



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

May 23, 2011

Mr. Ashok S. Bhatnagar
Senior Vice President
Nuclear Generation Development
and Construction
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 2 – REQUEST FOR ADDITIONAL
INFORMATION REGARDING FINAL SAFETY ANALYSIS REPORT
AMENDMENT RELATED TO SECTION 9.5.1 “FIRE PROTECTION SYSTEM,”
ROUND 4 (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), and March 31, 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 April 22, 2011. Based on these discussions, TVA stated to NRC staff that responses would be completed by May 27, 2011. If the response will not be completed by May 27, 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,

A handwritten signature in black ink, appearing to read "Justin C. Poole", written over a horizontal line.

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 INFORMATION

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 a handout for an April 22, 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 Revision 5 of the FPR refer to the version of the FPR that was submitted to the Nuclear Regulatory Commission (NRC) and reviewed as part of NRC Supplemental Safety Evaluation Reports 18 and 19. In alignment with TVA's revision control process, specific pages of the FPR are marked with the last revision to change that page, so the individual pages in Revision 5 of the FPR may be marked "Revision 1" through "Revision 5."

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 II-6.1

In TVA's response to RAI FPR II-6, the carbon dioxide fire suppression systems at Watts Bar Nuclear Plant (WBN) were divided into two groups: those for "Appendix R fire protection" and those for "property protection only."

However, it appears that a number of these "property protection" systems are relied on as part of the justification of acceptability of "deviations," for example, Part VII, Sections 4.6 and 5.2 of the FPR.

Describe the differences in the treatment of the two groups of systems as far as maintenance, testing, surveillances, etc. Additionally, describe any differences in the TVA response to a system actuation between the two populations.

RAI FPR II-41

There is no information in Part II, Section 12.2 "Standpipes, Hose Stations, and Hydrants," of the as-designed FPR, regarding the seismic qualification of the standpipes and hose stations installed to protect areas containing Unit 2 safe shutdown equipment.

A related section of the FPR is Part VIII, entry E.3.d [pg. VIII-47 of the January 14, 2011, version of the FPR]. RAI FPR VIII-17 is related to this topic.

Provide details regarding the seismic qualification of the standpipe and hose station systems, as well as the water supply system that supplies it, that are installed in areas containing Unit 2 safe shutdown equipment.

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

RAI FPR II-42

Identify all the electrical raceway fire barrier system materials (Thermo-Lag, HEMYC, etc.) used or planned to be used to provide separation for or protect Unit 2 safe shutdown cables or equipment.

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

RAI FPR IV-4

Provide the criteria for the decision to abandon the Main Control Room (MCR) and transfer control of the plant to the Auxiliary Control Room. Detail the assumptions that support the above criteria.

Discuss how the potential for cable damage and cable faults in the period between the start of the fire and the decision to abandon the MCR is addressed in the safe shutdown analysis.

Discuss the shutdown of both units for the case of a fire in the Control Building where the decision to abandon the MCR has not been made. Include discussion of the potential for cable and equipment damage and cable faults.

RAI FPR V-12

Enclosure 2 to TVA's March 31, 2011, letter included a description of the criteria used to ensure that Unit 2 operator manual actions (OMAs) are feasible and reliable.

1. In the section titled, "Unit 2 OMA Feasibility and Reliability," element 2, which describes the environmental factors considered, does not include a description of how these factors demonstrate feasibility and reliability.

Provide a technical explanation of how the environmental factors are used to establish feasibility and reliability. Where environmental factors impact the performance of the operator manual actions, provide a technical justification of how the manual actions have been demonstrated to be feasible and reliable.

2. Provide a description of the minimum defense-in-depth features (combustible controls, combustible loading, detection, suppression, etc.) that are available in the fire area of origin where manual actions are relied upon.

For areas that lack robust defense-in-depth, such as no detection, suppression, etc., provide a description of how that reduced defense-in-depth is compensated by other defense-in-depth features. For example, if an area lacks suppression perhaps a more robust detection system or more than the 100-percent time margin is available.

3. The RAI response discusses an assumption of 100-percent time margin for OMAs.

However, a 100-percent margin may not be sufficient for manual actions of short diagnosis plus performance time. For example, an easily diagnosed and performed action may occur in 3 minutes, which would equate to an allowable time of 6 minutes. This 3-minute margin may not be sufficient to demonstrate reliability.

Provide a description of how reliability is assured for short diagnosis plus performance times.

