



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

May 6, 2011

10 CFR 50.4

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

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

**Subject: WATTS BAR NUCLEAR PLANT (WBN) UNIT 2 – REQUEST FOR  
ADDITIONAL INFORMATION REGARDING “FIRE PROTECTION REPORT”  
(TAC NO. ME3091)**

**Reference: NRC Letter to TVA dated April 25, 2011, “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’  
(TAC NO. M/E3091)”**

The purpose of this letter is to respond to the referenced NRC request for information (RAI) pertaining to WBN Unit 1/Unit 2 Fire Protection Report (FPR). Enclosure 1 to this letter provides TVA's responses to NRC's questions.

Enclosure 2 provides the new Regulatory Commitments contained in this letter. If you have any questions, please contact William Crouch at (423) 365-2004.

I declare under the penalty of perjury that the foregoing is true and correct. Executed on The 6<sup>th</sup> day of May 2011.

Respectfully,

David Stinson  
Watts Bar Unit 2 Vice President

AOOL  
NRK

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Enclosures:

1. Response to NRC's Request for Information Regarding "Fire Protection Report"
2. Regulatory Commitments

Attachments to Enclosure 1:

1. Replacement Supporting Documentation for TVA Response 1. NRC Question RAI FPR General-6
2. Unit 1/Unit 2 As-Designed FPR, Part II, Table Titled: "Fire Pump Inoperability and Compensatory Actions"

cc (Enclosures):

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## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

Reference: 1. NRC Letter to TVA dated April 25, 2011, "Watts Bar Nuclear Plant (WBN) Unit 2 - Request for Additional Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1 'Fire Protection System' (TAC NO. ME3091)"

The following provides TVA's responses to the referenced NRC requests for information (RAI) pertaining to the WBN Unit 2 Fire Protection Report (FPR).

NRC's numbering system is referenced to identify each question. Some NRC questions have been subdivided for clarity of response.

#### **1. NRC Question (RAI FPR General-6)**

*A number of the pages in the supporting documents section of the "[Watts Bar Nuclear Plant] WBN Fire Protection Report Summary 6 thru 40" document are illegible. This document was submitted by TVA on December 20, 2010 (Agencywide Documents Access and Management System Accession Number ML 110060493).*

*One example is the section supporting FPR Revision 39 on pages 390 through 408.*

*Ensure that an extent of condition review has been performed to ensure that other, similar instances have been identified and corrected. Provide legible versions for all pages of this document.*

#### **TVA Response:**

TVA performed an extent of condition review of the supporting documents section of the "WBN Fire Protection Report Summary 6 thru 40," as submitted on December 20, 2010, and determined that only the supporting documents for FPR Amendment 39 were not legible. Accordingly, all of the supporting documents for FPR Amendment 39 have been replaced with legible documents and are contained in Attachment 1.

#### **2. NRC Question (RAI FPR II-12)**

*A change has been made to Part II, Section 12.10.5 "Fire Dampers," of the as-designed FPR to delete a reference to electro-thermal links for fire dampers. TVA's December 18, 2010, letter states that electro-thermal links are "not used in fire safe shutdown areas."*

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

*The use of electro-thermal links for fire dampers was specifically detailed in SSER 18. [1] Define "fire safe shutdown areas." This term is not used in the FPR. Discuss the differences between "fire safe shutdown areas" and "safety-related areas."*

*[2] Confirm that electro-thermal links are not used in fire safe shutdown areas.*

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#### TVA Response:

- [1] A "fire safe shutdown area" is a room, portion of a room, or group of rooms where a component required for safe shutdown due to a fire is located. A "safety-related area" is a structure (e.g., Auxiliary Building, Control Building, Intake Structure, Reactor Building, etc.) that contains a component required for safe shutdown due to a design basis event (DBE). A "fire safe shutdown area" does not have to be a safety-related area (e.g., Turbine Building or Yard). WBN sometimes uses the term "fire safe shutdown" and "analysis volume" interchangeably.
- [2] The change to Part II, Section 12.10.5 that deleted the reference to some dampers being provided with electro-thermal links (ETL) was made to clarify that none of the fire dampers in barriers required for fire safe shutdown have ETLs. A review of SSER 18 revealed only one reference to "electrothermal links" and that was due to the sentence in Section 12.10.5. A review of the system descriptions for the safety-related areas of the plant that are required for fire safe shutdown revealed there is no reference to ETLs on fire safe shutdown required fire dampers. This clarification does not change the required operation/function of the HVAC systems and their associated fire dampers.

#### **3. NRC Question (RAI FPR II-13)**

*Part II, Section 14.3.1.b.1 of the FPR describes Unit 1 specific operating requirements for water based suppression systems in the Unit 1 reactor building. No Unit 2 information is included, however. Section 6.14.3.1 indicates that this section should be applicable to both units.*

*[1] Provide the appropriate Unit 2 information. [2] 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.*

#### TVA Response:

- [1] Part II, Section 14.3.1.b.1 of the FPR should state: "For either Reactor Building...".
- [2] A review of the FPR revealed three other places where the discussion concerns both units:
1. Table 14.3, item 14.3.c should read: "... Unit 1 and 2 Containment Purge Air Exhaust Filters, ...".
  2. Part III, Section 4.7, third paragraph should read: "The CCS system provides cooling for the following safe shutdown equipment per unit." The CCS system equipment is for both units.
  3. Part IV, Section 3.3, second sentence should read: "The number in ( ) is the number available for shutdown." This deletes the reference to Unit 1 only.

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These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR.

#### **4. NRC Question (RAI FPR II-14)**

*Changes have been made to Part II, Table 14.10, "Fire Safe Shutdown Equipment," and to Part II, "Testing and Inspection Requirements (TIR)" table, element 14.10.e, of the as-designed FPR to eliminate the entries for the Component Cooling System (CCS) Pump 2B-B. This piece of equipment is credited in numerous Analysis Volumes in Part VI. Examples include, but are not limited to: AV-023, AV-024, and AV-050.*

*This change also affects Part II, Section B14.10.e.*

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

*Resolve the conflict that equipment relied on in Part VI is not included in Table 14.10 and the TIR table. Ensure that an extent of condition review has been performed to ensure that other, similar instances have been identified and resolved.*

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

#### **TVA Response:**

The Unit 2 CCS Pump (2B-B) was included in the Appendix R Operational Requirements (OR) during Unit 1 only operation because it was not included in the plant Technical Specification requirements. For dual unit operation, CCS Pump 2B-B will be returned to its Unit 2 functional role and will be included in the Technical Specification Bases Section 3.7.7. Therefore, separate Appendix R operational requirements are not needed and have been removed from the OR section of the FPR.

#### **5. NRC Question (RAI FPR II-15)**

*A change has been made to Part II, Table 14.1 "Fire Detection Instrumentation" of the as-designed FPR that deletes the Auxiliary Building detection zone 147 entry.*

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

*Provide a summary evaluation and technical justification supporting this change.*

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

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#### **TVA Response:**

The deletion of detection zone 147 was a typographical error that occurred during the revision of the table to add the Unit 2 zones. This has been corrected. A review of Table 14.1 was conducted and verified that the list of detection zones was complete with no further changes required.

#### **6. NRC Question (RAI FPR II-16)**

*A change has been made to Part II, Table 14.1 "Fire Detection Instrumentation" of the as-designed FPR report that creates an entry for zone 413 "Unit 2 Motor Driven AFW [Auxiliary Feedwater] Pumps." While the other entries in the Table exhibit a remarkable "Unit 1/Unit 2" mirroring, in this case, there does not appear to be a corresponding Unit 1 zone.*

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

*Confirm that the entry for zone 413 is correct in Table 14.1, and discuss the possible discrepancy regarding the apparent lack of a corresponding Unit 1 zone.*

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

#### **TVA Response:**

Table 14.1 contains detectors that are for protection of components and areas required for fire safe shutdown. The detection zone 413 contains the detectors provided for the Motor Driven Main Feedwater Pump located in the Turbine Building. The Motor Driven Main Feedwater Pump is not required for fire safe shutdown; therefore, this line item for zone 413 is deleted from Table 14.1.

These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR.

#### **7. NRC Question (RAI FPR II-17)**

*A change has been made to Part II, Table 14.1 "Fire Detection Instrumentation" of the as-designed FPR that creates an entry for zone 153 "Add. Eqpt. Bldg., U2 EL 763.5." In general, the entries in Part II, Table 14.1 "Fire Detection Instrumentation" of the as-designed FPR exhibit a remarkable "Unit 1/Unit 2" mirroring. However, in this case, the added Unit 2 entry notes four smoke detectors, while the corresponding Unit 1 entry (zone 154) has six.*

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

*Confirm that the number of detectors listed in Table 14.1 is correct for zones 153 and 154, and discuss the apparent discrepancy in the number of detectors between the two zones.*

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

#### **TVA Response:**

As shown on the compartmentation drawing (Figure II-38A), the Unit 2 room (763.5-A2) is smaller than the Unit 1 room (763.5-A1); therefore, it only requires four detectors for adequate coverage, while the larger Unit 1 room requires six detectors. The number of detectors listed in Table 14.1 is correct for zones 153 and 154.

#### **8. NRC Question (RAI FPR II-18)**

*A change has been made to Part II, Table 14.8.2 "Fire Dampers" in the as-designed FPR in the entry for damper 2-1SD-31-3872. The entry was changed to indicate that the damper lies between rooms 713.0-A29 and 737.0-A8 rather than 737.0-A9 and 737.0-A8. This is in conflict with the entry in Part VI, Section 3.19.4, of the as-designed version, which aligns with the unchanged description of the fire damper location.*

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

*Resolve this conflict. Ensure that an extent of condition review has been performed to ensure that other, similar instances have been identified and resolved.*

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

#### **TVA Response:**

Part II and Part VI were corrected to show the damper (2-1SD-31-3872) is in the fire barrier separating rooms 713.0-A29 (not 737-A9) and 737.0-A8. This discrepancy was identified during the Unit 2 Part VI update submitted in March 16, 2011 submittal. A review of the flow diagrams and physical drawing for the HVAC systems confirmed that the other dampers and their locations are correct. A review of the fire damper inspection procedure (0-FOR-304-3, Appendix C) determined the damper is and has been inspected periodically, as required.

These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR. Additionally, as a result of the extent of condition review, a PER has been initiated to address this discrepancy on Unit 1.

#### **9. NRC Question (RAI FPR II-19)**

*A change has been made to Part II, Table 14.8.2 "Fire Dampers" in the as-designed FPR in the entry for a 3 hour rated damper between rooms 772.0-A1 and 772.0-A7. The entry was changed to indicate that the damper is rated for 1.5 hours. Additionally, the damper identification number was changed from 1-1SD-31-2516 to 1-1SD-31-2561. This change is in*

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*conflict with the entries in Part VI [pages VI-583 and VI-626 of the January 14, 2011, version] which aligns with the unchanged version.*

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

*Resolve the conflicts regarding the damper rating and identification number. Ensure that an extent of condition review has been performed to ensure that other, similar instances have been identified and resolved.*

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

#### **TVA Response:**

A review of the HVAC configuration control drawings (47A381 series, 47W866 series, and 47W920 series) has been performed to determine the correct identification number and fire resistance rating of the damper. The correct damper number is 1-1SD-31-2516 and correct fire rating of the damper is 3 hours. A review of the damper information contained in Table 14.8.2 against the Damper tables provided in Part VI has also been completed. The information in the tables (Table 14.8.2 and Part VI Damper tables) has been verified and the discrepancies corrected.

These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR.

#### **10. NRC Question (RAI FPR II-20)**

*References 4.2.19 "WBPE-026-9208002 -Appendix R -High Pressure Fire Protection Cable Separation Analysis" and 4.2.21 "WBPE063201005 [sic] -Appendix R -Safety Injection Analysis" that were included in Revision 5 of the FPR appear to have been deleted from the FPR Part II reference list in Revision 10.*

*Describe, at a high level, where the information that was formerly located in these documents currently resides.*

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

#### **TVA Response:**

Calculations WBPE-026-9208002 and WBPE-063-9201005 (Note: Corrected calculation number) are remnants of a manual Appendix R cable separation analysis that was totally and completely superseded by the computerized safe shutdown analysis (INDMS/SAFE) prior to WBN Unit 1 licensing. These calculations were inadvertently carried forward as references in early revisions of the FPR. These nonessential references were removed by



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Revision 10 of the FPR. Any pertinent information formerly contained in these calculations is presently in:

- FPR Reference 4.2.8 WBN-0SG4-031 - Equipment Required for Safe Shutdown per 10 CFR 50, Appendix R and EDQ00099920090012 – Unit 1 and 2 Appendix R Safe Shutdown Analysis and
- FPR Reference 4.2.9 WBP-EVAR-9004001 - Appendix R – Cables Required for Safe Shutdown Following a Fire.

