporated in Amendment 97 of the Unit 2 FSAR by FSAR Change Package 2-97-01. The justification for the change is that the accelerations were revised to provide information for Unit 2 that was previously incorporated into the Unit 1 FSAR by Unit 1 FSAR Change Package 1532S00. The Units 1 and 2 Shield Buildings, and their respective Equipment Hatch and Sleeves located at Elevation 757.0, are identical. As described in WBN Design Criteria WB-DC-20-24, existing (i.e., not new or modified) commodities for Units 1 and 2 are evaluated for the effects of Set B seismic accelerations that resulted from the seismic re-analyses performed for the Seismic Corrective Action Program. Therefore, the change in question in the Unit 2 FSAR in Amendment 97 simply provides those accelerations, which are consistent with the accelerations in the Unit 1 FSAR, for the corresponding Unit 1 Equipment Hatch and Sleeves. The remainder of the information in Section 3.8.1.4 was not affected by the change in acceleration noted.

9. On page 3.8-11, under Equipment Hatch Doors and Sleeves; change Table 3.8.12 to read Table 3.8.1-2, under Concrete change C15072 to read C150-72.

Response: The noted discrepancies were corrected in Amendment 97. Since these changes were administrative, no change bars were provided for these changes. Note that due to other changes that affected page breaks, the first item changed is now on page 3.8-10.

Note that the page numbers were changed from "3.8-10" to "3.8.1-10" and "3.8-11" to "3.8.1-11" on the version of these pages issued by Amendment 98.

10. On page 3.8-13, under Construction techniques, second paragraph, second sentence change 9inchthick to read 9 inch thick.

Response: Amendment 97 changed "9inchthick" to "9-inch-thick." Since this change was administrative, no change bar was provided for this change.

Note that the page number was changed from "3.8-13" to "3.8.1-13" on the version of this page issued by Amendment 98; the amendment level remained at Amendment 97.

11. On page 3.8-15, third row down change Show Loads to read Snow Loads and Internal temperature Range of 80EF to 327EF to read 80°F to 327°F

Response: Table 3.8.b-1 (contained in 3.8.1) was redundant to Table 3.8B-1 (contained in 3.8.1). A98 deleted Table 3.8b-1.

The identified errors (i.e., "Show" vs "Snow" and "EF" vs "°" (degree symbol)) are properly reflected on Page 3.8B-11 in Amendment 98.

12. On page 3.8-27, under CC Construction Condition row: Insert 1.0 under Column "1"; then delete 1.0 under column "3."

Response: The identified error existed in the version of Table 3.8.1-4 (page 3.8-27) contained in Amendment 95. This error was corrected in Amendment 97; however, please note that due to deletion of some of the preceding tables in 3.8.1 by Amendment 97, Table 3.8.1-4 became Table 3.8.1-1 in Amendment 97.

Section 3.8.2 - Steel Containment System

1. On page 3.8.2-1; fourth, fifth, and the last paragraph; change "The Containment Vessel" to read SCV (total of four places). Reason: to clarify this is a Steel Containment Vessel)

Response: The noted discrepancies were corrected in Amendment 97. Since these changes were administrative, no change bars were provided for these changes on the version of this page issued by Amendment 98.

2. On page 3.8.2-4, third paragraph from the top; change 1-074B-D045-01A and 1-074B-D045-08A to read 2-074B-D045-01A and 2-074B-D045-08A. Also, in this paragraph, the applicant stated that TVA has performed calculations (WBN-MTB-025 and CEB-CQS415). Please confirm that these calculations were for Unit 1. If, yes, then where are the calculations for Unit 2?

Response: The equipment identification numbers are valid for Unit 1 and were not required to be revised to Unit 2 numbers. Amendment 98 added "(Unit 1 only)" just prior to the noted paragraph. The condition identified in this paragraph applies to only Unit 1.

3. On page 3.8.2-10, under item *(3A),* 6th line down "Thermal load due to temperature range 53°F to 273.5°F". Please, explain why these temperatures were so different from the original evaluation (80°F to 327°F)?

   Response: FSAR Section 3.8.2.3.2, Loading Conditions, was extensively revised by FSAR Change Packages 2-97-02 and 2-97-78, which were incorporated into Amendment 97. The load condition 3A noted by the reviewer was revised to load condition 3C, Upset Condition MSLB, and the entry now reads, "Thermal load due to temperature range 80°F to 325°F." Justification for the change in question, as provided in the change packages, is to correct the temperature range of the thermal load for the Upset Condition MSLB to be consistent with design criteria WB-DC-20-3 and Westinghouse Letter WBT-1410 dated December 22, 2009.

4. On page 3.8.2-11, under item *(4A);* change Condition 3A to read Condition 3

   Response: The item number is now "(4C)" and the correct item to be referenced is "Condition 3C." The version of this page issued by Amendment 98 shows the corrected reference.

5. On page 3.8.2-20, under Fasteners, third line down, move A307, Grade B to the second column.

   Response: The noted discrepancy was corrected in Amendment 97.

6. On page 3.8.2-24, move the second paragraph up to read "Preparation Specification No. 6, Commercial Blast ..."

   Response: The noted discrepancy was corrected in Amendment 97. Since this change was administrative, no change bar was provided for this change on the version of this page issued by Amendment 98.

7. From page 3.8.2-30, *majority of the drawings are not readable* (please see *an attached).*

   Response: Per discussions with the NRC project managers, the NRC will utilize the electronic version of the drawings submitted with Amendment 91 along with the electronic version of the current Unit 1 drawings submitted under Unit 1 FSAR Amendment 8. No further information is required from TVA at this time.

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 3.10 (taken from e-mail from NRC dated 05/04/2010)

Section 3.10

1. Reference is made to IEEE 344–1987 in Tables 3.10-1 and 3.10-2. However, IEEE 344-1987 is not mentioned in Section 3.10.1, "Seismic Qualification Criteria." Nor is this discussed in the referenced Section 3.7.3.16.

   Clarify how IEEE-1987 is used in a similar manner to how you discuss the use of IEEE 344-1971 and IEEE 344-1975.

   Response: The response to this RAI will be provided by June 18, 2010.

2. Table 3.10.1, "WBNP Instrumentation and Electrical Equipment," in WBN-2 FSAR Section 3.10 contains three new rows related to certain equipment and their qualification methods and test methods. The first new row in Table 3.10.1 states that the "Control Instrument Loops" (Unit 2) located at "multiple locations" were qualified by "Test" using "multiaxis" test method performed by "Nuclear Qualification Services."

   Clarify if the "Test" method and the "Test" results were reviewed by the NRC staff and provide a reference that documents the review conclusion. If they were not reviewed by the NRC staff, submit the results of the test for the staff's review.

   The second new row in Table 3.10.1 states that "Panels 2-L-11A and 2-L-11B" were qualified by "Analysis."

   1) Clarify if the Analysis mentioned in the second new row in table 3.10.1 was performed in-house by the TVA staff; if not, complete the Table 3.10.1 giving the name of the company, which performed the Analysis.

   2) Also, clarify if the "Analysis" method and the Analysis results were reviewed by the NRC staff and provide a reference that documents the review conclusion. If they were not reviewed by the NRC staff, submit the results of Analysis for the staff's review.

   The third new row in Table 3.10.1 states that the qualification method for the equipment (PAMS Cabinet and Components and Main Control Room Components) is "Analysis (to be performed)."

   Provide a target date when this analysis will be performed, submit the results of the Analysis for the staff's review, and amend the FSAR as needed.

   Response: The response to this RAI will be provided by June 18, 2010.

3. In several locations in FSAR Section 3.10 (e.g., pages 3.10-11, 3.10-12, and 3.10-18), the word "LATER" is inserted before a Reference or a report.

   If this word LATER refers to future action, provide a target date to provide these reports and the results of the qualification Tests / Analysis included in these reports for the staff's review.

   Response: The response to this RAI will be provided by June 18, 2010.

4. The numbering of the Unit 2 list on page 3.10-4 is not consistent with the numbering referenced by the text below the list.

   1) Correct the numbering to clearly identify the references associated with the items in the list.

   2) The Nuclear Instrumentation System Power Range Electronics appears to be a new item added to the list for Unit 2. Clarify which reference documents its qualification testing. Provide the results of the test or analysis.

   Response: The response to this RAI will be provided by June 18, 2010.

5. Page No. 3.10-4 in FSAR Section 3.10.1 lists several new items of instrumentation and electrical equipment requiring seismic qualification. It is stated on page 3.10-6 of Section 3.10.1 that seismic qualification testing of items 11 and 12 is documented in a new Reference 25. Provide a copy of Reference 25 for the staff's review.

   Response: The response to this RAI will be provided by June 18, 2010.

6. On line 3 from the bottom of Page No. 3.10-4 in FSAR Section 3.10.1, a new Reference 33 is cited. However Reference 33 is not actually included in the list of References on page 3.10-12.

   Correct the reference.

   Response: The version of page 3.10-4 issued by Amendment 98 corrected "[33]" to "[32]." Since this change was administrative, no change bar was provided for it, and the amendment level was not revised.