4. The section of the RAI response titled, "Safe Shutdown Procedures," states, in part:

The decision to declare an Appendix R fire and to trip the unit(s) is left to the judgment of the Unit SRO [Senior Reactor Operator]/Shift Manager and must be based on the magnitude of the fire and its potential effect on the System Structures and Components necessary to achieve and maintain cold shutdown.

Confirm that the procedures are based on both magnitude and effect. Also, confirm that hot shutdown capability is considered in addition to cold shutdown capability.

Also, provide the basis for the assurance that the judgment of the Unit SRO/Shift Manager will be timely enough to perform preventive manual operator actions to assure that safe shutdown capability can be maintained during and after a fire.

RAI FPR VII-2

Part VII, Section 3.3 "Adequacy of HPFP [high pressure fire protection] Pumps," of the as-designed FPR states, in part,

The fire suppression system design criteria incorporated into the hydraulic calculations include the required fire protection water flow and pressure for the most hydraulically remote location of each system, hose stream application (500 gpm), and those portions of the RSW [raw service water] loads that are not automatically isolated from the fire protection water system upon fire pump start due to a fire in safety-related areas. Four conditions are evaluated in the calculations to demonstrate hydraulic capabilities with clean pipe and corroded pipe to reflect a 40 year service life with and without a single impairment. Clean pipe calculations were based on actual pipe inside diameters and a Hazen-Williams C-factor of 100. Corroded pipe calculations were based on actual pipe inside diameters minus 8/10ths of an inch and a C-factor of 55 (i.e., the expected condition at the end of a 40 year service life). [emphasis added] [pg. VII-36 of the January 14, 2011, version] {1}

and

The results of corroded pipe calculations demonstrate that approximately the highest hose stations of four standpipe systems (serviced by 8 FCVs [flow control valves]) may not be capable of providing their design basis flows at 40 years. These systems are, however, capable of providing design basis flows for a number of years and will be trended to ensure functionality. [emphasis added] [pg. VII-36 of the January 14, 2011, version] {2}

and

To address the adequacy of the specific standpipe systems that may not provide design basis flows at 40 years, WBN will perform start-up flow tests on the specific systems to assure that adequate flow and pressure can be delivered. This start-up testing will become the hydraulic baseline for the systems. Flow tests will be conducted once per cycle to ensure the systems can meet design basis requirements. The data will be trended to promote corrective actions prior to the systems becoming inoperable. [emphasis added] [pg. VII-36 of the January 14, 2011, version] {3}

and

WBN will trend the performance of the HPFP system, and the specific standpipe systems that may not provide design basis flow for 40 years, to promote corrective actions prior to the systems becoming inoperable. [emphasis added] [pg. VII-37 of the January 14, 2011, version] {4}

Part II, section 12.1 "Water Supply," of the as-designed FPR, states, in part:

The HPFP system is normally pressurized by the raw cooling water (RCW) system when the fire pumps are not running. The RCW system is automatically isolated when a fire pump starts. [emphasis added] [pg. II-28 of the January 14, 2011, version] {5}

and

The high pressure fire protection system is shared with the raw service water (RSW) system. Automatic isolation valves are provided to isolate selected large raw service water loads from the HPFP system when any fire pump is started. Specific RSW loads are automatically isolated from the fire protection water system when the fire pump(s) start due to a fire in safety-related areas to reduce the RSW load on the fire protection system to ensure adequate flow and pressure is available. [emphasis added] [pg. II-28 of the January 14, 2011, version] {6}

NRC Information Notice 2006-17 "Recent Operating Experience of Service Water Systems Due to External Conditions" states, in part (concerning WBN):

The licensee identified silt accumulation in portions of systems providing raw cooling water for both essential and nonessential purposes and for high pressure

water for fire protection. These accumulations were identified in both stagnant and active cooling water lines, typically in system low points and in pipng with low water velocity. In 1999 and 2002, clam accumulations resulted from missed biocide treatments. The licensee implemented periodic ultrasonic testing and flushing to identify and minimize blockages due to silt and clam accumulations. The initial frequency of ultrasonic testing was every 6 months, later shortened to every 3 months. However, the licensee determined that this program did not cover all susceptible lines and components. [emphasis added] [pg. 3] {7}