#### **11. NRC Question (RAI FPR II-21)**

*A change was made to Part II of the FPR, after Revision 5, to add the following to the definition of "Operable-Operability":*

*Equipment being tested does not need to be declared inoperable provided appropriate manual actions by the test performer, stationed at the test location, are addressed under written procedures. The written procedures must provide the ability to recognize input signals for action, ready recognition of setpoints, design nuances that may complicate subsequent manual operation such as auto-reset, or other functions which are inherent to the fire protection system.*

*It appears that this change was made for Revision 7 of the FPR.*

**[1]** *Provide a summary evaluation and [2] technical justification supporting this change.*

**[3]** *Also provide examples of equipment where this would apply, and examples of equipment where it would not.*

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

#### **TVA Response:**

**[1]** The additional paragraph to Part II of the FPR for the definition of "Operable/Operability" was added in Revision 7 as a clarification to indicate that testing of Fire Protection Equipment may occur without declaring Fire Protection Equipment inoperable for some cases provided the equipment being tested can be immediately returned to service, if needed. This affords the Fire Operation department some flexibility in their Testing and Inspection Program.

**[2]** The above paragraph is referenced in WBN procedure NPG-SPP-18.4.6 (Control of Fire Protection Impairments) Section 3.2.2. This section of the procedure discusses Fire Protection Impairment Exceptions. Since the equipment can be immediately returned to service, a sufficient level of protection is provided.

**[3]** An example of a Fire Protection Component where this would apply is equipment that would be immediately restorable (e.g., opening a valve or closing a breaker). An

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example of a Fire Protection Component where this would not apply is equipment that would not be immediately restorable (e.g., a disassembled strainer).

#### **12. NRC Question (RAI FPR II-22)**

*A change was made to Part II of the FPR to delete the definition of "Regulatory Required." It appears that this change was made for Revision 7 of the FPR. The deleted text is as follows:*

*Regulatory Required -(REG) Refers to the fire protection systems or features which are required to demonstrate compliance with NRC [Nuclear Regulatory Commission] regulations. It also refers to those fire protection systems or features not required to demonstrate direct compliance with NRC regulations; however, specified commitments documented in this FPR have been made relative to the fire protection system or feature making the system or feature required to demonstrate compliance. [Emphasis added]*

**[1]** *Describe what was meant by "those fire protection systems or features not required to demonstrate direct compliance with NRC regulations" in this context. [2] Describe, at a high level, the "specified commitments documented in this FPR."*

*This change appears to remove a population of fire protection systems and features (those that had commitments documented in the FPR) from the list of fire protection systems and features required to demonstrate compliance.*

**[3]** *Provide a technical justification for this change. [4] Also, provide a summary of the differences in maintenance, testing, surveillance, etc., for those fire protection systems and features that are required to demonstrate compliance versus those that are not required to demonstrate compliance.*

#### **TVA Response:**

**[1]** The Fire Protection Systems or Features not required to demonstrate direct compliance with NRC regulations are as follows:

The FPR, Part II, Section 12.3.3 specifies the carbon dioxide concentrations vs time needed to meet the requirements of the 1973 Edition of National Fire Protection Association (NFPA) 12 (WBN's code of record). All the protected rooms have a requirement to reach a specified concentration within a specified time period. Additionally, certain CO<sub>2</sub> protected rooms (Diesel Generator Engine Rooms and Auxiliary Instrument Rooms) have a soak time requirement (negotiated between TVA and NRC during the licensing of WBN Unit 1). These rooms would be a specified Regulatory Required commitment. The remaining rooms protected by CO<sub>2</sub> were not required to have CO<sub>2</sub> suppression systems for compliance to Appendix R, Section III.G.2 separation requirements. These rooms are the only known case of "those fire protection systems or features not required to demonstrate direct compliance with NRC regulations."

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- [2] The carbon dioxide system described above is the only case of "specified commitments documented in this FPR." This change did not remove any fire protection systems or features.
- [3] Deleting the definition of "Regulatory Required" does not change any analysis, commitments, or implementation of the Fire Protection Program; therefore, the deletion of the definition is acceptable.
- [4] In general, systems and components required for Appendix R fire safe shutdown are under the Technical Specifications (Tech Specs) program. Those not under Tech Specs are documented in the FPR, Part II and have Testing and Inspection Requirements (TIR) and OR established that are comparable to Tech Specs. There are no differences in the maintenance, testing, surveillance, etc., for those fire protection systems and features in the FPR, Part II, Section 14 that are required to demonstrate compliance versus those that are not required to demonstrate compliance.

#### **13. NRC Question (RAI FPR II-23)**

*A change was made to remove the following text from Part II, Section 7.1, "TVA Corporate Management," of the FPR, after Revision 5:*

*The General Manager, Operations Services, establishes fire protection programs and fire brigade training and qualification requirements and assesses their effectiveness. Agreements are maintained between the TVAN [TVA Nuclear] and TVA Fossil and Hydro Power organizations for providing training and qualification of fire brigade and Incident Commander personnel.*

*It appears that this change was made in Revision 10 of the FPR.*

*These elements were specifically approved by the NRC in SSER 18.*

*Describe where these responsibilities currently reside.*

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

#### **TVA Response:**

The identification of responsibilities for the Fire Protection Program is maintained in the FPR, Part II, Section 7. The organizational titles in the FPR are a snapshot of company organization at the time of issue of the FPR. Individual responsibilities for elements of the program may shift as organization changes occur and these changes would be documented in a revision of the FPR.

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#### **14. NRC Question (RAI FPR II-24)**

*A change was made to remove the description of the fire protection training provided as part of general employee training from Part II, Section 7.8, "Site Personnel," of the FPR.*

*It appears that this change was made in Revision 10 of the FPR.*

*Provide a justification of this change and describe where this information is maintained.*

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

#### **TVA Response:**

The details for general employee training (GET) are maintained in the training modules for GET by the Nuclear Training group. The FPR was never intended to provide all of the detailed information concerning the Fire Protection Program, but rather to provide detailed information when required and as a roadmap to direct the users of the FPR to other controlled documents such as supporting calculations, procedures, drawings, etc. The removal of the training details was to keep the details in the appropriate control procedures and avoid duplication of material in multiple documents.

#### **15. NRC Question (RAI FPR II-25)**

*Several changes were made to Part II, Section 8.1, "Program Changes and Associated Review and Approval," of the FPR.*

- 1. Reference to Plant Operations Review Committee review of changes to the FPR was removed from 8.1.a.*
- 2. A reference to "10 CFR 50.59" was replaced with "plant specific procedures" in 8.1.b.*
- 3. The following text was removed from 8.1.c:*

*WBN may alter specific features of the approved Fire Protection Report provided: (a) such changes do not otherwise involve a change in a license condition or the technical specification or result in an unreviewed safety question, and (b) such changes do not result in failure to complete the Fire Protection Program [FPP] as approved by NRC.*

*All of these changes affect elements that were specifically approved by the NRC in SSER 18.*

*It appears that these changes were made in Revision 27 of the FPR.*

*Provide a justification for each of these changes.*

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

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#### **TVA Response:**

NRC GL 86-10, the amendment of rule 10 CFR 50.59 on October 4th, 1999, and Regulatory Guide 1.187 provided guidelines for 10 CFR 50.59 Implementation as related to the Fire Protection Program in that Fire Protection Program changes were excluded from the 10 CFR 50.59 process. This exclusion was based on the fact that licensee fire protection programs were now governed under a license condition (described in GL 86-10) that permitted such program changes. Development of NEI 02-03 provided additional guidance for determining whether Fire Protection Programs changes required prior NRC review and approval.

WBN in Revision 4 of procedure SPP-9.4 (10 CFR 50.50 Evaluation of Changes, Tests, and Experiments) revised its 50.59 Applicability Process for changes to the Fire Protection Program to procedure FPDP-3 (Management Of The Fire Protection Report) whose stated purpose was to establish the processes by which changes to the FPR are made. Changes made under FPDP-3 would be reviewed in accordance with SPP-9.13 (Fire Protection Program Change Regulatory Reviews).

Revision 2 of FPDP-3 added a process by which FPR changes were evaluated and deleted the requirement to perform a 50.59 review. Revision 3 of FPDP-3 was revised for the removal of the Plant Operation Review Committee (PORC) review. TVA letter to NRC, dated April 25, 2000, requested a proposed revision to the TVA Nuclear Quality Assurance Plan -TVA-NQA-PLN89-A to standardize PORC and plant review requirements for the three TVA nuclear plants. NRC letter to TVA, dated July 25, 2000, approved the request for the proposed revision to the TVA-NQA-PLN89-A, which was the bases for the change in FPDP-3.

PER 03-014910-000 (Problem Evaluation Report/Corrective Action Program) identified that Rev 3 to FPDP-3 removed the requirement for PORC review; however, FPR Part II, Section 8.1.a, was not revised. This section has been revised to delete PORC, 10 CFR 50.59 and technical specification per Revision 27 of the FPR.

#### **16. NRC Question (RAI FPR II-26)**

*A change was made to Part II. Section 8.3, "Audits/Inspections of the Fire Protection Program," of the FPR to remove a description of the "system of audits to be conducted to assess the WBN fire protection equipment and FPP implementation to verify continued compliance with NRC requirements and TVA commitments."*

*The description matched that provided in NRC Generic Letter 82-21 "Technical Specifications for Fire Protection Audits," and was specifically approved by the NRC in SSER 18.*

*This description was replaced with the statement that "the audit program is provided in the NQAP [Nuclear Quality Assurance Plan]."*

*It appears that this change was made in Revision 19 of the FPR.*

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*Confirm that the audit program described and maintained in the NQAP document aligns with the program previously described in the FPR and approved by the NRC. Otherwise, justify any changes. Also, describe the change control process for the NQAP that would prevent inadvertent changes to the fire protection audit program discussed above.*

#### **TVA Response:**

Procedure TVA-NQA-PLN89-A Rev 0024A1 (Nuclear Quality Assurance Plan) is the NQAP referenced above. The audit program described and maintained in this procedure aligns to the program previously described as follows:

#### **PREVIOUS FPR Part II, Section 8.3 stated:**

- a. An annual fire protection and loss prevention inspection and audit utilizing either qualified off site TVA personnel or an outside fire protection firm.
- b. A biennial audit of the FPP and implementing procedures, and
- c. A triennial fire protection and loss prevention inspection and audit utilizing an outside qualified fire protection consultant.

#### **CURRENT PROGRAM**

Procedure TVA-NQA-PLN89-A Rev 0024A1 (NQAP) Section 12.2 lists the program elements as related to the above, as follows:

- a. Item g. An independent fire protection and loss prevention program inspection and audit shall be performed at a maximum interval of 24 months utilizing either qualified offsite license personnel or an outside fire protection firm.

This aligns with Item a above, except that the time period was changed from annual to 24 months per letter dated August 28, 2002, titled "TVA Nuclear Quality Assurance (NQA) Plan (TVA-NQA-PLN89-A) - Annual Update" from TVA to the NRC per revision change 12.2.E.4.g referenced in this letter.

- b. Item f. The fire protection programmatic controls including the implementing procedures at least once per 24 months. This aligns with Item b above.
- c. Item h. An inspection and audit of the fire protection and loss prevention program shall be performed by an outside qualified fire consultant at intervals no greater than three years. This aligns with Item c above.

The change control process for the NQAP is documented in QADP-4, "QA Plan Management."

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#### **17. NRC Question (RAI FPR II-27)**

*SSER 18 specifically references the "Shift Operations Supervisor" in the evaluation of the WBN fire brigade. However, a change was made to Part II, Section 9.1 of the FPR to replace references to "Shift Operations Supervisor" with "Shift Manager."*

*It appears that this change was made in Revision 10 of the FPR.  
Describe the differences in roles, responsibilities, duties, etc., between the two positions.*

#### **TVA Response:**

The title "Shift Operations Supervisor" has been revised to "Shift Manager" but applies to the same position; therefore, there are no differences in roles, responsibilities, duties, etc. Position titles were changed, but the chain of responsibility for the various parts of the Fire Protection Program was maintained.

