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

June 8, 2011

Mr. Ashok S. Bhatnagar
Senior Vice President
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and Construction
Tennessee Valley Authority
6A Lookout Place
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SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 2 – REQUEST FOR ADDITIONAL INFORMATION REGARDING FINAL SAFETY ANALYSIS REPORT AMENDMENT RELATED TO SECTION 9.5.1 "FIRE PROTECTION SYSTEM" ROUND 5 (TAC NO. ME3091)

Dear Mr. Bhatnagar:

By letter dated January 11, 2010 (Agencywide Documents Access and Management System Accession No. ML100191732), the Tennessee Valley Authority (TVA) submitted Final Safety Analysis Report Amendment No. 97, which incorporates, by reference, the Watts Bar Fire Protection Report. TVA responded to earlier information requests relating to the Fire Protection Report through letters dated July 16, August 9, August 20, August 30, November 5, December 1, December 18, and December 20, 2010; and January 14, March 16 (two letters), March 31, May 6, and May 18, 2011.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information provided by TVA and has determined that additional information is needed to complete its review.

The requested information in these questions was discussed in a meeting held on May 12, 2011. Based on these discussions, TVA stated to NRC staff that responses would be completed by June 21, 2011. If the response will not be completed by June 21, 2011, a written request to the NRC for an extension, including justification, is required.

If you should have any questions, please contact me at 301-415-2048.

Sincerely,

Justin C. Poole, Project Manager
Watts Bar Special Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-391

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFROMATION

WATTS BAR NUCLEAR PLANT, UNIT 2

FIRE PROTECTION REPORT

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-391

- Draft versions of these requests for additional information (RAIs) were handed out for a May 12, 2011, public meeting with Tennessee Valley Authority (TVA), where they were discussed.

- A number of the RAIs involve modifications to the Fire Protection Report (FPR). This status is indicated at the end of the specific requests.

- In a number of the RAIs below, summary evaluations are requested. The following elements, as a minimum, are expected to be addressed by the summary: 1) identification of the issue evaluated; 2) a description of the evaluation method; 3) a discussion of key assumptions, including their bases; and 4) results of the evaluation.

- References to the "WBN [Watts Bar Nuclear Plant] Unit 2 MSO [Multiple Spurious Operation] Report, Revision 1" refer to the "WBN Unit 2 Multiple Spurious Operation Evaluation Report," Revision 1, which was submitted to the Nuclear Regulatory Commission on November 5, 2010.

RAI number format Example: [RAI FPR V-1]

RAI – RAI
FPR – topic or document from which the comment originates
V – Section of the document
-1 – Sequential comment for that section

RAI FPR III-14

Describe the procedural process that is in place to incorporate all necessary information from documents such as the FPR and the WBN Unit 2 MSO Report, Revision 1, into the documents that operators use for safe shutdown during and after a fire in the plant.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI FPR VI-5

Based on a sampling review, the staff has identified the following:

1. In Part VI of the as-designed FPR, room 713.0-A1C "Corridor, Column Lines U-W/A7-A9" is identified as part of Fire Area 1 (Analysis Volume AV-006 [Section 3.1.13.9]) and Fire Area 8 (Analysis Volumes AV-025C [Section 3.12.7.6] and AV-026A [Section 3.13.7.8]). Based on the definition of Fire Area, a specific room cannot be part of more than one Fire Area.

2. Part VI, Section 3.66.2 identifies the "RCW [Raw Cooling Water] Pump Area EL 728" as being part of Fire Area 60. However, examination of Section 3.66.3 "Fire Area 60 Safe Shutdown Analysis by Analysis Volume" shows that this room is not included in any of the Analysis Volumes for this Fire Area (AV-088, -089, and -090). By definition, the Analysis Volumes that comprise a Fire Area must account for all locations within the Fire Area.

3. Analysis Volume AV-112A appears in Part VI, Section 3.80.5.2 of the as-designed FPR, but does not appear in Part III, Table 3-3, and is not indicated on the previously provided as-designed compartmentation drawings.

The above identified items call into question the quality of the FPR. The scope and repetitive nature of these apparent errors calls into question the reviewability of this document.

Provide assurance that a comprehensive extent of condition review has been conducted to ensure the quality of the FPR.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI FPR VI-6

Part III, Section 10.3 "Analysis Volume Evaluation Methodology," of the as-designed FPR states: "The safe shutdown analysis is performed assuming that all components and cables in the analysis volume are damaged."