1. Identify the year that the fire water system went into service (that is the beginning of its service life). Excerpt {1} above.
2. Identify the pipe types used in the fire water system (the FPR discusses cement lined cast iron (outer loop) and unlined steel), and the maintenance program and degradation history of each.
3. Identify the standpipe systems described in the quoted text above, and also identify the locations of the affected hose stations and the safe shutdown or safety-related equipment that they protect. Excerpts {2} and {3} above.
4. Describe the results of the trending that is identified above. Discuss whether the trend is better or worse than that first calculated. In the discussion identify details of pipe type, typical flow seen, and systems affected. Excerpts {2}, {3}, and {4} above.
5. Discuss the corrective actions that are planned or have been taken to resolve identified fire water distribution issues. Describe the root cause for any past or ongoing corrective actions (pipe replacement due to corrosion, pin hole leaks, pipe thinning, etc.; water treatment (due to microbiologically influenced corrosion); etc.) and provide assurance that the fire water system will maintain operability over the life of Unit 2, for all pipe types and uses related to the fire water system. Excerpts {3} and {4} above.
6. Discuss the affect the additional system lifetime (due to Unit 2 operation) will have on trending and needed corrective actions. Excerpts {1}, {2}, {3}, and {4} above.
7. Discuss the typical RSW loads that the fire water system sees when the fire water system is not operating (i.e., when the fire pumps are not operating). Discuss the affect that this flow has on pipe degradation in the fire protection water supply system. Excerpts {1}, {5}, and {6} above.
8. Describe the actions taken to resolve the issues identified in NRC Information Notice 2006-17. Provide assurance that all susceptible lines and components are covered by appropriate testing and maintenance activities. Excerpt {7} above.

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

RAI FPR VII-3

A change was made to Part VII, Section 2.5, "Partial Fire Wall Between CCS [Component Cooling System] Pumps," of the as-designed FPR to add the following text to the second paragraph under "Justification" [pg. VII-10 of the January 14, 2011, version]:

... associated with each of the two Unit 1 AFW [auxiliary feedwater] pumps (there is approximately 12 feet separating the closest pumps – 1A-A AFW pump from 1AA CCS pump. The fire safe shutdown analysis considered both pumps lost for a fire near them). [emphasis added]

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

This text seems to be applicable only to Unit 1. Is there a similar configuration for the Unit 2 pumps? If so, provide that information. If not, justify why not.

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

RAI FPR VII-4

It appears that Part VII, Section 2.8 “Reactor Coolant Pump Oil Collection System,” of the as-designed FPR is written for single-unit operation. For example the correct number of reactor coolant pumps (if both units are considered) is eight not four.

Ensure that this and the other evaluations and deviations in Part VII correctly take into consideration dual-unit operation.

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

RAI FPR VII-5

Part VII, Section 3.4 “Large Fire Dampers,” of the as-designed FPR states, in part: “The overall damper size to protect the openings is 98_-inches wide by 24½-inches high.” [pg. VII-37 of the January 14, 2011, version of the FPR]

The Revision 5 version of the same text is as follows: “The overall damper size to protect the openings are 98 5/8-inches wide by 24 1/2-inches high.” [emphasis added]

It appears that the 5/8 fraction has been dropped in the as-designed version.

Similar situations exist on the next page [VII-38 of the January 14, 2011, version of the FPR] in items 1 and 2.

Correct these errors. Ensure that an extent of condition review has been performed to ensure that other similar instances are identified and corrected.

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

RAI FPR VII-6

Part VII, Section 4.1 “Fire Doors,” of the as-designed FPR, references, on page VII-41 of the January 14, 2011, version, Figures VI-5 and VI-10.

It is known, from previous RAI responses, that these are erroneous references.

Correct these errors. Ensure that an extent of condition review has been performed to ensure that other similar instances are identified and corrected.

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

RAI FPR VIII-2

A change was made to Part VIII, entry A.9, "Plant Conformance," of the as-designed FPR so that it now states, in part: "Simultaneous fires are not postulated." [pg. VIII-7 of the January 14, 2011, version]

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

What is the definition of the term "simultaneous fires"? Is this term intended to indicate fires in separate fire areas, or one fire in one fire area that affects both units? If it's the latter, provide a justification for excluding these scenarios from the analysis. Also, discuss how multicompartment fires were considered in the analysis.

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

RAI FPR VIII-3

A change was made to Part VIII, entry B.1, "Appendix A Guidelines," of the as-designed FPR to change the text from "NFPA [National Fire Protection Association] 4A - Organization for Fire Department" to "NFPA 4A - Organization for Fire Brigade." [emphasis added] [pg. VIII-8 of the January 14, 2011, version]

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

This change is not consistent with the text of Appendix A of the Branch Technical Position. Correct this error. Ensure that an extent of condition review has been performed to identify and correct other similar instances.