#### **18. NRC Question (RAI FPR II-28)**

*Part II, Section 12.1, "Water Supply," of the FPR contains the following text:*

*The water used in both the HPFP [High Pressure Fire Protection] and RCW [Raw Cooling Water] system is chemically treated to address concerns resulting from the use of raw water. A three-year evaluation period is being implemented to monitor the performance of the HPFP System. Periodic testing of the HPFP distribution system will be performed once a year for the first three years of plant operation. The results of the monitoring program will evaluate the adequacy of the existing fire suppression systems for testing frequency or possibly replacement plans.*

*SSER 18 describes a TVA commitment to continue this testing on a periodic basis.*

*[1] Describe how the results of the initial testing period modified the testing frequency and replacement plans for the fire suppression systems. [2] Describe the current monitoring and testing programs related to these topics (that is, the use of raw water and concern over microbiologically induced corrosion and other biological fouling).*

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

#### **TVA Response:**

**[1]** WBN committed to perform system performance testing on a yearly basis for three years to obtain data as to the rate of change of system flow and pressure. The test data showed that the rate of change was small enough to justify performing system testing (Reference 4.2.60 in Part II of the FPR) on a cycle consistent with the guidance set forth in the NFPA Handbook, 17<sup>th</sup> edition (Reference 4.3.2 in Part II).

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### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

[2] The TIR 14.2.f documented in Part II, Section B.14.2.f of the FPR states:

TIR 14.2.f specifies a flow test every three years of the system in accordance with Reference 4.3.2. Underground and exposed piping is flow tested to determine the internal condition of the piping at minimum three-year intervals. Flow tests are made at flows representative of those expected during a fire for the purpose of comparing friction loss characteristics of the pipe with that expected for the particular type of pipe involved, with due consideration given to the age of the pipe and to the results of previous flow tests. Any flow test results that indicate unacceptable deterioration of available water flow and pressure shall be fully investigated. The test frequency of three years is based on industry experience and NFPA consensus standard 25 and is considered acceptable.

The periodic testing is done in accordance with 0-FOR-26-2, 3 Year High Pressure Fire Protection Hydraulic Performance Verification. The results of the tests are given to the site Fire Protection Engineer for trending and are saved as Quality Assurance records. Portions of the piping system are replaced on an as-needed basis based on the test results.

#### **19. NRC Question (RAI FPR II-29)**

*A change was made to Part II, Section 12.10.4 "Fire Doors," of the FPR to remove a discussion of the process in place to perform fire door modifications.*

*It appears that this change was made in Revision 10 of the FPR.*

*Discuss the processes in place for fire door modification, or justify the removal of this information from the FPR.*

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

#### **TVA Response:**

Routine fire door repairs that do not require a design change are documented in TVA General Specification G-73, Installation, Modification, and Maintenance of Fire Protection Systems and Features, section 4.2.3.1 (Reference 4.2.25 in Part II of the FPR). These routine repairs are issued to the plant via drawing 46W454, sheet 18. Modifications to fire doors are implemented via the Design Change Notice (DCN) process and must be reviewed and approved by the Site Fire Protection Engineer. The FPR was never intended to provide all of the detailed information concerning the Fire Protection Program, but rather to provide detailed information, when required, and as a roadmap to direct the users of the FPR to other controlled documents, such as supporting calculations, procedures, drawings, etc.



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### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

#### **20. NRC Question (RAI FPR II-30)**

*Are the time studies that support the continuous fire watch routes in Part II, Section 13.0.A "Fire Watch -Continuous [Primary]," of the FPR maintained at the WBN site in an auditable form? If so, please provide the appropriate references. If not, justify why not.*

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

#### **TVA Response:**

FPR Part II, Section 4.2 (TVA Documents) lists reference 4.2.48 as Letter from T.R. Davis to P.S. Smith, dated May 12, 1997, "Fire Watch Time Studies." This study is maintained at WBN site in electronic format and is available for review.

#### **21. NRC Question (RAI FPR II-31)**

*Part II, Section 13.0 "Fire Protection System Impairments and Compensatory Actions," of the FPR states, in part:*

*Impaired fire protection systems or features will be returned to operable condition in the time frame specified in the OR sections. Should this restoration not be done, a 10 CFR 50.72 and 10 CFR 50.73 review shall be performed and documented in accordance with site administrative procedures.*

*Similar statements exist throughout Part II, Section 14 "Fire Protection Systems and Features Operating Requirements (OR)." A typical example is found in Section 14.9.2:*

*Restore the inoperable emergency battery lighting unit to Operable status within 14 days. If not restored within 14 days, continue the compensatory actions AND perform 10 CFR 50.72 and/or 10 CFR 50.73 reviews per site administrative procedures.*

**[1]** Describe how performing the 10 CFR 50.72 and 10 CFR 50.73 reviews and making an appropriate report, as needed, assists in returning a system or feature to operable status.

**[2]** Once any necessary report has been made, what is the path to operable status? **[3]** What actions are to be taken for systems or features that are not in operable status for extended periods beyond those outlined in Part II, Section 14? **[4]** What actions are to be taken to restore the system or feature to operable status if the 10 CFR 50.72 and/or 10 CFR 50.73 review determines that no report is necessary?

#### **TVA Response:**

**[1]** The 10 CFR 50.72 and 50.73 reviews do not assist in returning a system or feature to operable status. The function of the review is to assess whether the impairment constitutes a reportable event. An example of a condition that was previously reported on Unit 1 is Licensee Event Report, 50-390/1999-003, "Breach of a Fire Barrier."

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### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

- [2]** In parallel with the completion of the 50.72 or 50.73 evaluation, repair of the impaired component continues in order to bring the component to operable status.
- [3]** Compensatory actions are continued until impaired component is returned to operable status. The compensatory actions are formulated so as to compensate/replace the impaired component so that protection/mitigation capability is maintained despite the impaired component. If the OR time frame is to be exceeded, a Problem Evaluation Report (PER) is written which enters this item into the corrective action program. This will result in additional management attention to returning the impaired component to operable status and to monitor for adverse trends.
- [4]** Compensatory actions are continued until impaired component is returned to operable status.

#### **22. NRC Question (RAI FPR II-32)**

*A change was made to Part II, Section 14.2 "Water Supply," of the FPR to add Section 14.2.7, which deals with not as-designed loads or inhibited automatic isolation capability on the water supply system.*

*It appears that this change was made for Revision 7 of the FPR and expanded in Revision 10.*

**[1]** *Provide a technical justification supporting this change.*

*Also,*

- **[2]** *What is the timeframe for providing isolation capability (14.2.7.a)? What action is to be taken if this cannot be accomplished?*
- **[3]** *What is the timeframe for completing 14.2.7.b actions (controlling the inhibited automatic isolation by procedure)? What action is to be taken if this cannot be accomplished?*
- **[4]** *Identify and discuss the long term compensatory measures to be put in place if the operability time period in 14.2.7.c is missed.*
- **[5]** *In this scenario, once any necessary report has been made, what is the path to operable status?*

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

## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

#### **TVA Response:**

- [1]** The high pressure fire protection (HPFP) system is shared with the Raw Service Water System (RSW). Automatic isolation valves are provided to isolate selected large raw service water loads from the HPFP system when any fire pump is started. If the automatic isolation capability of one of these valves is taken out of service (inhibited), a fire impairment permit per plant procedure NPG SPP-18.4.6 (Control Of Fire Impairments) would be issued. There are also situations when raw service water loads are utilized that are not as designed and do not have an automatic isolation by procedure. An example of this would be usage of hose stations or fire hydrants for temporary chillers to cool plant process equipment. A fire impairment permit would be issued for such situations. This addition of Section 14.2.7 provides operating requirements in those situations when automatic isolation capability is taken out of service and when not-designed uses of raw water are needed. The actions (including dedicated attendant personnel) will provide sufficient protection during the limited period of impairment such that overall plant safety is maintained.
- [2]** The time frame for restoring automatic isolation capability is 30 days per 14.2.7.c. If isolation capability cannot be accomplished, a PER is written and restoration is established in the Corrective Action Program. For cases where raw water uses other than as-designed uses (these are usually short duration activities), 14.2.7.a requires the capability to manually isolate the line and a constant attendant be assigned within one hour and be in communication with the Main Control Room to immediately isolate the use when notified by the Main Control Room staff. The actions (including dedicated attendant personnel) will provide sufficient protection during the limited period of impairment such that overall plant safety is maintained.
- [3]** No work is allowed which would inhibit an automatic isolation component unless the initiating work order is issued and a fire impairment permit is issued in accordance with NPG SPP-18.4.6 prior to beginning work.
- [4]** If the time stipulated in 14.2.7.c is exceeded, a PER is written and the return to Operability is established in the Corrective Action Program. The impairment receives management attention such that the impairment is addressed in an expeditious fashion commensurate with the degree of impairment
- [5]** Compensatory actions established in the Corrective Action Program are continued until the impaired component is returned to operable status.

#### **23. NRC Question (RAI FPR II-33)**

*A change was made to Part II, Section 14.2 "Water Supply," of the FPR to add Section 14.2.8 which deals with fire pump automatic start impairments. Section B.14.2.8 appears to indicate that this section is intended to cover maintenance and testing. A 30-day period of allowed inoperability is inconsistent with maintenance and testing.*

*It appears that this change was made for Revision 27 of the FPR.*

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### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

**[1]** *Provide a technical justification supporting this change, including the duration of the allowed non-operability.*

Also,

- **[2]** *What is the timeframe for 14.2.8.a (controlling the inhibited automatic start circuitry by procedure)?*
- **[3]** *Describe the long term compensatory measures to be put in place if the operability time period in 14.2.8.b is missed*
- **[4]** *In this scenario, once any necessary report has been made, what is the path to operable status?*

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

#### **TVA Response:**

- [1]** PER 03-020146-000 (12878) was initiated in response to NCV 50-390/2003-05-01. It was identified that valve 0-PCV-26-18 controls the pressure on System 26 when an electric motor driven fire pump(s) is running. Due to problems with 0-PCV-26-18 failing to control pressure properly, 0-PCV-26-18 was isolated. To prevent the automatic starting of the electric motor driven fire pumps and relying on the pumps' relief valves to control pressure, the FPS circuit was defeated without entering Operation Requirement (OR) 14.2.3. The defeat of the FPS circuit without entry into an OR is allowed by the FPR, as specified in the bases B.14.2 to support testing. This same justification was used to defeat the FPS circuit for this maintenance issue. For completeness and clarity, Sections 14.2.8 and B14.2.8 were added to allow for maintenance of the motor driven fire pumps. To be consistent with the time period to have two electric pumps operable in OR 14.2.3, the 30 days time period is used for OR 14.2.8.
- [2]** The time period for controlling the inhibited automatic start circuitry begins immediately when the initiating procedure (work order, etc.) is entered and the physical work commences.
- [3]** Per the bases B14.2.8, there are no additional compensatory actions required because:
- a. Taking the circuitry out of service and returning it to service will be administratively controlled by the testing documentation.
  - b. The manual starting of the electric motor driven fire pump from the Main Control Room or their associated 480V shutdown board is not impaired. Additional administrative controls and abnormal operating instructions exist that ensure fire pumps are started upon the discovery of a fire.
  - c. The system is normally pressurized without the operation of the fire pump.

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### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

[4] Repair of the impaired component will continue to bring it to operable status.

#### **24. NRC Question (RAI FPR II-34)**

*There are a number of conflicts and inconsistencies between Part II, Section 14.2 "Water Supply" and the "Fire Pump Inoperability and Compensatory Actions" Table of the January 14, 2011, version of the FPR.*

- What is the time period for implementing the actions in the "Planned Outage" row of the Table? Also, the "planned outage" concept is not reflected in the text of Section 14.2.*
- The actions in the "14.2.1.c" column in the Table are not consistent with the actions described in the text of 14.2.1.c.*
- The actions in the "14.2.4.a" column in the Table are not consistent with the actions described in the text of 14.2.4.a.*
- The actions in the "14.2.5.a" column in the Table are not consistent with the actions described in the text of 14.2.5.a.*
- The actions in the "14.2.5.b" column in the Table are not consistent with the actions described in the text of 14.2.5.b.*
- There is no discussion in the text of the removing backup steps identified in columns "14.2.5.a" and "14.3.5.b" of the Table.*

*Resolve these conflicts.*

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

#### **TVA Response:**

The referenced conflicts and inconsistencies between Part II, Section 14.2, "Water Supply," and the "Fire Pump Inoperability and Compensatory Actions" Table have been reviewed, and Section 14.2 and the Table have been revised to reflect consistency between the two parts. The revised table is included as Attachment 2 to this letter and will be incorporated into the FPR as part of the As-Constructed update of the FPR prior to Unit 2 initial fuel load. The Planned Outage referenced in the table is discussed in the Basis section of Part II, B.14.2.1. The comparison of the text portion of Section 14.2 and columns 14.2.5.a and 14.2.5.b of the table indicate that the term "Remove backup" in these columns in the table has no added value and has no effect on the return to operability of the components and thus have been removed.