PRELIMINARY RAIs for FSAR 9.2.3 (taken from e-mail from NRC dated 04/19/2010)

Section 9.2.3

Section 9.2.3.4, "Test and Inspection," states: "Prior to startup piping and equipment were tested." Clarify if this means that the system has been completely tested for operation of both units and further testing will not be done prior to Unit 2 startup?

Response: The Demineralized Water Makeup System is, by design, a common system. Unit 1, common and Unit 2 sections of the system (except for the Unit 2 Reactor Building and limited portions which are not under Unit 1 control) are in service. The Unit 2 Reactor Building section and those sections not under Unit 1 control (piping and equipment) will be tested during the Unit 2 flush program. Hydrostatic tests will be performed where required and the containment penetration will be leak rate tested. No other preoperational startup testing is required for the Demineralized Water Makeup System.

PRELIMINARY RAIs for FSAR 9.2.6 (taken from e-mail from NRC dated 04/232010)

Section 9.2.6

In the Safety Evaluation Report related to the operation of Watts Bar Nuclear Plant Units 1 and 2, NUREG–0847, Supplement 12, dated October 1993, Section 9.2.6, "Condensate Storage Facilities" states:

> In Section 9.2.6 of the SER, the 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 72, the applicant 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 staff's conclusions reached in the SER or supplements related to the condensate storage facilities or the AFW system. The staff's effort was tracked by TAC M85037 and M85038.

In the proposed FSAR for Unit 2, Section 9.2.6.2 System Description, the applicant 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 staff requests the applicant to explain the apparent discrepancy and to clarify the design basis for Unit 2. Since the apparent discrepancy also appears to be applicable to Unit 1, your response should also identify the action taken, if any, to consider the impact on Unit 1.

Response: Amendment 89 revised the value from "210,000 gallons" to "200,000 gallons." At that time, the FSAR was for both Unit 1 and Unit 2. Thus, the revision applied to both units.

The amendment resulted from FSAR change number 0889. The reason for the change was to correct the condensate storage tank minimum reserve volume for auxiliary feedwater use, based on Calculation HCG-LCS-043085, Rev. 4.

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 9.3.2 (taken from e-mail from NRC dated 04/28/2010)

Section 9.3.2

9.3.2-01 Section 9.3.2.6 states that the "...existing Post Accident Sampling System (PASS) is being abandoned in place and disconnected for Unit 2. By letter dated June 14, 2000, the NRC issued "Safety Evaluation Related to Topical Report WCAP-14986, Revision 1, "Westinghouse Owners Group Post Accident Sampling System Requirements (TAC No. MA4176)." This safety evaluation addressed the staff's review of WCAP-14986, Revision 1 and concluded that the topical report provided a basis to eliminate the PASS as a required system for sampling the parameters listed in Section 4 of the safety evaluation. The staff identified four licensee required actions in Section 4.1 of the safety evaluation that must be fulfilled by a licensee that would eliminate PASS for sampling the identified 15 parameters in accordance with WCAP-14986 and the safety evaluation. A summary of the required actions are:

1. Establish a capability for classifying fuel damage events at the Alert level threshold (typically this is 300 microcuries per ml dose equivalent iodine).

2. Develop contingency plans for obtaining and analyzing highly radioactive samples of reactor coolant, containment sump, and containment atmosphere.

3. A licensee must determine for its own plant(s) that no decrease in the effectiveness of the emergency plan will result from the removal/downgrade of the PASS.

4. Licensees will maintain offsite capability to monitor radioactive iodines.

The applicant is requested to provide a description of how they comply with the required actions.

Response: The response to this RAI will be provided by June 18, 2010.

9.3.2-02 This is editorial: Section 9.3.2.2, pg 9.3-7, paragraph beginning "Each sample is listed...". Need to add ")" after "...or gas analyzer.

Response: This discrepancy was corrected in Amendment 98. Since the change is administrative, the amendment level on the page remained at "(WBN-97)." The change bar for this line indicates changes per Amendment 97.

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 9.4.4 and 9.4.8 (taken from Fax from NRC dated 03/01/2010)

Sections 9.4.4 and 9.4.8

RAI-1 (FSAR Section 9.4.4, "Turbine Building Ventilation System"):

In Amendment 94, TVA proposed design bases changes besides editorial changes, in FSAR Section 9.4,4 in the form of text, figure(s), or table for the turbine building ventilation system including radiation protection information in FSAR Section 9.4.4.1, cold weather building pressurization in FSAR Section 9.4.4.2.4, system safety evaluation in FSAR Section 9.4.4.3, etc.

Provide a detailed assessment of the proposed changes discussing how WBN-Unit 2 will continue to meet the Acceptance Criteria delineated in NUREG-0800, Standard Review Plan, Section 9.4.4, Revision 2, July 1981, with the proposed changes.

Response: Five out of six of the Unit 2 FSAR changes are associated with administrative or editorial corrections in text created during the 10 CFR 50.54(f) FSAR re-verification effort conducted between 1998 and 2000. These changes were incorporated to clarify Section 9.4.4 of the FSAR to better address NUREG-0800 in areas associated with the function and qualification of Turbine Area Ventilation Systems (TAVS). Changes which add clarifying text are simply being carried over to the Unit 2 FSAR to maintain compliance fidelity established for the Unit 1 UFSAR. Changes from the 50.54(f) re-verification effort which removed text considered to be excessive detail are not incorporated in the Unit 2 FSAR in order to maintain compliance with the "Level of Detail" requirements of 10 CFR 50.34(b) and the content requirements of Regulatory Guide 1.70, Revision 3, 1978. The turbine area (all elevations) is common to both units; therefore, establishment of the area design basis encompasses both units. Pursuant to NUREG-0847, Supplement 21, the Unit 1 design basis is considered to be sufficient for use as the basis for completion of Unit 2 which is especially true of common facilities.

The sixth issue is in the area of maintaining required minimum positive pressure of 1/8" water gauge with respect to outdoors and adjacent areas during both normal and emergency modes of operation in the Main Control Room Habitability Zone (MCRHZ) during periods where Turbine Building heating is required (Outdoor temperature is 35° Fahrenheit or less). During cold weather heating periods, certain dampers are closed with air flow directed across heating coils for maintaining interior heat. A potential exists for the Turbine Building to become pressurized with this system operating configuration which creates a challenge to the required minimum MCRHZ pressure since they share a common wall and penetrations at the "N" line. The potential for this anomaly is documented in Problem Evaluation Report (PER) 4947. As part of the corrective measures established for resolution of this PER, testing was performed to determine actual Turbine Building pressurization during worst case scenarios. This testing confirmed that the maximum turbine area pressure at the MCHRZ elevation (recorded at 0.01 inches of water) will not challenge minimum pressure requirements of the habitability zone.

Additionally, normal day to day pressure of the MCRHZ is maintained at 0.4 inches of water to assure continuous compliance with minimums. System Description Document (SDD) N3-44-4002 was revised to provide a detailed description of this situation. This information has been translated to the Unit 2 FSAR as reviewed under 10 CFR 50.59 for Unit 1.

RAI-2 (FSAR Section 9.4.8, "Condensate Demineralizer Waste Evaporator Building Environmental Control System"):

In the initial plant design, TVA included condensate demineralizer waste evaporate (CDWE) building environmental control system in the WBN-Unit 2 FSAR Section 9.4.8. However in Amendment 94, TVA proposed that "The condensate demineralizer waste evaporate (CDWE) building environmental control system is a separate nonsafety air conditioning system which is not required for Unit 2 operation."

In addition, you have stated that the above system is "Not required for WBN-Unit 1 operation."

Provide a discussion describing why the CDWE building environmental control system is no longer required for WBN-Units 1 and 2 operation. Also provide a detailed assessment of the proposed deletion discussing how WBN-Unit 2 will continue to meet the Acceptance Criteria delineated in NUREG-0800, Standard Review Plan, Section 9.4.3, Revision 2, July 1981.

RAI-3 (FSAR Section 9.4.8, "Condensate Demineralizer Waste Evaporator Building Environmental Control System"):

Your submittal stated that, "The CDWE Building is inside the Auxiliary building Secondary Containment Enclosure (ABSCE) boundary; therefore, it is connected to the Auxiliary Building (AB) ventilation exhaust system. The ventilation exhaust system provides a negative pressure inside CDWE Building."

If the function of the ABSCE ventilation exhaust system is to provide a negative pressure inside the CDWE Building (with respect to the outside atmosphere), explain why the CDWE building environment control system is not needed. Also if this function is not needed (or deleted), provide a detailed assessment discussing how WBN-Unit 2 will continue to meet the Acceptance Criteria delineated in NUREG-0800, Section 9.4.3, Revision 2, July 1981.