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

RAI FPR VIII-4

A change was made to Part VIII, entry B.5.d, "Alternatives," of the as-designed FPR so that it now states, in part: "As discussed in Part X, NFPA is an outdated code; therefore, refer to Part II of the FPR." [pg. VIII-13 of the January 14, 2011, version]

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

Is the "NFPA" in the above statement intended to indicate NFPA 27? If so correct the entry. If not, clarify the entry.

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

RAI FPR VIII-5

Provide plant conformance information for the WBN utilization of the standards identified in the text of Part VIII, entry B.5.d, "Appendix A Guidance," on page VIII-14 of the January 14, 2011, version of the FPR.

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

RAI FPR VIII-6

A change was made to Part VIII, entry D.4.f, "Plant Conformance," of the as-designed FPR to change the discussion of "access and egress routes" to "access and egress points." [pg. VIII-33 of the January 14, 2011, version]

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

It is the NRC position that there is a difference between access and egress "routes" and "points."

Provide a justification for this change in light of the text of the Appendix A guidance.

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

RAI FPR VIII-7

A change was made to Part VIII, entry D.5, "Appendix A Guidelines," of the as-designed FPR to change the text from "... two-way voice communication ..." to "... two-way voice communications ..." [emphasis added] [pg. VIII-35 of the January 14, 2011, version]

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

This change is not consistent with the text of Appendix A of the Branch Technical Position. Correct this error. Ensure that an extent of condition review has been performed to identify and correct other similar instances.

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

RAI FPR VIII-8

A change was made to Part VIII, entry E.3.a, "Remarks," of the as-designed FPR so that it now states, in part: "Where no fixed suppression is installed, the standpipe and hose station or adjacent fire hydrants are considered the primary system and other independent standpipe and hose stations or yard hydrants are the backup." [emphasis added] [pg. VIII-44 of the January 14, 2011, version]

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

Identify the Fire Areas and Analysis Volumes where fire hydrants are the primary fire suppression systems. Confirm that the required hydrants are appropriately identified as required in the FPR.

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

RAI FPR VIII-9

A change was made to Part VIII, entry F.1.b, "Alternatives," of the as-designed FPR so that it now states, in part: "Fire brigade and appropriate operations personnel are trained in the use and location of self-contained breathing apparatus. Refer to Part II of the FPR." [emphasis added] [pg. VIII-53 of the January 14, 2011, version]

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

The reviewers could not locate this information regarding operations personnel training in Part II of the FPR. Provide more detail concerning the location of this information within Part II. If the information does not exist in Part II, resolve the conflict.

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

RAI FPR VIII-10

A change was made to Part VIII, entry F.2, "Appendix A Guidelines," of the as-designed FPR to change the text from "...Exposure fire involving combustibles in the general room area. ..." to "...Exposure fire from combustibles in the general room area. ..." [emphasis added] [pg. VIII-54 of the January 14, 2011, version]

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

This change is not consistent with the text of Appendix A of the Branch Technical Position. Correct this error. Ensure that an extent of condition review has been performed to identify and correct other similar instances.

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

RAI FPR VIII-11

A change was made to Part VIII, entry F.8, "Alternatives," of the as-designed FPR so that it now states, in part: "The turbine oil tank hazards are protected by fixed water spray systems." [emphasis added] [pg. VIII-62 of the January 14, 2011, version]

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

Provide a technical justification for the change in protected hazards between "turbine oil hazards" and "turbine oil tank hazards."

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

RAI FPR VIII-12

A change was made to Part VIII, entry F.14, "Alternatives," of the as-designed FPR so that it now states, in part: "Manual hose stations (located in room 729.0-A6) and hand held portable extinguishers are available." [emphasis added] [pg. VIII-62 of the January 14, 2011, version]

However, the analysis in Part VI, section 3.16.1, credits a hose station in room 729.0-A5.

Resolve this conflict. Ensure that an extent of condition review has been performed to ensure that other similar instances are identified and corrected.

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

RAI FPR VIII-13

A change was made to Part VIII, entry F.16, "Alternatives," of the as-designed FPR so that it now states, in part: "Yard hydrants are strategically located for providing protection to the refueling water storage tanks and the primary water storage tanks." [emphasis added] [pg. VIII-70 of the January 14, 2011, version]

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

Confirm that the required hydrants are appropriately identified as required in the FPR.