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### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

#### **25. NRC Question (RAI FPR II-35)**

*Part II, Section 14.8.1.c of the as-designed FPR states:*

*If suppression (as listed in Section 14.3 and 14.4) and fire detection (as listed in Table 14.1) is designed to protect both sides of the inoperable barrier, then no compensatory actions are required.*

*Part II, Section 14.8.2 states:*

*Restore the inoperable fire-rated assembly/fire barrier to Operable status within 30 days. If not restored within 30 days, continue the compensatory actions AND perform 10 CFR 50.72 and/or 10 CFR 50.73 reviews per site administrative procedures. Also determine if any continuous fire watch routes are to be augmented as specified in Section 13.0.A.*

*The following questions relate to a scenario concerning an inoperable fire rated assembly falling under 14.8.1.c that enters 14.8.2.*

- **[1]** *Describe the long term compensatory measures to be put in place if the operability time period in 14.8.2 is missed based on entry from 14.8.1.c. If no additional compensatory measures would be needed beyond suppression and detection on both sides of the inoperable barrier, provide a justification of why suppression and detection alone would be sufficient for an extended period (beyond 30 days).*
- **[2]** *In this scenario, once any necessary report has been made, what is the path to operable status?*

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

#### **TVA Response:**

- [1]** An identified inoperable fire rated assembly is controlled procedurally by NPG-SPP-18.4.6, "Control of Fire Protection Impairments." If the operability time period in 14.8.2 is missed based on entry from 14.8.1.c, a PER is initiated. This will ensure that the return to operability of the fire rated assembly is entered into the Corrective Action Program and requires a 50.72 and 50.73 review.

The continuation of the suppression and detection alone is sufficient for an extended period (beyond 30 days). The majority of the combustible load in fire areas with moderate or greater fire severity rating is due to insulation on cables in cable trays. The insulation on the cables needs an external ignition source (proper sizing of circuit protective devices [fuses/breakers] prevents self ignition of the cables) which would be detected by the fire detection system (normally ionization smoke detectors). The installed fire suppression system would activate and control (or extinguish) a fire of any magnitude thus preventing the fire from breaching the fire barrier and also providing additional time for Fire Brigade response to extinguish the fire. The fire rated assembly by itself is just a

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### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

part of the passive fire protection feature that, in combination with the active fire protection features, ensures that the function of one set of redundant fire safe shutdown components necessary to achieve and maintain FSSD remains free of fire damage. This combination of suppression/detection and a rated fire barrier is an example of part of WBN defense in depth approach for fire protection.

- [2] If the inoperable fire rated assembly is not restored within the allowable time, a PER is written. The Corrective Action Program then assigns the priority for the restoration of the assembly to operable status.

#### **26. NRC Question (RAI FPR II-36)**

*Is it TVA's position that one hour fire rated electrical raceway fire barrier systems (ERFBS) (which normally require suppression and detection systems to also be installed) fall under Section 14.8.1.c? If not, describe which section of 14.8.1 would apply. If so, justify the equivalence of the two configurations: detection plus suppression plus a one hour rated ERFBS vs. detection and suppression only in terms of maintaining defense in depth and safety margins.*

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

#### **TVA Response:**

It is TVA's position that only qualified personnel are allowed and required to make the decisions as to which of the three conditions apply to each individual circumstance. Only Sections 14.8.1.a and 14.8.1.b apply to ERFBS and radiant energy shields. Section 14.8.1.c does not apply to ERFBS configurations. Section 14.8.1.c will be clarified to denote that it does not apply to ERFBS or radiant energy shields.

#### **27. NRC Question (RAI FPR II-37)**

*A change was made to Part II, Section 14.1.2 of the FPR to change the applicability of this section from inaccessible areas to containment. Section B.14.1.2 supports the original version.*

*It appears that this change was made in Revision 10 of the FPR.*

*Resolve this conflict. If the change is correct, provide appropriate sections that provide the requirements for inaccessible areas outside of containment and the associated bases.*

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

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#### **TVA Response:**

This change was made to correct a typographical error. The area referenced in 14.1.2 should have been to containment from the beginning. Section 14.1.1 addresses the areas outside of containment and 14.1.2 addresses the areas inside containment.

#### **28. NRC Question (RAI FPR II-38)**

*Part II, Section 14.2 "Water Supply," Note 2, of the FPR states, in part: "Section 14.S is not applicable to the diesel driven pump control panel (e.g., 0-PNL-26-31S0A)."*

*Describe the requirements that apply to this panel in lieu of Section 14.S.*

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

#### **TVA Response:**

The fire detection system code of record allows for an active trouble signal on a panel to go out when an alarm comes in. When the alarm clears, the trouble signal (if the condition that caused the trouble signal still exists) will come back in on the panel. This is a unique feature of the vintage fire detection system at WBN. The panel 0-PNL-26-3150A is the diesel fire pump controller, and its design does not function the same way as the detection panel in that a trouble signal does not clear and then come back in due to the receipt and clearing of an alarm signal. Note 2 was added as a clarification that "masking" per Section 14.5 on 0-PNL-26-3150A is not applicable. The diesel fire pump controller panel does not have this masking feature, nor is it required. This clarification was provided to ensure the system operation was understood.

#### **29. NRC Question (RAI FPR II-39)**

*A change was made to add Part II, Section 14.10.2, to the FPR:*

*With one or more of the breakers and/or valves specified in design output documents not in the noted position or condition, return the breakers and/or valve to the required position within 30 days.*

*It appears that this change was made for Revision 7 of the FPR and clarified in Revision 15.*

*Describe the compensatory actions to be taken in the 30 days between the discovery of the condition and the return to operability.*

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



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#### **TVA Response:**

NRC-approved SSER 18 under Section 2.4.3 (Fire Protection Technical Controls) states in part the following:

"With one or more of the required items of equipment listed in Watts Bar Fire Protection Report Table 14.10 inoperable, restore the equipment to the operable status within 30 days, or then either place the equipment in the condition required for fire safe shutdown, provide a backup means of instrumentation monitoring, or be in mode 3 within 6 hours and Mode 4 within the following 12 hours."

WBN is consistent with their approach to Fire Safe Shutdown Equipment as described in the approved SSER 18 and does not take compensatory action in the 30 days between the discovery of the condition and the return to operability.

#### **30. NRC Question (RAI FPR II-40)**

*Discuss the interaction and interface between the Operability Requirements and action statements in Part II, Section 14 "Fire Protection Systems and Features Operating Requirements (OR)," of the FPR and the Corrective Action Program (CAP) at WBN. Include in the discussion the point at which an item would be added to the CAP.*

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

#### **TVA Response:**

Corporate Procedure NPG-SPP-18.4.6, Rev 0 (formerly SPP-10.9), establishes the requirements and methods for controlling impairments to the operability of fire protection systems to include regulatory (FPR) and nonregulatory systems. With regulatory fire protection systems INOPERABLE, this procedure calls for restoring the equipment to operable within the time frames specified, or establish compensatory action in accordance with FPR Requirements (ORs and action statements in Part II, Section 14). The Fire Protection Supervisor/designee tracks OR/LCO action time limits. If the restoration will not be done or if these limits are anticipated to be exceeded, a PER, WBN Correction Action Program, is written to track that the 10 CFR 50.72 and 10 CFR 50.73 review is performed and documented in accordance with site administrative procedures. The PER receives management attention such that the deficiency is addressed in an expeditious fashion commensurate with the degree of deficiency.

#### **31. NRC Question (RAI FPR III-5)**

*Part III, Section 1.1, "Design Basis Evaluation," of the FPR states: "Loss of offsite power has been assumed for control building fires, for which alternative shutdown is provided."*

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*The FPR, Part I, Section 2.0, "Purpose", states "The FPR documents WBN's Appendix R evaluation which ensures that safe shutdown capability can be maintained during and after a fire in accordance with Sections III.G, III.J, III.L, and III.O of 10 CFR 50, Appendix R."*

*10 CFR 50, Appendix R (Appendix R), Section III.L.3, states:*

*The shutdown capability for specific fire areas may be unique for each such area, or it may be one unique combination of systems for all such areas. In either case, the alternative shutdown capability shall be independent of the specific fire area(s) and shall accommodate postfire conditions where offsite power is available and where offsite power is not available for 72 hours. Procedures shall be in effect to implement this capability.*

**[1]** *Confirm that the safe shutdown analysis, for alternate shutdown, addresses conditions where offsite power is available and where offsite power is not available for 72 hours.*

**[2]** *Also, confirm that procedures are in effect to implement this capability.*

**[3]** *Provide a summary evaluation and [4] technical justification for any fire areas that affect Unit 2 post-fire safe shutdown equipment and do not meet the above Appendix R criteria.*

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

#### **TVA Response:**

**[1]** The safe shutdown analysis for the control building (alternative shutdown) considers that offsite power is available but may be lost for 72 hours due to control building fire damage.

**[2]** Procedures are in place to address the potential loss of offsite power for 72 hours due to a control building fire.

**[3]** The control building (which meets the above criteria) is the only area crediting the alternative shutdown capability described in Appendix R, Section III.L.3.

**[4]** Not applicable since there are no areas required for alternative shutdown capability that do not meet the criteria for loss of either onsite or offsite power.

### **32. NRC Question (RAI FPR III-6)**

*Part III, Section 3.4.2, "Reactor Coolant Make-up Control," of the FPR states: "Reactor coolant make-up is available immediately post-reactor trip, except for a few fire locations where it is available within 75 minutes post reactor trip."*

**[1]** *Identify the Unit 2 safe shutdown fire areas where reactor coolant make-up is not available immediately, but is available within 75 minutes post reactor trip. [2] Confirm that the statement in Section 3.4.2 remains valid for Unit 2 and [3] confirm that not having*

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### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

*reactor coolant make-up available immediately will not have an adverse affect on Unit 2 post-fire safe shutdown.*

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

#### **TVA Response:**

- [1]** Unit 2 reactor coolant makeup may not be available immediately after reactor trip due to fire in Analysis Volumes AV-002, AV-005, AV-104, but will be available within 75 minutes.
- [2]** FPR Part III Section 3.4.2 is valid for Unit 2.
- [3]** Not having reactor coolant makeup available immediately after reactor trip will not have an adverse affect on Unit 2 post fire safe shutdown, as demonstrated by calculation EDQ00099920090016, appendix B.33, since the existing coolant is sufficient to maintain core cooling until makeup can be established.

### **33. NRC Question (RAI FPR III-7)**

*Part III, Section 3.4.3, "Reactor Coolant Pressure Control," of the FPR states:*

*Establishing and maintaining a sufficient sub-cooling margin within the RCS [reactor coolant system] is required to prevent void formation in the core and to ensure the ability to maintain natural circulation (if the RCPs [reactor coolant pumps] are not operable) through the steam generators (SG). This is essential to achieving and maintaining safe shutdown. [emphasis added]*

*FPR Part III, Section 2.3, "Reactor Coolant Pressure Control," states, in part: "Reactor coolant pressure control is required to assure that the RCS is operated: [ ... ] (3) With a sufficient sub-cooling margin to minimize void formation within the reactor vessel." [emphasis added]*

*Provide a technical justification that resolves the apparent conflict between the statements "prevent void formation in the core" and "minimize void formation within the reactor vessel."*

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

#### **TVA Response:**

Part III, Sections 2.3 and 3.4.3 provide qualitative statements regarding the need to control RCS pressure to maintain sub-cooling margin such that natural circulation would not be adversely affected by large bubble formation in the reactor vessel. Both statements convey the desired information, but for consistency Section 3.4.3 will be revised to say "minimize void formation" rather than "prevent void formation" and thereby be consistent with Section 2.3.

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### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR.