Response: The following provides the response to both items RAI-2 and RAI-3 above. The CDWE Building environmental control system is no longer required for either Unit 1 or Unit 2 due to the fact that the Condensate Demineralizer Waste Evaporator (CDWE) was abandoned in favor of Mobile Demineralizers provided by vendors. The physical space of the CDWE Building (CDWEB) is considered, therefore, a clean environment since no activity which would tend to produce radioactivity will be accomplished in the space. The space is connected to the Auxiliary Building Secondary Containment Enclosure (ABSCE) through exhaust ducting and a set of airlock doors in the tunnel between the waste packaging area and the CDWEB. The ventilation system is configured such that there is no supply air to the CDWEB (the supply fan and associated ducting are isolated by two closed and abandoned fire dampers and the fan is disabled). The fuel handling area exhaust fans take suction from the

CDWEB during normal operation and the area is maintained at a slight negative pressure relative to the outside environment. During accident conditions, the fuel handling area exhaust is isolated and the Auxiliary Building Gas Treatment System (ABGTS) takes suction from the same exhaust ductwork. Exhaust from the ABGTS is filtered and exhausted through the Shield Building exhaust stack. The exhaust function is not considered to be part of the CDWEB Environmental Control System (ECS) as it does nothing to moderate building temperature or air quality. The exhaust air flow creates a negative pressure condition in the CDWE space during both normal and post accident conditions. The CDWE Building is self contained with external walls and roof not shared with any other features which, when combined with negative pressurization, precludes transportation of potentially contaminated air to the environment. The abandoned CDWEB ECS components within the CDWEB, such as air coolers and space heaters, are not needed to control temperature since the original cooling loads are no longer present. Doors are treated as ABSCE boundary controlled access and egress points which must have clearance authorization from operations prior to opening. For the reasons outlined above, NUREG-0800 Acceptance Criteria, Standard Review Plan, Section 9.4.3, Revision 2, July 1981, is met.

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 11 (taken from e-mail from NRC dated 03/23/2010)

Section 11

1. Amendment 95 has added three columns of source terms (representing different waste processing configurations) to Table 11.2-5 to the two source terms formerly in the corresponding table in FSAR Amendment 89.

   a. Provide a full definition of the terms in the header of these columns, and a full discussion of the plant configuration they represent.

   Response: (See response to item "b." below relative to typographical errors in the column heading.)

   Column 1: This column does not have a heading. The items in this column represent radioisotopes expected to be present in the liquid waste stream as found in NUREG-0017.

   Column 2: Heading "MD DF" represents Mobile Demineralizer Decontamination Factor as derived from NUREG-0017.

   Column 3: Heading "CVCS DF" represents Chemical Volume Control System Decontamination Factor as derived from NUREG-0017.

   Various decontamination factors and their sources are as follows:

	H-3	Cs, Rb	Co-58	All others	Ref.
CVCS	1	2	50	50	NUREG-0017
Mobile Demin.	1	1000	100	1000	NUREG-0017 Vendor Info
Cond. Demin	1	2	10	10	NUREG-0017

   Column 4: Heading "w/o CD process by MD" represents waste processed by the Mobile Demineralizer (MD) only without processing by the Condensate Polishing Demineralizer (CD).

   Column 5: Heading "w/CD processing by MD" represents waste processed by both the CD and the MD.

Column 6: Heading "no CD processing" represents the release to the environment if no processing of the waste is performed. It shows the baseline and demonstrates that limits are required. This operating mode is not employed.

Column 7: Heading "no CD process, SGBD rel=LLD" represents the release to the environment if no processing of the waste is performed, but the blowdown from the steam generator is limited to the Lower Limit of Detection (LLD = 5E-7 µCi/cc gross gamma). These releases are within limits at 0.658 Ci without H-3.

Column 8: Heading "no CD process, SGBD rel=max" represents the release to the environment if no processing of the waste is performed, but the blowdown from the steam generator is limited to a maximum of 3.65E-5 µCi/cc max gross gamma. These releases are within limits at 4.84 Ci without H-3.

b. Columns 1 and 2 of Table 11.2-5 refer to "processing by MC". Should they read "processing by MD," as in Mobile Demineralizers? If so correct, if not define MC.

Response: The acronym "MC" is incorrect. The appropriate acronym is "MD" for Mobile Demineralizers. This error appears to be a translational error from transferring information from one electronic format to another. This error was corrected in Amendment 98. Since this change is editorial, the amendment level of the pages for Table 11.2-5 remained at "WBNP-95." Likewise, the change bars on the page reflect changes per Amendment 95 and not this change.

Additionally, the header was correct to replace "After Processing - One Unit Operation Total Releases***" with "After Processing Total Releases Per Unit (TPC Unit 1 Only) ***." This correction clarifies the intent of the table to indicate discharge from a single unit (per 10 CFR 20) allowing the table to serve both units for a common processing system. It is not intended for this table to indicate a single unit facility. Since this change is editorial, the amendment level of the pages for Table 11.2-5 remained at "WBNP-95." Likewise, the change bars on the page reflect changes per Amendment 95 and not this change.

c. The added source term columns do not appear to be used in the FSAR safety analysis. Two of the three source terms indicate they do not meet the total curie limit in RM 50-2 annex to Appendix I. Explain the purpose for including this revised Table 11.2-5 in the FSAR.

Response: This information was incorporated in the Unit 2 FSAR to match Unit 1 UFSAR, Amendment 7. All of the added columns resulted from a configuration where monitored SGB stream is released to the river without treatment. The associated Unit 1 UFSAR Table was revised to reflect this configuration and analytical basis as evaluated under 10 CFR 50.59 with NUREG-0017 and RM 50-2 annex to Appendix I (annual total quantity, all sources except tritium and dissolved gasses, no more than 5 Ci / unit/ year for liquid waste) used as the limiting basis. Three columns of information have been added (i.e., columns 6, 7, and 8 in the response to RAI 1.a. for Chapter 11). H3 values are calculated using the formula 0.90x0.4Ci/yr/MWt from NUREG-0017 and the unplanned release of 0.16 Ci/yr is based on tabulated base information also found in NUREG-0017. Unit 2 does not contemplate a tritium production core; therefore, TPC data is not applicable to Unit 2. See the definitions for terms in the response to RAI 1.a. for Chapter 11 for further explanations.

2. Amendment 95 has revised the entries in Table 11.2-5a and 11.2-5b for every isotope listed. These tables take the source term from the first two columns of Table 11.2-5 and calculate the sum of the fractional release values to demonstrate compliance with the public dose limit by the method provided in 10 CFR 20.1302(b).

a. However, the total sum of the C/ECL in Table 11.2-5a (1.343) indicates that operating one unit exceeds the requirements of 10 CFR 20.1302(b) (e.g., the sum is greater than 1.0). Provide a basis for why this mode of operation is acceptable.

Response: The sum over all isotopes of the concentrations/ECL (C/ECL) value from Table 11.2-5a is greater than unity for the case where all isotopes are at design values and the released liquid is not processed by the Mobile Demineralizers. This mode of operation is not permitted since the C/ECL value exceeds the requirements of 10 CFR 20.1302(b). The bulk of the release is due to the untreated condensate resin regeneration waste. In order to prevent exceeding the 10 CFR 20.1302(b) limits, the condensate regeneration waste is rerouted through the mobile demineralizers if the long term releases from the condensate regeneration waste is greater than the 10 CFR 20 concentration limits. With mobile demineralizer processing of condensate regeneration waste, the release concentrations are shown in Table 11.2-5b and are less than the limits specified in 10 CFR 20.1302(b).

b. The revised Table 11.2-5 has fourteen isotopes in the source term spectrum that have not been included in Tables 11.2-5a and 11.2-5b. These are Na-24, Fe-55, Zn-65, Y-91m, Y-93, Te-99m [sic-Tc-99m?], Ru-103, Ru-106, Te-129m, Te-129, Te-131m, Te-131, Ce-141, and Ce-143. Provide a basis for not including these isotopes in Tables 11.2-5a and 11.2-5b.

Response: The isotopes listed in Tables 11.2-5a and 11.2-5b are used to determine gaseous releases assuming 1% failed fuel. As discussed in the response to item c. below, the RCS sources for 1% failed fuel are taken from Westinghouse WCAP 7664 and are used to establish a scaling factor to ratio up the releases for normal realistic source terms. Isotopes Na-24, Fe-55, Zn-65, Y-91m, Y-93, Tc-99m, Ru-103, Ru-106, Te-129m, Te-129, Te-131m, Te-131, Ce-141, and Ce-143 do not appear in the RCS isotopic concentrations assuming 1% failed fuel by Westinghouse in WCAP 7664. Thus, releases were not tabulated for these isotopes. This same methodology was included in the Amendment 91 of the Unit 1 / Unit 2 FSAR, and was approved by NRC SER dated November, 1995. Thus, it is part of the Unit 1 licensing basis. Further, this same methodology is currently included in the Unit 1 living FSAR.

c. Provide an explanation of the values listed in the third column of Tables 11.2-5a and 11.2-5b (e.g., "Des/Exp Ratio") and explain how they are used in the calculation of the C/ECL.