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

RAI FPR VIII-14

A change was made to Part VIII, entry F.17, "Plant Conformance," of the as-designed FPR to add the following text: "Yard hydrants are available to support manual fire suppression activities around the cooling towers." [pg. VIII-70 of the January 14, 2011, version]

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

Confirm that the required hydrants are appropriately identified as required in the FPR.

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

RAI FPR VIII-15

Provide the summary evaluation supporting the deviation described in the "Remarks" portion of the D.1.d entry of Part VIII of the as-designed FPR. [pg. VIII-19 of the January 14, 2011, version]

Provide a justification regarding why this evaluation is not included in the appropriate section of Part VII of the FPR, or add it to that section.

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

RAI FPR VIII-16

Part VIII, entry B.3.c, "Appendix A Guidance," of the as-designed FPR states, in part: "Their possible and probable use should be considered in the fire hazard analysis to determine the adequacy of the installed fire protection systems." [pg. VIII-10 of the January 14, 2011, version]

However, no plant conformance information is provided for this portion of the guidance.

Confirm that the possible and probable use of combustible materials (as described earlier in the B.3.c guidance entry) has been considered in the fire hazards analysis to determine the adequacy of the installed fire protection systems.

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

RAI FPR VIII-17

Provide plant conformance information for the detailed guidance regarding seismically qualified standpipes and hose stations in Part VIII, entry E.3.d, "Appendix A Guidance," on page VIII-47 of the January 14, 2011, version of the FPR.

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

RAI FPR VIII-18

Provide plant conformance information for the guidance regarding primary and secondary containment in Part VIII, entry F.1.a, "Appendix A Guidance," on pages VIII-51 and -52 of the January 14, 2011, version of the FPR.

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

RAI FPR VIII-19

Provide plant conformance information for the guidance regarding ventilation and drainage in radwaste areas in Part VIII, entry F.14, "Appendix A Guidance," at the top of page VIII-69 of the January 14, 2011, version of the FPR.

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

RAI FPR IX-1

Part IX, entry III.G.2.a, "Plant Conformance," of the as-designed FPR states, in part: "Structural steel required to support a required fire barrier is protected as discussed in Part II of the FPR." [pg. IX-9 of the January 14, 2011, version]

The reviewers could not locate this information in Part II of the FPR. Provide more detail concerning the location of this information within Part II. If the information does not exist in Part II resolve the conflict.

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

RAI FPR IX-2

Part IX, entry III.L.1 "Plant Conformance," of the as-designed FPR states, in part: "No fuel clad damage, rupture of any primary coolant boundary or rupture of the containment boundary will occur because these conditions are prevented from occurring following a fire in the control room and auxiliary instrument room." [pg. IX-15 of the January 14, 2011, version]

Confirm that the above statement is correct for fires in all alternate shutdown areas, not just the control room and (presumed Unit 1) auxiliary instrument room.

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

RAI MSO-1

Describe TVA's plans (schedule, level of detail, etc.) to incorporate multiple spurious operation (MSO) information (found, for example, in the "WBN Unit 2 Multiple Spurious Operation Evaluation Report") into the FPR.

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

RAI MSO-2

Section 1.0, "Purpose," of the "WBN Unit 2 Multiple Spurious Operation Evaluation Report," Revision 1 (hereafter referred to as the "WBN Unit 2 MSO Report, Revision 1"), which was submitted to the NRC on November 5, 2010 (ML103160419), states, in part:

This report provides the result of the evaluation of Watts Bar (WBN) Unit 2 for issues resulting from the publication of Nuclear Regulatory Commission (NRC) Regulatory Guide 1.189 Rev. 2 (RG 1.189) (Ref. 1). Specifically, Section 5.3 of RG 1.189 discusses an allowable approach to address multiple fire induced circuit failures.

Section 2.0, "Results," of the WBN Unit 2 MSO Report, Revision 1, states, in part: "Many of the resolutions were identified by the baseline post fire safe shutdown analysis (FSSD) and resulting plant modifications are in process."

Confirm that the resolutions that were identified by the baseline post fire safe shutdown analysis are consistent with the guidance in RG 1.189, which addresses multiple fire induced circuit failures.

Provide a summary evaluation and technical justification for any resolutions, safe shutdown compliance strategies, analyses or operator manual actions in the MSO evaluation that did not utilize the above referenced RG 1.189 approach.