#### **34. NRC Question (RAI FPR III-8)**

*Part III, Section 4.10.4, "125V DC [direct current] Power System," of the FPR states:*

*During normal operation, the 125V dc loads are fed from the battery chargers, with the batteries being supplied a 'trickle' charge floating on the system. Upon loss of ac [alternate current] power, the entire dc load is drawn from the batteries. The batteries are credited for two hours of operation after a loss of charging, predicated upon the continued operation of dc emergency equipment. However, the battery chargers can be manually aligned to alternate power sources to take over the load and recharge their associated battery.*

*Confirm that the basis used for crediting the batteries for two hours of operation after a loss of charging considered potential fire induced faults on cables and equipment connected to the battery.*

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

#### **TVA Response:**

The battery sizing calculation EDQ00023620070003, 125VDC Vital Battery System Analysis, includes an evaluation to verify adequacy of the vital batteries to supply emergency vital dc power for Units 1 and 2 to meet requirements for Appendix R wherein the vital batteries are required to supply applicable safe shutdown loads considering loss of ac power for two hours. The loads applied in the analysis are those that would be imposed as a result of a Station Blackout and are considered bounding for Appendix R. The major continuous loads consist of the vital inverters, emergency dc lighting, annunciation system inverters, Auxiliary Feedwater Pump Turbine controls, switchgear control circuits and miscellaneous solenoid valve and relay control circuits. There are no additional major loads connected to the batteries which could be applied as a result of spurious operations due to fire-induced faults on cables or equipment that are not already considered in the loading analysis. The worst case continuous station blackout load on any of the batteries in the latest revision of the calculation (R11) is less than 390 amps whereas the batteries have capability to supply over 550 amps for two hours while meeting minimum voltage requirements and considering de-rating factors for age and temperature. TVA considers the use of station blackout loading without benefit of the available ac power, and additionally, the substantial available battery load margin, to be more than sufficient to account for any credible spurious loading effects.

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#### **35. NRC Question (RAI FPR III-9)**

*Part III, Section 4.14, "Auxiliary Control Air System [ACAS]-Key 13," of the FPR states, in part:*

*The ACAS air dryers operate continuously during normal operation. The dryers are dual stage regenerative types which operate automatically and independently of their respective compressors. [ ... ] The electrical circuit is designed with interlocks that prevent a purge exhaust valve and an inlet switching valve on the same side of the dryer to be open at the same time. This precludes loss of air from the system through the purge valve.*

*Confirm that fire damage to the electrical interlock circuits for the ACAS air dryers will not prevent the equipment from performing its safe shutdown function in fire areas where it is required.*

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

#### **TVA Response:**

The ACAS electrical interlocks that prevent loss of air through the purge valve are located with the local control panels and compressors. The interlock circuits do not extend outside the fire zone where the compressor is located. Therefore, a fire that could damage the interlock circuit could also damage the compressor and the ACAS could not be credited to perform a safe shutdown function.

#### **36. NRC Question (RAI FPR III-10)**

*Part III, Section 6.0, "Identification of Safe Shutdown Circuits and Cables," of the FPR states: "However, for some equipment, either a subset of cables or no cables were identified. For example, cables were not selected for valves where local manual operation is required during cooldown and nitrogen bottle control stations are used for AFW flow control."*

**[1]** *Define the term "cooldown."* **[2]** *Also, categorize the above identified manual operator actions as hot or cold shutdown.*

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

#### **TVA Response:**

**[1]** In Part III, Section 6.0, the term "cooldown" is used in regard to controlling auxiliary feed water flow to maintain steam generator level as decay heat is removed from the reactor by venting steam via the steam generator atmospheric relief valves.

**[2]** Local manual operator actions to control auxiliary flow to the steam generators are classified as "hot shutdown" actions.

## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

#### **37. NRC Question (RAI FPR III-11)**

*Part III, Section 7.3, "Associated Circuits by Spurious Operation," of the FPR states:*

*The evaluation of Appendix R events ensures that any failure of associated circuits of concern by spurious operation (Type II) will not prevent safe shutdown. Credible electrical faults considered in the analysis included open circuit, short circuit (conductor-to-conductor), short to ground, and cable-to-cable (hot-short) including 3-phase hot shorts for high/low pressure interface valves. [emphasis added]*

*Appendix R, Section III.G.2, states:*

*Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided: [emphasis added]*

*Appendix R addresses hot shorts, open circuits and shorts to ground, but the FPR addresses these items in the singular tense as open circuit, short circuit (conductor-to-conductor), and short to ground.*

*Confirm that the fire induced circuit analysis methods in the FPR meet the requirements of Appendix R, Section III.G.2 for fire areas containing Unit 2 safe shutdown equipment. This includes circuits (plural) that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground. Provide a summary evaluation and technical justification for any circuit analysis methods that do not meet these criteria.*

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

#### **TVA Response:**

The paragraph in question identifies the various types of electrical faults considered in the circuit analysis. It does not and was not intended to limit the number of such faults to be considered. The fire induced circuit analysis methods in the FPR meet the requirements of Appendix R, Section III.G.2 for fire areas containing Unit 2 safe shutdown equipment. This includes circuits (plural) that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground.

#### **38. NRC Question (RAI FPR III-12)**

*A change has been made to Part III, Section 10.1, "Overview of Evaluation Methodology," from Revision 5 of the FPR to the as-designed FPR that changes the text from:*

## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

*The resolutions may consist of modifications, use of alternate equipment, manual operator actions, fire barrier installation, pre-fire actions, post-fire repairs, engineering evaluations prepared in accordance with the guidance of Generic Letter 86-10, or deviation requests. [emphasis added]*

to:

*The resolutions may consist of modifications, use of alternate equipment, manual operator actions, fire barrier and radiant energy shield installation, post-fire repairs, engineering evaluations prepared in accordance with the guidance of Generic Letter 86-10, or deviation requests. [emphasis added]*

*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 from "pre-fire actions" to "radiant energy shield installation."*

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

#### **TVA Response:**

FPR Part III, Section 10.1, is a very high level overview of the safe shutdown analysis methodology. The paragraph in question suggests the types of resolutions that may be used to resolve interactions. Deletion of "pre-fire actions" and addition of "radiant energy shields" are clarifications of resolution types actually used in the safe shutdown analysis. This change does not affect any specific resolution, modification, operator manual action, fire safe shutdown strategy, or the post fire safe shutdown capability of either Unit 1 or Unit 2.

#### **39. NRC Question (RAI FPR III-13)**

*Part III, Section 4.7 "Component Cooling System (CCS) -Key 1 B," of the as-designed FPR contains the following sentence: "The CCS system provides cooling for the following safe shutdown equipment in Unit 1:" .*

**[1]** *Is this sentence correct, or is the text intended to cover both units? If it is correct, provide the Unit 2 information. If it is not correct, correct the text.*

**[2]** *Ensure that an extent of condition review has been performed to ensure that other, similar instances have been identified and corrected.*

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

## ENCLOSURE 1

### Response to NRC's Request for Information Regarding "Fire Protection Report"

#### TVA Response:

- [1] Part III, Section 4.7 is incorrect and the third paragraph should read "The CCS system provides cooling for the following safe shutdown equipment per unit." The CCS system equipment is for both units.
- [2] A review of the FPR revealed three other places where the discussion concerns both units:
1. Table 14.3, item 14.3.c should read: "... Unit 1 and 2 Containment Purge Air Exhaust Filters, ...".
  2. Part IV, Section 3.3, second sentence should read: "The number in ( ) is the number available for shutdown." This deletes the reference to Unit 1 only.
  3. Part II, Section 14.3.1.b.1 of the FPR should say "For either Reactor Building...".

These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR.

#### **40. NRC Question (RAI FPR IV-1)**

*Part IV, Section 3.0, "Alternate Control Room [ACR] Capabilities," of the FPR states "The instruments and controls located in the ACR are separated from, or can be electrically isolated from, the corresponding instrumentation and controls located in the MCR [main control room]."*

*Describe the specific methods used to analyze and mitigate fire damage to circuits that could prevent operation or cause maloperation due to hot shorts, open circuits or shorts to ground, prior to the transfer of control to the ACR. This includes, fire induced spurious operation of equipment, including spurious operations that can cause equipment damage, system actuations such as Engineered Safety Feature Actuation System and ground faults on circuits of equipment to be controlled at the ACR. Also, describe the method used to ensure the safe shutdown capability will not be adversely affected by the one worst case spurious actuation or signal, resulting from the fire, before control is transferred to the ACR.*

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

#### TVA Response:

The control building is considered an alternative shutdown area with the alternative control and indications provided by the auxiliary control system (ACS) described in Part IV of the FPR. The effects of potential fire damage to circuits in the control building were analyzed in accordance with the methods described in Appendix D to NEI-00-01, Revision 2, "Guidance for Safe Shutdown Circuit Analysis," as endorsed in Section 5.4 of Regulatory Guide 1.189, Revision 2, "Fire Protection for Nuclear Power Plants."



## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

The analysis considers both conditions: (1) Offsite power is available, and (2) Offsite power is lost. Areas of the control building containing safe shutdown circuits have fixed suppression and detection systems. Specific shutdown procedures are provided for control building fires. The auxiliary control system is physically separate from and electrically isolated from the control building as described in the following analysis summary:

1. Power sources – The power distribution boards and cables for the ACS are located in the auxiliary building, emergency diesel generator (EDG) building, and the intake pumping station. Control cables for the offsite power source equipment are located in the control building. If offsite power is lost due to control building fire damage, the onsite power sources (EDGs) are designed to sense the loss of 6.9kv Shutdown Board voltage and automatically start and load. The onsite power cables are located outside the control building, and the control circuits can be isolated from the control building by transfer switches. Spurious operation due to fire damage prior to transfer could start all four EDGs (common start signal) which would not be an adverse effect because breaker closure and load sequencing is controlled from the logic relay panels in the auxiliary building. A spurious emergency stop signal could lock out automatic start of one EDG. The emergency stop signal would have to be reset at the engine control panel. The worst case power system single spurious actuation could result in temporary unavailability of one of the four EDGs. Two EDGs are sufficient for safe shutdown.
2. Control Circuits -- Most ACS controls are on the main control panels in the auxiliary control center located in room 757-A1 of the auxiliary building. Large motor type controls are located on the 6.9kv and 480vac shutdown boards, and motor operated valve type controls are located on motor control centers (MCC) in the auxiliary building. EDG controls are located in the auxiliary control center and locally in the EDG building. Control circuits are electrically isolated from the control building by transfer switches located in the auxiliary building. The transfer switches disconnect the control building controls and enable the ACS controls. The circuitry enabling the ACS controls have their own separate set of control fuses to ensure operability even if fire damage caused a fault resulting in operation of the normal circuit fuses.

Evaluation of the effects of spurious equipment and signal actuation prior to transferring to the ACS concluded that the worst case spurious actuation signal would be a spurious containment isolation (CI) signal (2/4 containment pressure HI-HI) in either Train A or Train B. The CI signal would start a containment spray (CS) pump and open the pump discharge valve creating a flow path to draw down the Refueling Water Storage Tank (RWST) inventory and flood the containment sump. Thermal-hydraulic calculations indicate that this flow must be terminated within 10 minutes to preserve adequate RWST inventory. Prior to control room abandonment, a spurious CS system actuation would be indicated by alarms, valve and pump status lights, and CS flow instruments. Spurious CS pump start would be mitigated in accordance with existing procedures by placing the pump hand switch in the STOP, PULL-TO-LOCK position. After the control room abandonment decision is made and the reactor is tripped, the core spray pump auxiliary control transfer switches will be operated in less than 10 minutes to preclude excessive RWST inventory loss. Other spurious actuation signals were evaluated with similar results but less time restrictive than CS.

## ENCLOSURE 1

### Response to NRC's Request for Information Regarding "Fire Protection Report"

Single individual component spurious actuations were evaluated one at a time with the worst case being inadvertent stopping of a charging pump room cooler fan with the pump continuing to operate. Even if the pump failed due to high room temperature before transfer to the ACS, the opposite Train charging pump would be available and sufficient for shutdown. Spurious operation of high-low pressure interfaces was evaluated to ensure that concurrent spurious operation of two redundant valves could not occur and adversely affect the safe shutdown capability.

TVA's motor operated valve control circuit design precludes spurious valve operation concurrent with bypass of valve over travel protection which could lead to permanent valve damage or difficulty in manual valve operation. The end of travel limit switch/torque switch portion of the circuit is not exposed to control building fire damage (reference NRC IN 92-18).