Response: The second column in Tables 11.2-5a and 11.2-5b contains the normal expected liquid releases (Ci/Yr) assuming Reactor Coolant System (RCS) and secondary side source terms based on ANSI-18.1, 1984. The third column in the tables is a scaling factor which is the ratio of RCS isotopic concentrations assuming 1% failed fuel (from Westinghouse WCAP 7664) divided by RCS isotopic concentrations based on ANSI-18.1, 1984. The normal expected releases (column 2) are multiplied by the scaling factor (column 3) to obtain the releases if the RCS activity is based on 1% failed fuel (column 4). To determine the average design concentration (column 5), the design release (column 4) is divided by volume released and the dilution flow (the minimum cooling tower blowdown flow = 20,000 gpm = 2.88E7 gal/day). The volume released is sum of all sources = 6141.654 gal/day. The formula for column 5 is: [uCi/gm] =Column 4 [Ci/yr]*(1E6 uCi/Ci) / ((16141.654+2.88E7gal/day) *8.34 lb/gal * 453.59 g/lb * 365 day/yr). The design concentration (column 5) release of each isotope is then divided by the 10 CFR 20, Appendix B, Table 2 Effluent Concentration Limit (ECL) (column 6). This fraction (column 7) is then summed over all isotopes. The acceptance criterion is for this sum to be less than unity.

d. Verify that the subtitle to Table 11.2-5b should read "With Processing of the Condensate Resin ..."

Response: Amendment 98 replaced "NO PROCESSING OF CONDENSATE RESIN REGENERATION WASTE PROCESSED BY MOBILE DEMINERALIZERS" with "WASTE PROCESSED BY MOBILE DEMINERALIZERS."

3. Table 11:2-7

a. Provide a basis for concluding that the doses to members of the public presented in the table for the year 2040, are bounding and conservative for current plant operation.

b. Verify that the individual doses listed in the table are to the maximum exposed individual in each group.

c. Identify the specific source term, models, parameters, and assumptions used in calculating these values.

Response: The response to this RAI will be provided by June 18, 2010.

4. Verify that the land-use census that is reflected in Table 11.3-9 is still valid or provide a basis for concluding that the analysis based on this information is bounding and conservative.

Response: The response to this RAI will be provided by June 18, 2010.

5. Amendment 95 revised the gaseous release estimates in Tables 11.3-8a and 11.3-8b. The revised value for the designed release of I-131 indicated in both tables is approximately 8 Ci/yr/unit. Provide a basis for why Watts Bar meets the RM 50-2 limit for I-132 release of 1 Ci/yr/unit.

Response: The gaseous release estimate of approximately 8 Ci/yr/unit of I-131 in column 4 of Tables 11.3-8a and 11.3-8b is based on RCS source terms assuming 1% failed fuel, and is intended to compare gaseous releases at this failed fuel percent to the limits imposed by 10 CFR 20, Appendix B, Table 2. The gaseous release estimates for evaluating the 10 CFR 50, Appendix I RM 50-2 limits are based on realistic source terms, which are significantly less than those associated with 1% failed fuel. The I-131 annual release value (0.153 Ci/yr) in column 1 of these tables should be compared to the RM 50-2 limits. This value is based on source terms contained in NUREG-0017 specifically adjusted for WBN, which are approximately equivalent to source terms based on ANSI-18.1, 1984. Section 11.3.1, "System Description and Review Discussion," of NUREG-0847, Supplement 16, evaluated WBN gaseous releases and determined an I-131 annual release of 0.17 Ci/yr based on realistic sources from NUREG-0017 and concluded WBN releases meet the requirements of RM 50-2.

6. Provide the headers for columns in table 11.3a (sic 11.3-8?) and discuss the significance of this table and how it differs from the source term provided in table 11.3-8.

Response: The purpose of Table 11.3-7a is to show that gaseous releases for both units will remain within the allowable limits of 10 CFR 20, Appendix B, Table 2 assuming 1% failed fuel. The following breakdown provides definitions for the information provided in each of the columns presented in Table 11.3-7a:

Column 1: This column does not have a heading. This column represents the nuclides expected to be present in the gaseous waste stream as derived from published tables in NUREG-0017.

Column 2: Heading "Exp. Rel. (Ci/yr)" represents expected gaseous releases expressed in Curies per year assuming Reactor Coolant System (RCS) and secondary side source terms as derived from NUREG-0017 specifically adjusted for WBN. These values are taken directly from the last column of Table 11.3-7.

Column 3: Heading "Des/Exp" represents the scaling factor expressed as the ratio of RCS isotopic concentrations, with 1% failed fuel assumed, as taken directly from Westinghouse WCAP-7664 and then divided by the RCS isotopic concentrations from ANSI-18.1, 1984, source terms which are approximately equivalent to NUREG-0017.

Column 4: Heading "Design (Ci/yr)" represents design releases expressed in Curies per year using the following formula:

Normal expected releases (column 2) x scaling factor (column 3) = designed release concentration (column 4).

Column 5: Heading "Design (µCi/cc)" represents the average design concentration expressed in Micro Curies per cubic centimeter using the following formula for derivation:

(column 4) [Curies/Year] * X/Q [1.09E-5 seconds/cumulative site boundary value] * [1 (µCi/CC) / (Ci/Cumulative) / (60 sec/min * 60 min/hr * 24 hr/day * 365 days/year)] = average design concentration (column 5).

Column 6: Heading "10CFR20 (ECL)" represents the Effluent Concentration Limit (ECL) as derived from 10 CFR 20, Appendix B.

Column 7: Heading "Single Unit Operation C/ECL" represents the ECL fraction (C/ECL) summed over all isotopes for one unit

Column 8: Heading "Dual Unit Operation C/ECL" represents the ECL fraction (C/ECL) summed over all isotopes for two units.

The acceptance criteria for these final summed values must be less than unity which is represented by the posted values.

7. Describe the source term used to calculate the doses listed in Table 11.3-11. Amendment 95 resulted in lower values for the Total Body and Skin doses. Describe what factors changed with Unit 2 operation that resulted in these lower revised values.

   Response: The response to this RAI will be provided by June 18, 2010.

8. Verify that Watts Bar is committed to meeting the limits in Docket RM 50-2 in lieu of the cost benefit requirement as provided in 10 CFR 50 Appendix I Section II D.

   Response: TVA committed to meeting the limits in Docket RM 50-2 in lieu of the cost benefit requirement as provided in 10 CFR 50 Appendix I Section II D by letter dated February 17, 1995, Docket Nos. 50-390 and 50-391. This commitment is acknowledged in Section 11.1, "Summary Description," of NUREG-0847, Supplement 16.

The staff has also identified the following typographical errors:

1. Section 11.2.3.1, "Component Design," states in part: "...design parameters are given in Table 11.2-3." A review of the tables associated with Section 11.2 indicates that this should be Table 11.2-2.

   Response: Amendment 98 corrected "Table 11.2-3" to "Table 11.2-2." Since this change was administrative, no change bar was provided for this change, and the amendment level remained at Amendment 95 for page 11.2-4.

2. Section 11.2.3.1, "Component Design," states under both "High Crud Pumps" and "Neutralization Tank Pumps": "Two gpm pumps..." A review of Table 11.2-2 indicates that these pumps have higher flow rates.

   Response: The acronym "gpm" should be removed in these applications. The actual pump performance characteristics are provided in Table 11.2-2. This was an inadvertent retention of an acronym that was supposed to have been removed along with the pump performance value as redundant information.

   Amendment 98 corrected "Two gpm pumps" to "Two pumps" in both noted locations. Since these changes were administrative, no change bars were provided for these changes, and the amendment level remained at Amendment 95 for pages 11.2-7 and 11.2-8.

3. Section 11.2.9.1, "Assumptions and Calculational Methods," subsection (2) references Table 11.2-10. The staff is unable to find Table 11.2-10. It appears the correct reference is Table 11.2-6.

   Response: Amendment 98 corrected "Table 11.2-10" to "Table 11.2-6." Since this change was administrative, no change bar was provided for this change, and the amendment level remained at A89 for page 11.2-20.

4. Section 11.2.9.2, "Summary of Dose from Radionuclides in Liquid Effluent," refers to Table 11.2-6. This table contains no dose information. It appears that the correct reference in Amendment 95 is Table 11.2-7.

   Response: Amendment 98 corrected "Table 11.2-6" to "Table 11.2-7." Since this change was administrative, no change bar was provided for this change; the existing change bar for this line reflects a valid change per Amendment 95 to this line. The amendment level remained at Amendment 95 for page 11.2-21.

5. The references to Tables 11.2-4, 11.2-4a and 11.2-4b in FSAR section 11.2.6.5, and to Table 11.2-5 in FSAR section 11.2.9.1, appear to be incorrect.

   Response: Amendment 98 corrected "Table 11.2-4" to "Table 11.2-5"; "Table 11.2-4a" to "Table 11.2-5a"; and "Table 11.2-4b" to "Table 11.2-5b." Since these changes were administrative, no change bars were provided for these changes. Due to other changes to the paragraph, the level was changed to Amendment 98 for page 11.2-18.

   Amendment 98 corrected "Table 11.2-5" to "Table 11.2-6." Since this change was administrative, no change bar was provided for this change; the existing change bar for this line reflects a valid change per Amendment 95 to this line. The amendment level remained at Amendment 95 for page 11.2-19.

6. The title to Table 11.2-4 indicates that there are four pages to the table. However, only one page of the table is included in the FSAR.