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

RAI MSO-3

Appendix A, Section 22.3.1, of the WBN Unit 2 MSO Report, Revision 1, states, in part:

Based on the baseline FSSD analysis the following design change has been issued. A third "C" solenoid opposite train from the existing "A & B" solenoid valves is being added to the Unit 2 design. It is located in a separate fire zone and its cables are routed separately from the "A & B" solenoid valves for each PORV [power-operated relief valve].

Appendix B, "Unit 2 Resolutions," MSO #22, states:

Based on the baseline FSSD [analysis] the following design change has been issued. A third "C" solenoid opposite train from the existing "A & B" solenoid valves is being added to the Unit 2 design. It is located in a separate fire zone and its cables are routed separately from the "A & B" solenoid valves for each PORV.

The above MSO #22 section is typical of the other MSO resolutions in Appendix B and C in that they do not identify a scheduled or committed completion date. Appendix B and C have approximately 16 resolutions that address approximately 22 scenarios. These resolutions address items such as rerouting or protecting cables, modifying valve circuits, adding equipment, and revising engineering documents.

Confirm that all modifications and document revisions will be completed prior to the Unit 2 fuel load.

RAI MSO-4

Appendix A, Section 6.2, "Notes," of the WBN Unit 2 MSO Report, Revision 1, states, in part:

Also note that the letdown isolation valves and letdown orifice valves are often interlocked such that the isolation valves will not open without the orifice valves being open. Letdown failure to isolate can be a single spurious operation with interlocked valves.

Various "Notes" sections addressed possible single spurious actuation for scenarios.

Provide the specific methods used to incorporate any single spurious actuations, not presently analyzed in the FPR, into the post fire safe shutdown analysis.

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

RAI MSO-5

Appendix A, Section 53.2, "Notes," of the WBN Unit 2 MSO Report, Revision 1, states, in part:

This generic issue may have already been addressed during disposition of NRC Information Notice 92-18. This disposition should be reviewed in the context of multiple spurious operations and multiple hot shorts.

Appendix A, Section 53.3.2, "Resolution" of the WBN Unit 2 MSO Report, Revision 1, states:

For all MOVs [motor operated valves] required to be manually operated to achieve safe shutdown following a fire outside the control building, perform a

review to ensure that, if the limit/torque switch could be bypassed, the MOV motor torque will not damage the valve operator such that the valve cannot be manually operated.

Describe the specific circuit analysis methods used in the above analysis and how the analysis methods meet the RG 1.189 approach to address multiple fire induced circuit failures. Provide a technical justification for any of the circuit analyses not performed in accordance with the RG 1.189 approach.

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

RAI MSO-6

Appendix A, Section 54.3.1., of the WBN Unit 2 MSO Report, Revision 1, states:

Based on the baseline FSSD design changes have been issued to provide adequate physical separation between redundant sensing instruments and cables such that fire damage cannot cause a spurious engineering safeguards actuation signal (ESFAS) except for a control building fire. 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]

Typically, post-fire safe shutdown relies on the auxiliary control room to be the central control point when the control room has been abandoned. Based on the FPR Part II, item 14.10.j, the backup control station is for the operation of valves related to steam generators and AFW only. Explain the use of the term "backup control station" in this context. Also, resolve the apparent conflict between the concepts of shutting the units down (after MCR abandonment) from the auxiliary control room versus from the "backup control stations."

Ensure that an extent of condition review has been performed to ensure that other, similar instances have been identified and addressed as required.

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

May 23, 2011

Mr. Ashok S. Bhatnagar
Senior Vice President
Nuclear Generation Development
and Construction
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 2 – REQUEST FOR ADDITIONAL
INFORMATION REGARDING FINAL SAFETY ANALYSIS REPORT
AMENDMENT RELATED TO SECTION 9.5.1 “FIRE PROTECTION SYSTEM,”
ROUND 4 (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), and March 31, 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 April 22, 2011. Based on these discussions, TVA stated to NRC staff that responses would be completed by May 27, 2011. If the response will not be completed by May 27, 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,

/RA/

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

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*via memo

OFFICE	LPWB/PM	LPWB/LA	AFPB/BC	OGC/NLO	LPWB/BC
NAME	JPoole	BClayton	AKlein*	DRoth	SCampbell
DATE	5/11/11	5/16/11	4/25/11	5/23/11	5/23/11

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