Further, Part VI, Section 2.2 "Summary of Safe Shutdown Analyses for the Fire Area," states, in part: "... all required safe shutdown cables and components in the AV [Analysis Volume] are conservatively assumed damaged by the fire."

However, it appears that the evaluations for a number of Analysis Volumes did not follow the above methodology.

Part IV, Section 3.1.13.4 "AV-004A," states, in part:

> AV-004 contains both RHR [residual heat removal] power feeds. Therefore, two separate analyses (AV-004A and AV-004B) are performed to address the use of either path depending upon on the location of the fire within this analysis volume.

A similar statement is in Section 3.1.13.5 "AV-004B."

The description of the plant areas covered by AV-004A and AV-004B are identical. The performance of two analyses in exactly the same area appears to contradict the description of the evaluation methodology described elsewhere in the FPR, as indicated by the above excerpts.

A sampling review of Part VI of the FPR found that similar conditions exist for the paired Analysis Volumes AV-004AC and AV-004BC, as well as in AV-117. Additional instances may exist.

Provide a summary evaluation and technical justification for all Analysis Volumes that do not rigorously follow the identified evaluation methodology.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI FPR VI-7

In Part III, Table 3-3 "Analysis Volume by Fire Area List," of the as-designed FPR, the "Inside Crane Wall" and "Outside Crane Wall" components of Analysis Volumes in Fire Area 77 are noted with quadrant ranges (e.g., 0-90, 180-270, etc.). However, in Part VI, Section 3.84.3 "Fire Area 77 Safe Shutdown Analysis by Analysis Volume," these quadrant ranges are not present in any of the Analysis Volumes for the lower containment area.

Resolve the conflict in Analysis Volume descriptions. If the descriptions with the "quadrant" designations are correct, provide a technical justification for limiting the Analysis Volumes in this manner.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI VI-8

Part VI, Section 2.2 "Summary of Safe Shutdown Analyses for the Fire Area," of the as-designed FPR states, in part: "i) Identification of the power systems and major equipment affected and credited for a fire in the AV; ..." [emphasis added] [pg. VI-3 of the January 14, 2011, version of the FPR].

The term "major equipment" is not defined in the FPR.

Provide a definition of this term. Also, provide examples of safe shutdown components that fall under the definition and those that do not.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI FPR VII-9

Part VII, Section 2.6.3 "Justification for Auxiliary Bldg HVAC, Stair, Elevator and Hatch Penetrations," of the FPR, states, in part: "As documented in Section 2.4 of this Part, the cables are provided with appropriately sized circuit protective devices (breakers and fuses)."

The staff could not locate this information in Part VII, Section 2.4 "Intervening Combustibles," of the FPR. Provide more detail concerning the location of this information within Part VII, Section 2.4. If the information does not exist in Section 2.4, resolve the conflict.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI FPR VII-10

Part VII, Section 4.3 "Manual Hose Stations," of the as-designed FPR is an evaluation of the acceptability of hose stations with installed hose lengths greater than the allowed 75 feet. This

section states, in part: "These hose installations are pre-operationally tested to ensure that sufficient pressure is available at the standpipe to compensate for the additional lengths of 1½-in [inch] fire hose."

Confirm that this statement is still correct in light of the pipe corrosion and fouling identified in RAI FPR VII-2.

RAI FPR VII-11

Part VII, Section 5.2 "Sliding Fire Doors with Fusible Links on One Side of Door Only," of the as-designed FPR evaluates two sliding fire doors related to the Diesel Generator Building Lube Oil Storage Room, doors D7A and D8A.

An examination of Part II, "Table 14.8.1 Fire Doors," and Part VI of the as-designed FPR did not locate any entries for door D7A.

Resolve this conflict. If there are, in fact, two doors, ensure that the evaluation in Part VII, Section 5.2, correctly differentiates between the two doors and addresses the individual environment of each.

RAI FPR X-1

A change was made to Part X, Section 3.2.2 "NFPA [National Fire Protection Association] 11B-1977: Foam-Water Sprinkler Systems," of the as-designed FPR, so that it now states, in part: "... (some system 67 piping and valves are located in the Additional Diesel Generator Buildings, but they are not required for fire safe shutdown)."

The term "system 67" is not used elsewhere in the FPR.

It appears that this change was made between Revision 40 and the January 14, 2011, version of the FPR.

Define the term "system 67" and identify, at a high level, the role of these components in fire safe shutdown. Explain why the components installed in the Additional Diesel Generator Buildings are not required for fire safe shutdown.