Updating the control room abandonment analysis identified specific times for operation of the transfer switches at each ACS control station rather than the existing 10 minutes action time applied to all transfer switches. All of the action times are evaluated and prioritized, but only the worst case is listed in the table. Currently the control room evacuation procedure includes tripping the reactor and stopping the reactor coolant pumps; closure of the pressurizer PORV block valves is being added to conserve pressurizer pressure and allow additional time for transfer to the ACS. FPR Part VI, Section 3.54.21 was revised to include the updated times for the transfer switch OMAs, as shown in the following table:

| Aux Control Station | Description                  | Existing Time | New Time   |
|---------------------|------------------------------|---------------|------------|
| 0-L-4               | EDG CONTROLS                 | 10 minutes    | 15 minutes |
| 1-L-11A             | Unit 1 Train A               | 10 minutes    | 15 minutes |
| 1-L-11B             | Unit 1 Train B               | 10 minutes    | 15 minutes |
| 1-BD-211-A-A        | Unit 1 6.9kv Train A         | 10 minutes    | 10 minutes |
| 1-BD-211-B-B        | Unit 1 6.9kv Train B         | 10 minutes    | 10 minutes |
| 1-BD-212-A1-A       | Unit 1 480v Train A BD 1     | 10 minutes    | 20 minutes |
| 1-BD-212-A2-A       | Unit 1 480v Train A BD 2     | 10 minutes    | 20 minutes |
| 1-BD-212-B1-B       | Unit 1 480v Train B BD 1     | 10 minutes    | 20 minutes |
| 1-BD-212-B2-B       | Unit 1 480v Train B BD 2     | 10 minutes    | 20 minutes |
| 1-MCC-213-A1-A      | Unit 1 Train A RMOV BD 1     | 10 minutes    | 18 minutes |
| 1-MCC-213-A2-A      | Unit 1 Train A RMOV BD 2     | 10 minutes    | 18 minutes |
| 1-MCC-213-B1-B      | Unit 1 Train A RMOV BD 1     | 10 minutes    | 18 minutes |
| 1-MCC-213-B2-B      | Unit 1 Train A RMOV BD 2     | 10 minutes    | 20 minutes |
| 1-MCC-214-A1-A      | Unit 1 Train A C&A Vent BD 1 | 10 minutes    | 20 minutes |
| 1-MCC-214-B1-B      | Unit 1 Train B C&A Vent BD 1 | 10 minutes    | 20 minutes |
| 2-L-11A             | Unit 2 Train A               | 10 minutes    | 15 minutes |
| 2-L-11B             | Unit 2 Train B               | 10 minutes    | 15 minutes |
| 2-BD-211-A-A        | Unit 2 6.9kv Train A         | 10 minutes    | 10 minutes |
| 2-BD-211-B-B        | Unit 2 6.9kv Train B         | 10 minutes    | 10 minutes |
| 2-BD-212-A1-A       | Unit 2 480v Train A BD 1     | 10 minutes    | 20 minutes |
| 2-BD-212-A2-A       | Unit 2 480v Train A BD 2     | 10 minutes    | 20 minutes |
| 2-BD-212-B1-B       | Unit 2 480v Train B BD 1     | 10 minutes    | 20 minutes |

## ENCLOSURE 1

### Response to NRC's Request for Information Regarding "Fire Protection Report"

| Aux Control Station | Description                  | Existing Time | New Time   |
|---------------------|------------------------------|---------------|------------|
| 2-BD-212-B2-B       | Unit 2 480v Train B BD 2     | 10 minutes    | 20 minutes |
| 2-MCC-213-A1-A      | Unit 2 Train A RMOV BD 1     | 10 minutes    | 18 minutes |
| 2-MCC-213-A2-A      | Unit 2 Train A RMOV BD 2     | 10 minutes    | 18 minutes |
| 2-MCC-213-B1-B      | Unit 2 Train A RMOV BD 1     | 10 minutes    | 18 minutes |
| 2-MCC-213-B2-B      | Unit 2 Train A RMOV BD 2     | 10 minutes    | 20 minutes |
| 2-MCC-214-A1-A      | Unit 2 Train A C&A Vent BD 1 | 10 minutes    | 20 minutes |
| 2-MCC-214-B1-B      | Unit 2 Train B C&A Vent BD 1 | 10 minutes    | 20 minutes |

3. Instrumentation – Process monitoring indicators are located on the main auxiliary control center panel and are augmented by locally mounted mechanical gauges. Instrument signal isolation from the control building is provided in 3 forms.
- Dedicated instrument loops consisting of separate transmitters, power supplies, modifiers, and indicators. The cabling for these ACS instrument loops does not enter the control building and is not affected by a control building fire.
  - Shared instrument loops with qualified electronic isolators for all signals going into the control building. Fire damage to instruments and cables in the control building is blocked by the isolator and does not propagate into the ACS portion of the instrument loop.
  - Transfer switch – In a few cases valve position controllers receive input from either a setpoint station in the main control room or from a setpoint station located in the ACS main control panel. Prior to transfer to the ACS, control building fires involving the setpoint station or associated cable could alter the setpoint signal and drive the valve to an undesirable position. The valve would be returned to the desired position upon activation of the ACS controller setpoint station. Each of the controller transfer switches were evaluated as potential spurious equipment actuations. Neither permanent equipment damage nor unrecoverable conditions were found to result from spurious controller setpoint station actuations prior to transfer.

#### **41. NRC Question (RAI FPR IV-2)**

*Part IV, Section 3.3, "Instruments and Controls Required for Alternative Shutdown not in the ACR," of the FPR states:*

*The above instrumentation and controls are well in excess of that detailed in IE Information Notice 84-09. There are also numerous local indications and controls available to the operators outside the ACR which provide additional information and control which were not included in the above listing.*

*Confirm that the indications and controls outside the ACR are independent of the control building. If not independent of the control building, describe how the operators ensure that the instruments are providing accurate information and that the controls will function properly and not cause additional problems that may not be covered by procedure.*

## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

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

#### **TVA Response:**

The local indications and controls referred to in the last paragraph of Part IV, Section 3.3, are local gages and manual valve controls (handwheels), which are independent of the control building.

#### **42. NRC Question (RAI FPR IV-3)**

*Part IV, Section 3.3 "Instruments and Controls Required for Alternative Shutdown Not in the ACR," of the as-designed FPR contains the following sentence: "The number in ( ) is the number available for Unit 1 shutdown."*

**[1]** *Is this sentence correct, or is the text intended to cover both units? If it is correct, provide the Unit 2 information. If it is not correct, correct the text.*

**[2]** *Ensure that an extent of condition review has been performed to ensure that other, similar instances have been identified and corrected.*

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

#### **TVA Response:**

**[1]** Part IV, Section 3.3, is incorrect. The second sentence should read "The number in ( ) is the number available for shutdown." This deletes the reference to Unit 1 only.

**[2]** A review of the FPR revealed three other places where the discussion concerns both units:

1. Table 14.3, item 14.3.c should read: "... Unit 1 and 2 Containment Purge Air Exhaust Filters, ...".
2. Part II, Section 14.3.1.b.1 of the FPR should read: "For either Reactor Building...".
3. Part III, Section 4.7 is incorrect. The third paragraph should read: "The CCS system provides cooling for the following safe shutdown equipment per unit." The CCS system equipment is for both units.

These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR.

## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

#### **43. NRC Question (RAI FPR V-11)**

*Part V, Section 2.1.2, "Operator Locations Prior to Initiating Manual Actions and t=0 Definition," of the FPR states:*

*For the purposes of developing the safe shutdown procedures, all operators performing manual actions are dispatched from the main control room for fires in most plant locations, or from the Auxiliary Control Room for Control Building fires. The basis for dispatch locations is that the operators must obtain the operator-specific safe shutdown procedures from these locations.*

*This section also states: "The time requirements for completion of manual operator actions are based on defining the initiating time t=0 as the time when the reactor is tripped from the Main Control Room (MCR)."*

*Confirm that using this definition of t=0 for fire areas containing Unit 2 safe shutdown equipment will ensure that safe shutdown capability can be maintained during and after a fire in accordance with Appendix R, Sections III.G, and III.L.*

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

#### **TVA Response:**

As described in Enclosure 2 to TVA letter to NRC dated March 31, 2011, most of WBN Unit 2 operator manual actions are preventative rather than reactive. That is, they are driven by procedure rather than reacting to changing plant conditions as indicated by instrumentation and alarms. While there are some actions that are taken in response to the fire itself (de-energize electrical board that is on fire), most WBN Unit 2 actions are in response to tripping the reactor. This clarification of T=0 is being included in the ongoing revision of Part V Section 2, which will be included in the next FPR revision.

#### **44. NRC Question (RAI FPR VII-2)**

*Part VII, Section 6 "General Engineering Evaluations," was added to the FPR after the WBN Fire Protection Program was approved by the NRC in SSER 18.*

*Probabilistic risk assessment (PRA) information is utilized throughout this section of the FPR as one element supporting the safety conclusions of the engineering evaluations the section contains and in some cases appears to be an important justification.*

*It is the NRC's position that licensees with a deterministic fire protection licensing basis cannot rely on risk information for their safety conclusions. Risk information may only be relied upon as part of a risk-informed licensing action request, not as part of the traditional fire protection self-approved engineering evaluation process.*

*Provide updated versions of the engineering evaluations in this section of the FPR that do not rely on or reference PRA information. Otherwise, provide further justification regarding the acceptability of this use of PRA information.*

## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

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

#### **TVA Response:**

References to IPEEE have been deleted from Part VII, Section 6. The justification for the conclusion of each of the four evaluations is valid without the results of the IPEEE input. The reference to IPEEE results was only used to provide additional confirmation that fire safe shutdown was assured.

**ENCLOSURE 1**

**ATTACHMENT 1**

**Response to NRC's Request for Information Regarding "Fire Protection Report"**

**Replacement Supporting Documentation for**

**TVA Response 1. NRC Question RAI FPR General-6**

## TVAN FIRE PROTECTION LICENSE CONDITION IMPACT EVALUATION (LCIE)

DCN 52285A

PIC 54370 Page 35 WATTS BAR Nuclear Plant

Page 1413A. Document No. / Rev. No.: 52285 /A LCIE Rev. No.: 0

## B. Description of Change:

The proposed modifications of DCN 52285-A provides four new 20 KVA uninterruptible power systems (UPS) that contain regulated rectifiers, auctioneering diodes, inverters, static and manual transfer switches, and regulated bypass transformers for WBN Unit 2 Vital AC Power System. It removes the cross-connections between Units 1 and 2 at the 120V AC Vital Instrument Power Boards and re-configures the cable connections to the existing spare Unit 1 inverters for use as installed spare swing inverters – one for each Channel (I, II, III and IV). Two of the new inverters will be located in room 772.0-A2, Fire Area 33 and the remaining two in room 772.0-A15, Fire Area 45.

## C. Evaluation of the proposed change with respect to the FP License Conditions:

Combustible load changes as a result of this modification (each inverter adds an additional 75lb's of combustible material) have been incorporated into calculation EPMDOM012990 and do not impact the Fire Protection Report Severity Index "Severe" for Fire Area 33 and the Severity Index "Moderately Severe" for Fire Area 45.

The Emergency Lighting Units, 1-BAT-228-1419/02 & 2-BAT-228-2419/04, will be redesigned to relocate the illumination path because of the location of the new Inverters. Shielding to protect water-sensitive equipment from water spray will remain intact. The new equipment is equipped with drip shields.

The Fire Protection Report (Section III) will be revised to include the new configuration for the 120 VAC Vital Power System. Page III-20 of FPR section 4.10.3 has verbiage revised.

Page III-56 of FPR is adding the new UNID numbers for the new inverters.

Additionally, the following Appendix R calculations will be revised to comply with the Appendix R Program:

WBPEVAR9509001 "Appendix R - Multiple High Impedance Fault Analysis"

WBPEVAR9004001 "Appendix R — Cables Required for Safe Shutdown Following a Fire"

WBNOSG4031 "Equipment Required for Safe Shutdown per 10CFR50 Appendix R"

These changes are configuration related and will not adversely affect any conclusions or analyses. This DCN modification does not create or change any Appendix R manual actions for Operations. The manual actions associated with the 120 VAC Vital Power System is located at the Vital Transfer Switch and are not affected by this DCN. The changes involved with this DCN are in compliance with NEI 02-03.