   Response: Amendment 98 deleted "(Sheet 1 of 4)" from the header. Since this change was administrative, no change bar was provided for this change; the existing change bar for this line reflects a valid change per Amendment 95 to this line. The amendment level remained at Amendment 95 for page 11.2-32.

7. Table 11.2-7 has "change bars" indicating Amendment 95 updates; however the page header indicates that this page has not been revised since Amendment 89.

   Response: The change bars reflect valid changes made per Amendment 95. Amendment 98 corrected "WBNP-89" to "WBNP-95." This table is now on page 11.2-41.

8. The tables referenced in section 11.3.7.5 of the FSAR appear to be erroneous (no Table11.3-8c is included).

Response: The references to tables in the Chapter 11 text were reconfirmed with corrections made in Amendment 98.

9. Table 11.3-9 has "change bars" indicating Amendment 95 updates; however, the page header indicates that this page has not been revised since Amendment 89.

Response: Amendment 98 corrected "WBNP-89" to "WBNP-95."

10. Table 11.3-4 indicates sheet 1 of 2. No sheet 2 is provided

Response: There is no error in this table. The actual error is due to the incorrect numbering of Table 11.3-5 as discussed in the next item.

11. Table 11.3-5 indicates sheet 2 of 2. No sheet 1 is provided.

Response: Table 11.3-5 was incorrectly numbered; Amendment 98 corrected "Table 11.3-5" to "Table 11.3-4." Since this change was administrative, no change bar was provided for this change, and the amendment level remained at Amendment 95 for page 11.3-19.

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 11.3 and 11.4 (taken from e-mail from NRC dated 04/28/2010)

Sections 11.3 and 11.4

RAI 11.3-02: The references in Section 11.3.2 to Tables 11.3-4/5 appear incorrect. A review of the tables indicate the reference to 11.3-4 should be 11.3-3and 11.3-5 should be 11.3-4 and 11.3-5 (these two tables appear to be sheet 1 and sheet 2 of the same table or some of the sheets are missing)

Response: The response to this RAI will be provided by June 18, 2010.

RAI 11.3-03: Section 11.3.3.1 under "Waste Gas Compressors" did not include a revision base for the deletion of: "Each unit is sized for 40 gpm."

Response: The response to this RAI will be provided by June 18, 2010.

RAI 11.3-04: Section 11.3.3.2, "Instrumentation Design," failed to note a revision to the first paragraph where a sentence was deleted.

Response: The version of this page issued by Amendment 98 inserted the missing change bar. Since this was an administrative change, the amendment level was not revised.

RAI 11.3-05: Section 11.3.3.2, "Instrumentation Design." last paragraph. Confirm that this paragraph accurately describes the operation of this instrument. Specifically address the difference between how the Unit 2 instrument operates compared to how the Unit 1 instrument operates as described in the Unit 1 UFSAR.

Response: The response to this RAI will be provided by June 18, 2010.

RAI 11.3-06: The reference to Table 11.3-3 in Section 11.3.7.2 appears to be incorrect and should be 11.3-2.

Response: The version of this page issued by Amendment 98 corrected "Table 11.3-3" to "Table 11.3-2." Since this change was administrative, no change bar was provided for it, and the amendment level was not revised.

RAI 11.3-07: Section 11.3.7.5 references Table 11.3-8c. The staff is unable to find Table 11.3-8c in the applicant's submittal.

Response: The version of this page issued by Amendment 98 corrected "Table 11.3-8c" to "Table 11.3-7c." Since this change was administrative, no change bar was provided for it. Note that the change in amendment level was due to revisions on the page other than this administrative one.

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

RAI 11.3-08: Section 11.3.8 under Auxiliary Building Vent - two editorial corrections: third line "throu" should be "through" and fifth line "Auxiliary Building exhaust **bent**" should be "Auxiliary Building exhaust **vent**."

Response: The version of this page issued by Amendment 98 corrected "throu" to "through" and "bent" to "vent." Since these changes were administrative, no change bar was provided for them, and the amendment level was not revised. The change bar next to this sentence is due to its addition in Amendment 95.

RAI 11.4-01: Table 11.4-1, "Process and Effluent Radiation Monitors - Liquid Media," includes the "Steam Generator Blowdown Liquid Sample Monitor" and the "Boric Acid Evaporator Condensate Monitor." Both of these monitors have a footnote that states "Deleted by Amendment 95." Explain why these monitors are being deleted and why are they still included in the table, if not to be installed in the plant.

Response: The response to this RAI will be provided by June 18, 2010.

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 12 (taken from e-mail from NRC dated 03/25/2010)

Chapter 12

1. Amendment 95 revised FSAR Section 12.2.1.3 to include incore instrumentation thimble assemblies as important radioactive sources during refueling operations and deleted the incore detectors from this list. Provide an analysis of the impact of the dose rates to areas of the plant with the thimbles stored in the BMI guide tubes, as described. Describe the plant design features that minimize radiation exposure to plant individuals from this radiation source.

   Response: The IITAs are treated like the BMI thimble tubes in terms of their effects as radiation sources. WINCISE removes the BMI thimble tubes and replaces them with Incore Instrument Thimble Assemblies (IITAs). During plant operation, the IITAs are located within the reactor core and generate signals that are proportional to the reactor power in that area of the core. For refueling outages, the IITAs are withdrawn from the core into the area below the reactor vessel. This area below the reactor vessel is maintained as a locked high radiation area to prevent personnel access to this area. Accessible areas of the lower Containment Building are shielded from the locked high radiation area by concrete and steel shielding. The radiation from the IITAs that have been exposed to the core neutron flux is on the same order of magnitude as would be the radiation from BMI thimble tubes that have been exposed to the core neutron flux. The radiation levels in areas in the lower Containment Building that are accessible to personnel are expected to be approximately the same as those radiation levels that are seen in similar plants using moveable incore detector systems with BMI thimbles.

2. Amendment 95 revised the estimated airborne radioactivity concentrations listed in Tables 12.2-19 and 12.2-22. Provide a description of what changed in the Watts Bar design that resulted in the revised values of airborne contamination?

   Response: Unit 1 FSAR Change Package 1725 S00 and associated Engineering Change EDC 51071-A revised Tables 12.2-19 and 12.2-22. The change was reviewed and determined to be applicable to Unit 2. The FSAR revision was based on a revision of a calculation entitled, "Maximum Expected Airborne Concentration in Primary Containment, Turbine Bldg, and Instrument Room During Normal Operation." The revision incorporated two changes:

   1. It was recognized that the calculation originally assumed the RCS particulate leakage for two units was present in a single Containment Building and thus overestimated the effect on doses inside containment. This was corrected to use only one unit's worth of RCS particulate leakage which thus tended to lower the airborne concentrations inside the containment (i.e., Lower Containment, Upper Containment and Instrument Room).

2. Another revision was made to more conservatively represent the temperature difference between the Lower Containment and the Upper Containment. The calculation utilized a higher temperature in the Lower Containment which caused the temperature induced flow from the Lower Containment to the Upper Containment to increase. The higher flow increased the airborne concentrations in the Upper Containment and lowered the concentrations in the Lower Containment.

3. Amendment 97 revised the last paragraph of page 12.3-1 to read, "Typically, cleaner areas are exhausted to areas of higher potential airborne radioactivity..." [emphasis added]. List those areas of the plant where this is not the case and describe compensatory measures to minimize the spread of contamination from high to lower airborne areas.

Response: Further review has determined the Amendment 97 change in FSAR 12.3.1 (Radiation Protection Design Features - Facility Design Features) is non-conservative and inconsistent with information provided in FSAR 9.4.2.1 (Fuel Handling Area Ventilation System - Design Bases) and FSAR 9.4.3.1 (Auxiliary Building and Radwaste Area Ventilation System - Design Basis) regarding control of airborne radioactivity.

Unit 2 FSAR Amendment 97 revised the second sentence of the seventh paragraph of 12.3.1 to read, "Typically, cleaner areas are exhausted to areas of higher potential airborne radioactivity which are then exhausted to the atmosphere through air cleanup units."

This sentence originally read, "Air flow patterns are controlled throughout the plant such that cleaner areas are exhausted to areas of higher potential airborne radioactivity which are then exhausted to the atmosphere through air cleanup units."

A review indicates the original sentence is consistent with the text in FSAR Sections 9.4.2.1 and 9.4.3.1 which clearly states, "To control airborne activity, ventilation air is supplied to clean areas, then routed to areas of progressively greater contamination potential."

Subsequently, this matter was entered into the corrective action program to restore the text in the WBN Unit 1 and Unit 2 FSAR respective sections 12.3.1 as they were prior to implementing the WBN Unit 1 FSAR 1582 S00 PKG. This FSAR revision is consistent regarding control of airborne radioactivity with the referenced regulatory and industry standards.

Amendment 98 restored the sentence in Unit 2 12.3.1 to the way it was prior to Amendment 97.

References:

1. NUREG-800 Section 12.3-3, Radiation Protection Design Feature - Ventilation
2. NUREG-800 Section 9.4.3.I.2A, Auxiliary and Rad-waste Area Ventilation System
3. ASME N509-1989, Nuclear Power Plants Air-Cleaning Units and Components, Section 4.7 - Nuclear Air Temperature System Configuration and Location

4. As required by 10 CFR 20.1406, describe the Watts Bar Unit 2 design features and operating procedures that will minimize, to the extent practicable, contamination of the facility and the environment to facilitate decommissioning.