RAI FPR X-2

Part X, Section 3.3.2 "NFPA 20-1973: Centrifugal Fire Pumps," of the as-designed FPR, states, in part: "The electric motor driven HPFP [high pressure fire protection] pumps fulfill the safety function of supplying emergency cooling water during a flood mode condition."

The term "flood mode" is not defined in the FPR.

Define the term "flood mode" and identify, at a high level, the effects this configuration has on the fire water supply system and on fire safe shutdown.

RAI FPR X-3

Inconsistencies have been identified in Part X, Section 3.3.1 "NFPA 15-1973: Water Spray Fixed Systems for Fire Protection," of the as-designed FPR.

- Section 3.3.1 states, in part: "However, NFPA 15-1975 forms the design basis of the water spray systems."
  - In the rest of the FPR, NFPA 15-1973 is identified as the code of record, not NFPA 15-1975.
  - NFPA 15-1975 does not exist.
- Section 3.3.1.2 states in part: "In accordance with NFPA 15, Section 4-4.1.2, a design density was determined for this unique application based on analysis of the combustibles."
  - Section "4-4.1.2" does not exist in NFPA 15-1973.

Correct these inconsistencies.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI MSO-7

The term "compliance strategy" is used throughout the WBN Unit 2 MSO Report, Revision 1, but is not defined in that document or the FPR.

Provide the definition of the term "compliance strategy." Identify what compliance is being measured against, for example specific guidance or regulations.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI MSO-8

Appendix A, Section 46.3.2, of the WBN Unit 2 MSO Report, Revision 1, states:

> Overall long term resolution in addition to that mentioned above is to include in the FSSD [fire safe shutdown] analysis all cables that could spuriously start or prevent removing a large load to/from an EDG [emergency diesel generator]. These cables would be analyzed with the specific EDG for which they are associated.

Confirm the cables will continue to be analyzed in accordance with the Regulatory Guide (RG) 1.189 guidance to address multiple fire induced circuit failures after being included in the FSSD analysis. If not, provide the technical justification for not continuing to use the RG 1.189 guidance.

RAI MSO-9

Describe the means of tracking the cable analysis method used for each cable after the cables are added to the post-FSSD analysis.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI MSO-10

Confirm that the Unit 2 scenario resolution actions will be completed prior to the Unit 2 fuel load for all MSO scenarios affecting Unit 2.

RAI MSO-11

Appendix A, Section 54b.3.1 of the WBN Unit 2 MSO Report, Revision 1, states, in part: "The control building is an alternative shutdown area. For control building fires the control room will be abandoned and safe shutdown achieved from the backup control stations." [emphasis added] This statement is repeated in other sections of the WBN Unit 2 MSO Report, Revision 1.

Part IV, Section 1.0, "Introduction" of the as-designed FPR contains the following sentence: "The Appendix R compliance strategy for the control building is based on ensuring alternative shutdown capability for those fires in the building that could result in abandonment of the main control room (MCR)." [emphasis added]

The staff sees a conflict in that the second statement indicates that there exists a range of fires that will not cause MCR abandonment, while the first indicates that the MCR will be abandoned in all cases.

Resolve the conflicts between these statements concerning control room abandonment. Ensure that an extent of condition review has been performed to ensure that other, similar, references to control building fires and control room abandonment have been identified and resolved.

This RAI may involve an update to the FPR to incorporate the response to the RAI.

RAI MSO-12

Appendix A, Section 19.3.1, of the WBN Unit 2 MSO Report, Revision 1, states, in part:

> Reactor Upper Head Vent valves 2-FSV-68-394-A, -395-B, -396-B, -397-A are administratively closed (Modes 1 through 4) with control circuits disabled (switch 2-SW-68-394, -395 are in "off" position). In addition, the power cables for 2-FSV-68-396, -397 are routed in dedicated conduits with no energized circuits and cables are protected at penetrations with radiant energy shields.

Confirm that the power cables for 2-FSV-68-396, -397 are protected at penetrations with radiant energy shields inside containment only. If not, provide a technical justification and summary evaluation for any cables protected with radiant energy shields at penetrations outside

containment. Additionally, identify whether these cables run in dedicated conduits either inside containment, outside containment, or both.

RAI MSO-13

Describe the process that is in place to ensure that information regarding MSO resolutions is incorporated into the FPR and other plant documents. One example of such information would be ensuring that all operator manual actions relied on for MSO resolutions are incorporated into the FSSD analysis and the FPR.

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