Based on the review of the FPR, this DCN change will not adversely affect the plants ability to mitigate a fire emergency in Unit 1 and Unit 2 during construction and does not violate the FP License Conditions.

D. Does the proposed change adversely affect the ability to achieve and maintain safe shutdown in the event of a fire? Yes ☐ No ☒

If a YES box above is checked, either revise the change and re-evaluate, OR do not implement the change, OR obtain NRC approval before implementing the change.

|                         | Name             | Signature               | Date       |
|-------------------------|------------------|-------------------------|------------|
| E. Preparer:            | George Senicz    | <i>George Senicz</i>    | 7/29/2009  |
| F. Reviewers:           |                  |                         |            |
| SE - M/N Program Owner: | ERNEST T. HASTON | <i>Ernest T. Haston</i> | 07/29/2009 |
| SE - EE Program Owner:  | RONALD E. COX    | <i>Ronald E. Cox</i>    | 7/29/09    |



**ATTACHMENT 1****Fire Protection Program Change Regulatory Review (FPPCRR)**

Page 1 of 3

1. Station(s) / Unit(s): Watts Bar 1& 2

Activity Document No: DCN 52285-A

2. Description:

Provide a brief description of, including the reason for, the proposed change (or refer to change package that provides description):

The proposed modifications of DCN 52285-A results in specific changes to Watts Bar Unit 1 & 2. This DCN will add four new 120V AC Vital Inverter Systems consisting of regulated rectifiers, auctioneering diodes, inverters, static and manual transfer switches, and regulated voltage bypass transformers. It will remove the cross-connections between WBN Units 1 and 2 at the Vital AC Power Boards. DCN 52285-A will modify the existing spare Unit 1 inverters for use as installed spare swing inverters – one for each channel I through IV, by the addition of a sync reference, alarm output and sync light output switches, and the addition of wiring connections for Unit 2.

After the modification, each channel of AC vital power will have two uninterruptible power system (UPS) sources: the normal UPS (inverter) and the existing spare swing inverter which can be substituted for either of the normal Unit 1 or normal Unit 2 sources for that channel. The function of the UPS with respect to the vital power system will not change. This modification enhances the present design by providing automatic transfer to a regulated bypass supply for each UPS and by providing manual transfer from a normal inverter to a qualified installed spare inverter.

A review of BSL was performed to determine if there were any predecessor DCNs that must be implemented before DCN 52285 and none were found.

The Fire Protection Report (FPR) will be modified to include this new physical arrangement.

Screening:

Answer the following questions; include a reference to the applicable regulatory, licensing basis, or NFPA document(s), and a brief description of why the proposed change does or does not satisfy the referenced documents(s).

Note: If acceptance of the feature being changed was based on a commitment to "exceed" an applicable requirement or guidance document, then further evaluation may be necessary.

- A. Does the proposed change satisfy applicable fire protection regulatory requirements (i.e. GDC, 10CFR 50.48 and Appendix R), guidance documents (i.e., NUREG 0800, NRC Generic Letters, NFPA Codes, or NRC-approved NEI guidance documents), and/or the fire protection licensing basis (i.e. previously approved alternate compliance strategy, exemption, deviation, SER, docketed correspondence, or NFPA Codes of Record, etc.)?

☒ Yes

☐ No

Basis for Determination:

The design function of the 120 VAC vital power system is to supply continuous reliable, Safety Related, Class 1E, regulated, single-phase, 120 VAC power to the reactor protection instrumentation and control system and other safety-related components and systems. The addition of the new Unit 2 Vital inverters is required to provide sufficient independent, reliable Safety Related, Class 1E power to the same Unit 2 safety related systems. The removal of the cross-connections between Unit 1 and Unit 2 at the 120 VAC Vital Instrument Power Boards is required to provide electrical independence and separation between units.

## **ATTACHMENT 1**

### **Fire Protection Program Change Regulatory Review (FPPCRR)**

Under the new configuration, the only common equipment is the installed swing inverter which can be manually connected to the same channel of either Unit 1 or Unit 2, and serves as an alternate source of Safety Related, Class 1E, regulated, single-phase, 120 VAC power in the event of an inverter failure or overload. The new configuration satisfies the 120 VAC vital power design function for Unit 1 and Unit 2 with backup for both units.

This DCN involves required fire safe shutdown circuitry. These changes do not impact the capability to safely shutdown the units after a fire. The following Appendix R calculations and database have been revised and the results will be compliant with the Appendix R Program: WBPEVAR9509001 "Appendix R- Multiple High Impedance Fault Analysis", WBPEVAR9004001 "Appendix R- Cables Required for Safe Shutdown Following a Fire", WBNOSG4031 "Equipment Required for Safe Shutdown per 10CFR50 Appendix R", and the SAFE database. The amount of combustible material being added to each room was analyzed in calculation EPMDOM012990 "Combustible Loading Data (CLD)" and is acceptable. No new operator manual actions relating to fire protection are required. The manual actions associated with the Vital Power System are located at the Vital Transfer Switch and are not affected by this DCN.

This change does not adversely impact or violate any of the fire protection licensing bases and has no adverse impact on the design function, control, or operation of any equipment required to achieve and maintain the fire safe shutdown.

**ATTACHMENT 1****Fire Protection Program Change Regulatory Review (FPPCRR)**

If no, then complete step 3.B.

B. Was the plant licensed prior to January 1, 1979

☐ Yes

☒ No

☐ N/A

If yes, then complete to Step 3.C.

If no, then check Step 3.C N/A and proceed to Step 4 (see Appendix A for additional guidance).

C. Does the proposed change satisfy the detection, suppression and/or separation requirements within the fire area or zone affected by the change specified in Appendix R Sections III.G.2 and/or III.G.3?

☐ Yes

☐ No

☒ N/A

If yes, then proceed to Step 4 (see Appendix A for additional guidance).

If no, then NRC approval is required prior to implementing the proposed change. Proceed to Step 5.

3. **Evaluation:**

Does the proposed change adversely affect the ability to achieve and maintain safe shutdown in the event of a fire (provide justification below or attach Generic Letter 86-10 type or equivalent evaluation)?

☐ Yes

☐ No

☒ N/A

Basis for Determination:

\_\_\_\_\_  
 \_\_\_\_\_

If yes, then the proposed change may not be implanted without prior NRC approval.

If no, then the proposed change does not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire, and NRC approval is not required.

4. **Conclusion:**

☒

Proposed change may be implemented without prior NRC approval.

☐

NRC approval is required prior to implementing the proposed change.

6. I have determined that the documentation is adequate to support the above conclusion.

Preparer: George Senicz

Print

George Senicz  
Signature

01/23/2009  
Date

Reviewer: ERNEST T. HASTON

Print

Ernest T. Haston  
Signature

02/18/2009  
Date

**TVAN FIRE PROTECTION LICENSE CONDITION IMPACT EVALUATION (LCIE)**

**WATTS BAR Nuclear Plant**

A. Document No. / Rev. No.: 52283 /A LCIE Rev. No.: 0

**B. Description of Change:**

The proposed modifications of DCN 52283-A result in specific changes to the boundary of the Auxiliary Building Secondary Containment Enclosure (ABSCE). Revised ABSCE boundary includes Unit 2 shield building wall sections adjacent to interior of Auxiliary building and the corresponding Unit 2 shield building wall penetrations qualified for anticipated Unit 2 operation. This revised ABSCE boundary in some cases overlap existing Fire Area Boundaries and include modifications to Auxiliary Building personnel access doors A-77, A-118, A-157, A-130, A-204, and A-214. The relocation of the ABSCE boundary by DCN 52283-A includes the procurement of 3 new doors in the Unit 2 Reactor building equipment hatch that penetrates the Unit 2 Shield Building wall at Elevation 75' of the Auxiliary Building. When the equipment hatch opening is closed, the new Fire Rated Steel Curtain Rollup Door in combination with a Fire Wall System will temporarily replace the existing Bio-Shield Wall as an alternate fire protection barrier. The Fire Protection Report (FPR) is being changed by this revision to include this new physical arrangement.

**C. Evaluation of the proposed change with respect to the FP License Conditions:**

DCN 52283-A relocates the ABSCE boundary to now include only a portion of the Unit 2 Reactor Bldg. WBN's Fire Protection Program in part utilizes the Fire Protection Report (FPR) to document WBN's compliance to Appendix A & Appendix R.

The relocation of the ABSCE boundary does not change any of the existing Fire Areas boundaries or rooms therein for both Unit 1 and Unit 2. It does however affect the FPR as follows:

A. Temporarily installs a Fire Rated Steel Curtain Rollup Door (0-DOOR-410-R001), a Fire Barrier Wall and two Fire Retardant Fabric Doors. FPR Part VII - Deviations And Evaluations will be updated to address these doors. When the equipment hatch opening is closed, the new fire rated rollup door in combination with the new fire barrier wall will maintain the integrity of the deviation justification for Fire Area 10 when the bioshield blocks are removed.

FPR Part VII - Deviations And Evaluations, Paragraph 4.7 current evaluation addresses when out of normal configuration (i.e bioshield blocks are removed), the doors that close the opening to the Unit 2 Reactor Building (blast door and over head rolling door) are not fire rated door assemblies. DCN 52283-A installs a combination Fire Rated Rollup Door (WBN-0-DOOR-410-R001) and a Fire Barrier Wall that will temporarily replace the current deviation configuration for closing of the hatch opening. Fabric door WBN-0-DOOR-410-R002 (acting as a ABSCE pressure boundary) will be installed in parallel to the new fire rated steel rollup door. The second fabric door (WBN-0-DOOR-410-R003) will be installed adjacent to the interior of the Unit 2 Reactor Bldg hatch way.

The UL rating provided with Door R001 has been downgraded due to removal of a fusible link, a header brush and door frame modification for seismic stability. The fusible link & header brush will not be needed for the operational phase of this door. The door frame modifications consists of adding gusset plates & weld material to various wall angles in the frame system. Review of the vendor drawings indicates that these modifications in addition to the deletion of the fusible link & header brush will not impair the capability of the door to perform its design function in the event of a fire. Door WBN-0-DOOR-410-R001 will be added to Table 14.8.1 in the Fire Protection Report and coded as EQ.

The existing blast door and rollup door provided an alternate fire barrier configuration when the bioshield blocks were removed. In the new configuration, the combination of the new fire rated rollup door and the fire barrier wall will provide an alternate fire barrier configuration. This new configuration replaces the existing fire hazards evaluations. Review of this new configuration indicates that this justification of this deviation remains unchanged for DCN 52283-A. The justification paragraph in FPR VII section 4.7 will have to be modified to reflect the new alternate physical description

B. Relocation of the ABSCE boundaries will entail modification to doors A-77, A-118, A-157, A-130, A-204, and A-214. Door A-157 is listed in Table 14.8.1 "Fire Doors" of PART II - FPR. Door A-157 will be modified to provide a security balanced magnetic switch for ingress & egress control.

Doors A-77, A-130, A-204, A-118 & A-214 are being modified. Door A-130 will be modified to become sealed and secured (welded shut). Door A-77 & A-204 will have a balance magnetic switch added. Door A-214 will have both a card reader and balance magnetic switches installed. Door A-118 presently has a card reader installed but the card readers will be disabled in place. In Fire Protection Report Part II Paragraph 9.5 Fire Emergency Procedures and PrePlans includes information on access and egress routes for fire areas in Unit 1 & 2. Revisions to the appropriate Preplans will incorporate these changes to the access & egress paths.

Based on the review of the FPR, this DCN change will not adversely affect the plants ability to mitigate a fire emergency in Unit 1 and Unit 2 during construction and does not violate the FP License Conditions.