Response: The response to this RAI will be provided by June 18, 2010.

5. Amendment 97, in Section 12.3.1 revised the discussion of the radiation source terms used in the facility design.

a. NUREG-0800, "Standard Review Plan", identifies that 0.25% fuel cladding defects is considered an acceptable source term. NUREG-0847, " Safety Evaluation Report related to the operation of Watts Bar Nuclear Plant, Units 1 and 2," Supplement 14, Section 12.3 states that the descriptions of radioactive sources conform to the acceptance criteria of the Standard Review Plan and therefore are acceptable to the staff. The revised text refers to "1/8"% failed fuel". Verify that the source term used for the design (normal operation) of the radiation shielding and ventilations system continues to be based on 0.25% fuel cladding defects, consistent with the acceptance criteria of the Standard Review Plan (NUREG-0800) and NUREG-0847, or provide information demonstrating the acceptability of the use of "1/8% failed fuel as the source term."

b. The last sentence of the revised text indicates that the radiation "accident levels are based on the Oak Ridge National Laboratory ORIGEN computer code". The ORIGEN code calculates the inventory of radionuclides in the reactor core, it does not determine the types and quantities of radioactive materials released into the plant systems during the accident. Verify that the accident source term used in the design of Watts Bar 2 radiation protection design features is consistent with the guidance in TID-14844 and NUREG-0737, Action item II.B.2.

Response: a. The FSAR text for section 12.3.1 was revised by Unit 1 FSAR Amendment 88 to change the basis for normal plant design radiation levels to "1/8% failed fuel." This change was reviewed and accepted by NRC SER 14, dated December, 1994. Thus, source terms based on "1/8% failed fuel" are part of the licensing basis for Unit 1 and therefore should be acceptable for Unit 2.

b. The ORIGEN computer code calculated the inventory of radionuclides in the reactor core. Accident releases were based on guidelines in TID-14844, NRC Regulatory Guide 1.4, and NUREG-0730, Action item II.B.2, as applicable.

6. Provide plant layout drawings that indicate the radiation zoning for accident conditions in each of the vital areas (listed on pages 12.3-13 and 12.3-14 of the FSAR) and the planned access/egress routes to these vital areas.

Response: The enclosed OSM includes an electronic version of the TVA calculations which establish the doses for the post accident activities listed in FSAR Section 12.3.2.2 (Pages 12.3-13 and -14), "Shielding for Accident Conditions." The calculations describe the access/egress routes assumed to be followed and the calculated exposure for the personnel. The dose calculation for the alternate sampling of the reactor coolant and containment atmosphere for Unit 2 has not yet been completed but will use methodology similar to that described in the other calculations. This remaining calculation will be provided to the NRC by July 30, 2010.

7. The text at the top of page 12.3-3 indicates that the layout drawings provided show the controlled access areas, decontamination areas, onsite laboratories and counting rooms. However, Amendment 97 deleted FSAR Figures 12.3-18 and 19 that contained the drawings of these design features. Provide drawings that indicate the location and arrangement of these radiation protection features.

Response: FSAR Figures 12.3-18 and 12.3-19 showed portions of the Service Building originally controlled by drawings 46W421-3 and 47W425-7. These drawings are no longer maintained under design configuration control process and are thus not available. The Radcon facilities such as the Health Physics Lab, personnel decontamination station, and Health Physics count room are discussed in Section 12.5.2. The portions of these areas important to radiological considerations discussed in R.G. 1.70 are now controlled by Site Radcon and are discussed in FSAR Chapter 12, Section 12.5.2.

8. Amendment 97 revised the frequency of the radiation monitor channel operability tests. Describe the criteria used in the Technical Specifications, ODCM, and plant procedures to determine the frequency of these tests. Provide a basis for concluding that the operability tests will be performed at a frequency sufficient to detect operability issues with the monitors in a timely manner.

Response: Amendment 97 revised the Unit 2 FSAR to make it consistent with the Unit 1 FSAR as revised by Unit 1 Change Package 1617 and associated Safety Assessment/Screening Review/Safety Evaluation. The enclosed OSM includes an electronic version of this FSAR change package. As noted in this package, the change was made to delete an unnecessary level of detail from the FSAR; the change replaces a specific numeric frequency with a reference to the appropriate governing document.

For items contained in the Technical Specifications (TS), the TS Bases would provide the justification for the applicable surveillance frequency. For example, the currently submitted version of the TS Bases for SR 3.3.6.4 states, "A COT is performed every 92 days on each required channel to ensure the entire channel will perform the intended Function. The Frequency is based on the staff recommendation for increasing the availability of radiation monitors according to NUREG-1366 (Ref. 2). This test verifies the capability of the instrumentation to provide the containment vent system isolation. ..."

Changes to the ODCM are governed by TS 5.7.2.3, "Offsite Dose Calculation Manual (ODCM)."

TVA calculation (WBN-EEB-EDQ1090-99005) established the basis for extending the channel test frequency. The enclosed OSM includes an electronic version of this calculation.

9. Provide a description of the radiation monitoring in areas where reactor fuel is handled or stored sufficient to demonstrate compliance with the requirements of 10 CFR 70.24 or 10 CFR 50.68

Response: The response to this RAI will be provided by June 18, 2010.

10. Amendment 97 revised the description of the airborne monitoring channels on page 12.3-21 of the FSAR to replace the seven (7) channels of airborne monitors previously indicated for the Auxiliary Building with four (4) portable airborne monitors.

a. Verify that these portable monitors will detect a 10 DAC-hour change in airborne levels in the areas monitored.

Response: Portable airborne monitors referred to in this chapter are not used in the DAC-hour mode; instead, if equipped with a local readout and circuitry, may readout in DAC or $\mu Ci/cm^3$ or cpm. These monitors will detect a 10 DAC local change in particulate airborne radioactivity at the monitor only.

b. Describe the controls in place to ensure these portable monitors will not be inadvertently relocated from their intended monitoring areas

Response: Control of continuous air monitors for the main control room, hot sample rooms, and waste packaging area is specified in RCI-101, Radiation, Contamination and Airborne Surveys. "Airborne monitoring of the Unit 1 Control Room and the Unit 1 and 2 Hot Sample Rooms and Waste Packaging Area will be accomplished using portable CAMs having a range of 0.1 to 100.0 DAC." Selection of monitor type and controls to prevent inadvertent relocations of the monitors is overseen by Radiation Protection and may be relocated as necessary pending plant conditions.

c. Are these monitors different than the CAMs used to monitor the sample rooms, and waste packing areas?

Response: Airborne radioactivity monitors placed at the spent fuel pool, SI pump rooms, railroad bay and hold up tank valve gallery may be different than those specified for the sample rooms and waste packaging area as determined necessary by Radiation Protection

d. Verify that the Containment upper and lower monitors are able to detect a 10 DAC-hour change in airborne levels in the areas they monitor.

Response: The Containment upper and lower monitors are not calibrated specifically to detect a 10 DAC-hr change in airborne levels. They are calibrated for determination of RCS leak rate.

The requirement to detect a 10 DAC-hr change in airborne levels is addressed in the paragraph previous to the one in which the Containment upper and lower monitors are discussed. Neither the Unit 1 nor the Unit 2 FSARs specify this requirement for the Containment upper and lower monitors. NPG Design Criteria Document WB-DC-40-24, "Radiation Monitoring -- (Unit 1 / Unit 2)," addresses the Containment upper and lower monitors. It does not specify a requirement to detect a 10 DAC-hr change in airborne levels either.

e. Verify that these monitors alarm locally on high airborne conditions as well as instrument malfunction and high radiation.

Response: Monitors so equipped with local readout meters and alarm functions are programmed to alarm locally on high airborne conditions and instrument malfunction, but there is no high radiation alarm.

11. Provide a basis for deleting the radiation monitors (listed on table 12.2-4) from the Unit 1 and 2 post accident sample rooms?

Response: The area monitors 1-RE-90-280 and 2-RE-90-280 do not perform a primary safety function, nor are they interlocked with any equipment that performs a primary safety function. These monitors were determined to not be required since any post accident mission to this area would require health physics support.

The calculation entitled "Mission Dose for Obtaining the Required Post Accident Samples According To NUREG-0737" demonstrates that the mission doses to the Post Accident Sampling Facility will not exceed the allowable doses after a design basis accident for the original design. The Post Accident Sampling Facility (PASF) is eliminated for the Unit 2 design. This change is consistent with the NRC approved Technical Specification Task Force (TSTF) Traveler, TSTF-366, "Elimination of the Requirements for a Post Accident Sampling System." Amendment 34 to the Unit 1 TS (approved by the NRC on January 14, 2002) deleted 5.7.2.6, "Post Accident Sampling."

The markup for Unit 2 Technical Specifications Developmental Revision A (submitted on March 4, 2009) noted that Unit 2 had deleted 5.7.2.6, "Post Accident Sampling" also.

Unit 1 FSAR Change Package 1639 S00 through Engineering Change DCN D50482A deleted area monitor 1-RE-90-280. The Unit 2 area monitor 2-RE-90-280 was removed under the safety screening evaluation contained within the above mentioned Unit 1 change package and utilizing Unit 2 engineering Change Package EDCR 52339.

These changes resulted in the revision reflected in the FSAR Section 12.3, Table 12.3-4.

12. Amendment 95 revised FSAR Section 12.4, "Dose Assessment." This revised assessment is of insufficient detail to meet the guidance in Regulatory Guide (RG) 8.19. In addition, the 120 person-rem/outage dose estimate in the revised assessment is not consistent with Watts Bar Unit 1 operating history. Provide a revised assessment that meets the criteria in RG 8.19 and describe what measures will be employed in the Unit 2 operations to improve on the annual collective dose experienced in operating Unit 1.

Response: Initial design stage estimates, using the guidance of Regulatory Guide 8.19, were included in earlier amendments to the Watts Bar Unit 2 FSAR Section 12.4 "Dose Assessment." The Watts Bar Unit 2 updated annual estimate of exposures proposed in this amendment was developed based on near term completion of construction and anticipated near term operation and the historical collective exposures recorded during the past eleven years of Watts Bar Unit 1 operation and maintenance. Watts Bar Unit 2 operation and maintenance is expected

to be virtually the same as that experienced in the operation and maintenance of Watts Bar Unit 1, including the radiation source term. Historic exposures for Watts Bar Unit 1 are provided in NUREG-0713 volume 29, beginning with startup in 1997 until 2007. The annual collective dose (person-rem) for this time frame ranged from a low of 3.106 person-rem to a high of 322.682 person-rem. The high collective dose of 322.682 person-rem occurred in 2006 at which time all four Unit 1 steam generators were replaced. Steam generator replacement and the resultant collective dose is not typical of normal operation and maintenance activities, thus is treated as special maintenance and not included in the proposed Watts Bar Unit 2 exposure estimate. (Steam generator replacement activities contributed to approximately 180 person-rem of the 322.682 person-rem for that year.) The proposed annual collective dose was determined by averaging the annual dose (less the steam generator replacement dose). This yields an average annual dose estimate of [(113 + 3.106 + 98.946 + 122.453 + 5.912 + 93.598 + 165.741 + 5.893 + 143.506 + (322.682-180) + 4.414)/11)] = 81.75 person-rem. Additionally, the collective doses for years 2008 and 2009 show a continuing downward trend towards dose reduction.

Watts Bar Unit 2 final construction phase will implement a majority of design changes that were implemented for Unit 1 to further reduce operating doses. Many of these design changes will be implemented in whole or in part specifically for dose reduction purposes, including: removal of the reactor coolant system RTD bypass system, installation of reactor vessel head shielding, implementation of reactor coolant zinc injection, steam generator channel head polishing/electro-polishing, restoration of shield wall penetrations with high density elastomer sealant, partial re-routing of the CVCS letdown pipe from accessible areas, and polar crane wall door shielding. Other high dose design changes that were not specifically performed for dose reduction purposes will be or have been implemented in the Unit 2 design that will further avert future implementing dose.

13. The first sentence at the top of page 12.5-2 states that the "minimum qualification requirements for the Radiation Protection Manager are stated in Section 13.1.3" of the FSAR. Section 13.1.3 refers to Regulatory Guide 1.8 with the alternatives identified in NUCLEAR QUALITY ASSURANCE PLAN, TVANQA-PLN89-A. Clarify which alternatives in TVA-NQA-PLN89A could be applied to the Radiation Protection Manager, if any.

Response: The qualification requirements for the Radiation Protection Manager follows the Nuclear Quality Assurance Program (NQAP) alternative 1, i.e.:

1. TVA will meet the requirements of Regulatory Guide 1.8, Revision 2 (4/87) for all new personnel qualifying on positions identified in regulatory position C.1 after January 1, 1990. Personnel qualified on these positions

prior to this date will still meet the requirements of Regulatory Guide 1.8, Revision 1-R (5/77). As specified in regulatory position C.2, all other positions will meet the requirements of ANSI/ANS N18.1-1971.

Additional instruction is provided in the Nuclear Power Group Standard Programs and Processes, SPP-5.1, Radiological Controls, which requires in part:

3.3.2 Qualifications and Training for RP Personnel

B. The site Radiation Protection Manager shall have the education and experience as described in Regulatory Guide 1.8, Revisions 1 and 2 in the context of Regulatory Guide 1.8 and the endorsed ANSI N18.1-1971 and ANSI/ANS-3.1-1981. Because of TVA's commitment to both documents, the Radiation Protection Manager must meet the more restrictive of the composite qualifications and training of both documents.

C. The Radiation Protection Manager shall have a bachelor's degree in a science or engineering subject, including formal training in radiation protection. At the time of initial core loading or appointment to the active position, whichever is later, the responsible individual shall have five years of experience in applied radiation protection. At least three of the five years shall be professional-level experience in applied radiation protection work in a nuclear facility dealing with radiological problems similar to those encountered in nuclear power plants, preferably in a nuclear power plant. During the three years, the individual shall participate in the radiation protection section of an operating nuclear power plant during the following periods: (1) routine refueling outage (one to two months); and (2) two months operation above 20 percent power. The Radiation Protection Manager shall have at least six months experience onsite (See Section 5.0 Definitions for clarification). Individuals who do not fully meet the literal requirements for the position may be temporarily assigned to fill that position. Such assignments shall be justified and a time for the temporary assignment specified and documented. Temporary assignments shall not reduce the collective experience requirements specified for the level.

14. The discussion of High Radiation Area controls at the top of page 12.5-5 indicates that High Radiation Areas with dose rates greater than 1.0 rem/hour, but less than 500 rads/hour, will be posted as a Locked High Radiation Area, but does not indicate that they will actually be maintained locked. Clarify the proposed controls for these areas.

Response: Developmental Revision A of the Unit 2 Technical Specifications (TS) was submitted on March 04, 2009. 5.11.2 provides the following:

"5.11.2 High Radiation Areas with Dose Rates Greater than 1.0 rem/hour at 30 Centimeters from the Radiation Source or from any Surface Penetrated by the Radiation, but less than 500 rads/hour at 1 Meter from the Radiation Source or from any Surface Penetrated by the Radiation

a. Each entryway to such an area shall be conspicuously posted as a high radiation area and shall be provided with a locked or, continuously guarded door or gate that prevents unauthorized entry, and, in addition:

1. All such door and gate keys shall be maintained under the administrative control of the Shift Manager, radiation protection manager, or his or her designee.

2. Doors and gates shall remain locked except during periods of personnel or equipment entry or exit.

b. Access to, and activities in, each such area shall be controlled by means of an RWP or equivalent that includes specification of radiation dose rates in the immediate work area(s) and other appropriate radiation protection equipment and measures.

c. Individuals qualified in radiation protection procedures may be exempted from the requirement for an RWP or equivalent while performing radiation surveys in such areas provided that they are otherwise following plant radiation protection procedures for entry to, exit from, and work in such areas.

d. Each individual entering such an area shall possess:

1. A radiation monitoring device that continuously integrates the radiation rates in the area and alarms when the device's dose alarm setpoint is reached, with an appropriate alarm setpoint, or

2. A radiation monitoring device that continuously transmits dose rate and cumulative dose information to a remote receiver monitored by radiation protection personnel responsible for controlling personnel

radiation exposure within the area with the means to communicate with and control every individual in the area, or

3. A self-reading dosimeter (e.g., pocket ionization chamber or electronic dosimeter) and,

   (i) Be under the surveillance, as specified in the RWP or equivalent, while in the area, of an individual qualified in radiation protection procedures, equipped with a radiation monitoring device that continuously displays radiation dose rates in the area; who is responsible for controlling personnel exposure within the area, or

   (ii) Be under the surveillance as specified in the RWP or equivalent, while in the area, by means of closed circuit television, of personnel qualified in radiation protection procedures, responsible for controlling personnel radiation exposure in the area, and with the means to communicate with and control every individual in the area.

4. In those cases where options (2) and (3), above, are impractical or determined to be inconsistent with the "As Low As is Reasonably Achievable" principle, a radiation monitoring device that continuously displays radiation dose rates in the area.

e. Except for individuals qualified in radiation protection procedures, or personnel continuously escorted by such individual's, entry into such areas shall be made only after dose rates in the area have been determined and entry personnel are knowledgeable of them. These continuously escorted personnel will receive a pre-job briefing prior to entry into such areas. This dose rate determination, knowledge, and pre-job briefing does not require documentation prior to initial entry.

f. Such individual areas that are within a larger area where no enclosure exists for the purpose of locking and where no enclosure can reasonably be constructed around the individual area need not be controlled by a locked door or gate, nor continuously guarded, but shall be barricaded, conspicuously posted, and a clearly visible flashing light shall be activated at the area as a warning device."

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

Typographical Errors

1. The header to page 12.2-35 of the FSAR indicates that it was revised by Amendment 95; however, it appears no change was made to this page.

   Response: No changes were made to this page; therefore, the header was corrected from "WBNP-95" to "WBNP-84" in Amendment 98.

2. On page 12.3-2, fourth paragraph, ANSI/ANS 18.1 Revision 0 of was dated 1976 not 1984, as stated.

   Response: The date for ANSI/ANS 18.1 Revision 0 was corrected from "1984" to "1976" in Amendment 98. Since this was an administrative change, the amendment level remained at Amendment 97.

3. On Page 12.5.6, in the middle of the page, "ectering" should read "entering."

   Response: Amendment 98 corrected "ectering" to "entering." Since this was an administrative change, the amendment level remained at Amendment 97.

ENCLOSURE 1

Response to Preliminary Request for Additional Information Regarding Unit 2 FSAR

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

PRELIMINARY RAIs for FSAR 14 (taken from e-mails from NRC dated 03/25/2010 and 03/26/2010)

Chapter 14

1. In NUREG-0847, SSER 16, dated September 1995, the staff stated in Section 14.2, "Preoperational Tests," Item 11, that ..."Before issuance of an operating license for Unit 2, however, the applicant would have to demonstrate the capability of each common station service transformer to carry the load required to supply ESF loads of one unit under LOCA conditions, in addition to power required for shutting down the non-accident unit." However, Table 14.2-1 (Sheet 48 of 89) of Amendment 97 to the Watts Bar FSAR for the AC Power Distribution System Test Summary, does not incorporate this additional language in the Test Method section of the test description. Provide a discussion specifically addressing this SSER condition for Unit 2, given the scenario of having both units operational.

   Response: The response to this RAI will be provided by June 18, 2010.

2. The following preoperational and power ascension tests have been deleted in their entirety in Table 14.2-1 of Amendment 97. Preoperational tests Sheet 43 of 89, DG Building Ventilation System; Sheet 50 of 89, DC Power System; Sheet 21 of 89, Boron Recycle System; Sheet 52 of 89, Vital 120V AC Power System; Sheet 34 of 89, Control Building Ventilation System; and power ascension test Sheet 11 of 39, Spent Fuel Pool Cooling System. Additionally, performance of the Pressurizer Spray Capability and Continuous Spray Flow Setting test, Sheet 13 of 39, from a plant trip at 100% power, has been modified to remove the 100% power requirement. Provide a discussion regarding the basis of deleting these tests in their entirety from the initial test program, and for the Pressurizer Spray test, the removal of performance of the test during a plant trip at 100% power.

   Response: The following preoperational and power ascension tests were deleted for the following reasons:

   - Sheet 43, Diesel Generator Building Ventilation System: The equipment was turned over to Unit 1. Ref: Drawing 1-47W866-9

   - Sheet 50, DC Power System: The equipment was turned over to Unit 1. Ref: Drawing 1-45W700-1

   - Sheet 21, Boron Recycle System: The principal components have been turned over to Unit 1 or abandoned per DCN 53387 (Ref. Drawings 47W809-2, 3, 4, 5, 6 and EDCR 2-53580). Proper operation of valves in the boric acid subsystem, flows to the in-service mixed bed and the cation demineralizer and boric acid transfer will be demonstrated during testing of the chemical and volume control system.

   - Sheet 52, 120V AC Power System Test: The equipment was turned over to Unit 1. Ref: Drawing 1-45W700-1

- Sheet 34, Control Building Ventilation: The equipment was turned over to Unit 1. Ref: Drawing 1-47W866-4

- Sheet 11 (Power Ascension), Spent Fuel Pool Cooling System: The equipment was turned over to Unit 1. Ref: Drawing 1-47W855-1

Performance of the Pressurizer Spray Capability and Continuous Spray Flow Setting test, Sheet 13 of 39, from a plant trip at 100% power, was modified to remove the 100% power requirement.

An editorial error introduced in Unit 1 FSAR Amendment 91 was subsequently corrected by deleting the performance of the test during a plant trip at 100% power. The Unit 2 FSAR was revised to be consistent with Unit 1. The Unit 1 test was performed in 1-PAT-3.2 with the prerequisite condition of MODE 3 prior to initial criticality.

3. EQVB 14.0-3: In Table 14.2-2 of Amendment 97 (Sheet 2 of 39) page 14.2-129, the index lists the Loss of Offsite Power test; however, no such test description is included. Provide a test summary for this test.

Response: Sheet 33 of Table 14.2-2 reads "TURBINE GENERATOR TRIP WITH COINCIDENT LOSS OF OFFSITE POWER TEST SUMMARY." Thus, the index is incorrect because "Loss of Offsite Power" was placed on a separate row in error. This error was corrected in Amendment 99 to the Unit 2 FSAR; the page number is now 14.2-128.

4. EQVB 14.0-4: Numerous preoperational and power ascension tests have been revised, modified, or completely deleted from Table 14.2-1 of Amendment 97. Provide an explanation to support such actions due to the staff's impression that the initial test program for Unit 2 is similar to that performed for Unit 1.

Response: The table of interest is actually Table 14.2-2. The initial test program for Unit 2 is similar to that performed for Unit 1. The majority of changes are due to turnover of equipment to Unit 1. The enclosed OSM includes an electronic version of explanations supporting the revisions, modifications or deletions.

PRELIMINARY RAIs for FSAR 14 (taken from e-mails from NRC dated 05/10/2010)

Chapter 14

1. Justify the deletion (Amendment 97) of the following test requirements from TEST METHOD on sheet 13 of 90:

   a. Verify proper operation of the fire suppression system, and obtain flow rates through the underground loop and differential pressure across the strainers.

   Response: Deletion of Test Method 2: The equipment was turned over to Unit 1. Ref: Drawing 1-47W832-2.

   b. Verify the Aqueous Film Forming Foam system proportioning equipment operates in accordance with design and vendor documents.

   Response: Deletion of Test Method 7: The equipment was turned over to Unit 1. Ref: Drawing 1-47W850-10.

   c. Verify that each enclosure which utilizes a CO_2 fire suppression system is provided with appropriate CO_2 concentrations in accordance with design requirements. The test will be performed by either an actual CO_2 discharge or by integration of enclosure air leakage data with previous CO_2 discharge test data. Air leakage data will be obtained by performing a pressurization test for the enclosure and measuring the air leakage to determine the CO_2 retention time.

   Response: Deletion of Test Method 8: The equipment was turned over to Unit 1. Ref: Drawings 1-47W843-1 and 2.

2. Justify limiting the testing of the ability of the fire pumps to supply water to only the "Unit 2 annulus and reactor building" at design flow and pressure. (Item 4 under "TEST METHOD" on sheet 13 of 90)

   Response: Test Method 4 was revised to identify the test scope remaining for Unit 2. This scope includes the Unit 2 Annulus, Reactor Building, and 713' elevation containment purge air exhaust filters, fans and control station. Other Unit 2 and common piping and equipment were turned over to Unit 1. Ref: Drawings 1-47W850-7, 9 and 13.

3. Justify the deletion (Amendment 97) of the following from ACCEPTANCE CRITERIA on sheet 14 of 90:

   a. The hydraulic performance of the High Pressure fire protection pumps meets or exceeds design requirements as described in FSAR Section 9.5.1.

   Response: Deletion of Acceptance Criteria 1: The equipment was turned over to Unit 1. Ref: Drawing 1-47W832-2.

   b. Carbon dioxide and Aqueous Film Forming Foam (AFFF) suppression system operate properly and in accordance with vendor documents and as described in FSAR Section 9.5.1.

   Response: Deletion of Acceptance Criteria 4: The equipment was turned over to Unit 1. Ref: Drawing 1-47W850-10.

ENCLOSURE 2

List of Files Provided on Enclosed Optical Storage Media (OSM)

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

File Name	Fill Size - Bytes
001 - Subsection 2.5 - Question 1 - Feb 6, 1984 Letter.pdf	123,022
002 - Chapter 12 - Question 6 - Calculations.pdf	18,345,397
003 - Chapter 12 - Question 8 - FSAR Change Package.pdf	1,107,971
004 - Chapter 12 - Question 8 - Calculation.pdf	1,389,919
005 - Chapter 14 - Question 4 - Supporting Information.pdf	141,069

ENCLOSURE 3

List of Regulatory Commitments

Tennessee Valley Authority - Watts Bar Nuclear Plant - Unit 2, Docket No. 50-391

1. The response to the following preliminary RAIs will be provided by June 18, 2010:
   - subsection 3.5.3: RAI 1;
   - subsection 3.10: RAIs 1, 2, 3, 4 and 5;
   - subsection 9.3.2: RAI 9.3.2-01;
   - Chapter 11: RAIs 3, 4, and 7;
   - subsection 11.3: RAIs 11.3-02, 11.3-03, and 11.3-05;
   - subsection 11.4: RAI 11.4-01;
   - subsection Chapter 12: RAIs 4 and 9; and
   - Chapter 14: RAI 1.
2. The response to Chapter 12 – RAI 6, states, in part, "The dose calculation for the alternate sampling of the reactor coolant and containment atmosphere for Unit 2 has not yet been completed but will use methodology similar to that described in the other calculations. This remaining calculation will be provided to the NRC by July 30, 2010."