D. Does the proposed change adversely affect the ability to achieve and maintain safe shutdown in the event of a fire? Yes ☐ No ☒

If a YES box above is checked, either revise the change and re-evaluate, OR do not implement the change, OR obtain NRC approval before implementing the change.

|                         | Name                    | Signature               | Date      |
|-------------------------|-------------------------|-------------------------|-----------|
| E. Preparer:            | George Senicz           | <i>George Senicz</i>    | 11/4/08   |
| F. Reviewers:           |                         |                         |           |
| SE - M/N Program Owner: | <i>Robert Krupinski</i> | <i>Robert Krupinski</i> | 11/4/08   |
| SE - EE Program Owner:  | <i>Ronald E. Cox</i>    | <i>Ronald E. Cox</i>    | 11/4/2008 |

**ATTACHMENT 1****Fire Protection Program Change Regulatory Review (FPPCRR)**

Page 1 of 3

**1. Station(s) / Unit(s): Watts Bar 1 & 2**Activity Document No: DCN 52283-A**2. Description:**

Provide a brief description of, including the reason for, the proposed change (or refer to change package that provides description):

The proposed modifications of DCN 52283-A result in specific changes to the boundary of the Auxiliary Building Secondary Containment Enclosure (ABSCE). Revised ABSCE boundary includes Unit 2 shield building wall sections adjacent to interior of Auxiliary building and the corresponding Unit 2 shield building wall penetrations qualified for anticipated Unit 2 operation. This revised ABSCE boundary in some cases overlaps existing Fire Area Boundaries and includes modifications to Auxiliary Building personnel access doors A-77, A-118, A-157, A-130, A-214 and A-204. The revision of the ABSCE boundary by DCN 52283-A includes the procurement of 3 new doors in the Unit 2 Reactor Building Equipment Hatch Room 757.0-A15. One of the doors (Fire Rated Steel Curtain Rollup WBN-0-DOOR-410-R001) working in combination with a fire wall system will temporarily replace the Bio-Shield Block Wall as a fire protection barrier. The Fire Protection Report (FPR) will be modified to include this new physical arrangement.

**3. Screening:**

Answer the following questions; include a reference to the applicable regulatory, licensing basis, or NFPA document(s), and a brief description of why the proposed change does or does not satisfy the referenced documents(s).

Note: If acceptance of the feature being changed was based on a commitment to "exceed" an applicable requirement or guidance document, then further evaluation may be necessary.

- A. Does the proposed change satisfy applicable fire protection regulatory requirements and/or guidance documents (i.e. GDC 3, 10CFR 50.48 and Appendix R, BTP Appendix A, NUREG 0800, NRC Generic Letters, NFPA Codes, or NRC-approved NEI guidance documents)?

☒ Yes

☐ No

**Basis for Determination:**

DCN 52283-A relocates a part of the ABSCE boundary. The movement of the ABSCE boundary does not change any of the existing Fire Areas boundaries or rooms therein for both Unit 1 and Unit

2. It does however affect the FPR as follows:

Temporarily installs a Fire Rated Steel Curtain Rollup Door, Two Fire Retardent Fabric Doors and a Fire Barrier Wall. When the equipment hatch opening is closed, the new fire rated rollup door in combination with the new fire rated wall will maintain the integrity of the deviation justification for Fire Area 10 when the bioshield blocks are removed.

**ATTACHMENT 1****Fire Protection Program Change Regulatory Review (FPPCRR)****Page 2 of 3**

FPR Part VII - Deviations And Evaluations, Paragraph 4.7 currently evaluates the deviation when out of normal configuration (i.e. bioshield blocks are removed), the doors that close the opening to the Unit 2 Reactor Building (blast door and over head rolling door) are not fire rated door assemblies. DCN 52283-A adds three new doors in the Unit 2 Reactor Bldg. Equip. Hatch (Rm. 757.0-A15). A combination Fire Rated Rollup Door (WBN-0-DOOR-410-R001) and a Fire Wall will temporarily replace the current configuration for closing of the hatch opening when bioshield blocks are removed. Fabric door WBN-0-DOOR-410-R002 (acting as a ABSCE pressure boundary) will be installed in parallel to the new fire rated steel rollup door and will open and close simultaneously with the Fire Rated Rollup Door. The second fabric door (WBN-0-DOOR-410-R003) will be installed adjacent to the interior of the Unit 2 Reactor Bldg Hatch Way.

The pre-existing blast door and rollup door provided an alternate fire barrier configuration when the bioshield blocks were removed. In the new configuration, the combination of the new fire rated rollup door and the fire barrier wall will provide this alternate fire barrier configuration. This new configuration replaces the existing configuration described in BTP 9.5-1 deviation 4.7.

Additionally, the materials in the new configuration meet or exceed the fire behavior characteristics in a positive manner compared to the existing configuration. The new wall configuration is constructed with fire resistant panels providing a high performance fire barrier. The new steel rollup door has been constructed to specifications that will provide an effective fire barrier. The new fabric doors are constructed with materials evaluated for surface flammability and smoke development and are classified as Class A material, placing it in a favorable category relative to flame spread and smoke development.

Manning of the breached fire and security barrier (when bioshield blocks are removed) in combination with an active sprinkler system and detection system and low combustible loading in this area provides an effective 3 hour barrier equivalent. Review of this new configuration indicates that this justification of this deviation remains valid as updated for DCN 52283-A. The justification paragraph in FPR VII section 4.7 will be modified to reflect the new alternate physical description.

Relocation of the ABSCE boundaries will entail modification to Doors A-77, A-118, A-157, A-130, A-204, and A-214. Door A-157 will be modified to provide a security balanced magnetic switch for ingress and egress control. Door A-130 will be modified to become sealed and secured (welded shut). Door A-77 & A-204 will have a balance magnetic switch added. Door A-214 will have both a card reader and balance magnetic switches installed. Door A-118 presently has a card reader installed but the card reader will be disabled in place.

The UL rating provided with Door R001 has been downgraded due to removal of a fusible link, a header brush and door frame modifications for seismic stability. The fusible link & header brush will not be needed for the operational phase of this door. The door frame modifications consists of adding gusset plates & weld material to various wall angles in the frame system. Review of the vendor drawings indicates that these modifications in addition to the deletion of the fusible link & header brush will not impair the capability of the door to perform its design function in the event of a fire.

New Door 0-DOOR-410-R001 will be added to the FPR Table 14.8.1, page II-133 "Fire Doors" of PART II and coded as EQ.

The changes associated with Doors A-77, A-118, A-157, A-130, A-204, and A-214 do not adversely impact applicable fire protection regulatory requirements and/or guidance documents. The changes associated with Doors R001, R002 and R003 do require a revision to the FPR to change Deviation 4.7 to Appendix A of BTP 9.5-1. However, all other applicable fire protection regulatory requirements and/or guidance documents are satisfied.

DCN 52283A  
pg 190**ATTACHMENT 1****Fire Protection Program Change Regulatory Review (FPPCRR)**

Page 3 of 3

- B. Does the proposed change satisfy the fire protection licensing basis (e.g. alternate compliance, exemption, deviation, SER, docketed correspondence, or NFPA Codes of Record)?

- ☒ Yes  
☐ No

Basis for Determination:

Based on the review of the FPR provided in Section 3(A) of this review, this DCN change and associated FPR revisions will not adversely affect the plant's ability to mitigate a fire emergency in Unit 1 and/or Unit 2 during construction and does not violate the FP License.

- C. Is the answer to either question 3A or 3B "Yes"?

- ☒ Yes  
☐ No

If yes, then the proposed change does not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire and NRC approval is not required. Check N/A on Step 4 and proceed to Step 5.

If no, then complete Step 4 (see appendix A for additional guidelines)

4. **Evaluation:**

Does the proposed change adversely affect the ability to achieve and maintain safe shutdown in the event of a fire (provide justification below or attach Generic Letter 86-10 type or equivalent evaluation)?

- ☐ Yes  
☐ No  
☒ N/A

Basis for Determination:

\_\_\_\_\_

\_\_\_\_\_

If yes, then the proposed change may not be implanted without prior NRC approval.

If no, then the proposed change does not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire, and NRC approval is not required.

5. **Conclusion:**

- ☒ Proposed change may be implemented without prior NRC approval.  
☐ NRC approval is required prior to implementing the proposed change.

6. I have determined that the documentation is adequate to support the above conclusion.

Preparer: George Senicz

Print George Senicz Signature

Date 11/4/08

Reviewer: James S. Robertson

Print

Signature

Date 11/4/08

## WATTS BAR Nuclear Plant

A. Document No. / Rev. No.: 54347 /A LCIE Rev. No.: 0

## B. Description of Change:

Interim ABSCE rollup doors R001, R002, and R003 are located at the 757' auxiliary building equipment hatch. A problem exists when a significant pressure transient is caused by certain off normal auxiliary building general ventilation alignments. These pressure variations are severe enough to blow the roll up doors out of their tracks and render them inoperable, thus losing ABSCE boundary function (R002 & R003) and fire and security barrier (R001).

The proposed modifications of DCN 54347-A results in specific changes to the boundary of the Auxiliary Building Secondary Containment Enclosure (ABSCE) and the Fire Area Boundary. It closes and credits the Unit 2 Reactor Building Blast Doors for ABSCE boundary function. Revised ABSCE boundary includes Unit 2 shield building wall sections adjacent to interior of Auxiliary building and the corresponding Unit 2 shield building wall penetrations qualified for anticipated Unit 2 operation.

When the equipment hatch opening is closed, the existing Reactor Building Blast Doors in combination with limited combustibles and a suppression & detection system will temporarily replace the existing Bio-Shield Wall as an alternate fire protection barrier. The Fire Protection Report (FPR) is being changed by this revision to include this new physical arrangement.

## C. Evaluation of the proposed change with respect to the FP License Conditions:

DCN 54347-A relocates the ABSCE boundary to now include the existing Reactor Building Blast Doors.

The relocation of the ABSCE boundary also changes an existing Fire Area boundary. It does affect the FPR as follows:

A. This DCN defeats Fire Rated Steel Curtain Rollup Door (0-DOOR-410-R001) as a fire rated door and will leaves it in an open position. FPR Part II-Fire Protection Program Plan will be updated to remove Door R001 from Table 14.8.1 which currently lists R1 as a Fire Door.

B. FPR Part VII - Deviations and Evaluations will be updated to address the reclassification of 0-DOOR-410-R001 and the addition of the Blast Doors 0-DOOR-410-ABD2.

Paragraph 4.7 current evaluation addresses when out of normal configuration (i.e bioshield blocks are removed), the doors that close the opening to the Unit 2 Reactor Building (blast door and over head rolling door) are not fire rated door assemblies. DCN 52283-A installed a combination Fire Rated Rollup Door (WBN-0-DOOR-410-R001) and a Fire Barrier Wall that would temporarily replace the previous deviation configuration for closing of the hatch opening. Fabric door WBN-0-DOOR-410-R002 (acting as a ABSCE pressure boundary) was installed in parallel to R001, the fire rated steel rollup door. The second fabric door (WBN-0-DOOR-410-R003) was installed adjacent to the interior of the Unit 2 Reactor Bldg hatch way.

DCN 54347 establishes the existing blast door in combination with limited combustibles and a operable suppression & detection system on the Auxiliary Building side of the blast doors as an alternate fire barrier configuration when the bioshield blocks were removed. This new configuration replaces the existing Fire Hazards Evaluation. The following two conditions will now exist:

1. With the Blast Door (0-DOOR-410-ABD2) in the closed position, the fire would have to overcome the insignificant combustible load in front of door (0-DOOR-410-ABD2), overcome the Blast Doors, overcome the operable sprinkler and detection system on the Auxiliary Building side of the blast doors and cross the low combustible loading room or
2. With the Blast Doors open, the fire would have to overcome the operable suppression and detection system on the Auxiliary Building side of the blast doors, cross the low combustible loading room, and be unnoticed by the required personnel in constant attendance.

The above two conditions will maintain the integrity of the deviation justification for Fire Area 10 when the bioshield blocks are removed.

Review of this new configuration indicates that this justification of this deviation remains unchanged for DCN 54347-A. The justification paragraph in FPR VII section 4.7 have been modified to reflect the new alternate physical description

C. Relocation of the ABSCE boundaries will entail modifications to door WBN-0-DOOR-410-ABD2.

Based on the review of the FPR, this DCN change will not adversely affect the plants ability to mitigate a fire emergency in Unit 1 and Unit 2 during construction and does not violate the FP License Conditions.

D. Does the proposed change adversely affect the ability to achieve and maintain safe shutdown in the event of a fire? Yes ☐ No ☒

If a YES box above is checked, either revise the change and re-evaluate, OR do not implement the change, OR obtain NRC approval before implementing the change.

|                         | Name             | Signature               | Date       |
|-------------------------|------------------|-------------------------|------------|
| E. Preparer:            | George Senicz    | <i>George Senicz</i>    | 10/30/2009 |
| F. Reviewers:           |                  |                         |            |
| SE - M/N Program Owner: | ERNEST T. HASTON | <i>Ernest T. Haston</i> | 10/30/2009 |
| SE - EE Program Owner:  | RONALD E. COX    | <i>Ronald E. Cox</i>    | 10/30/09   |



## ATTACHMENT 1

### Fire Protection Program Change Regulatory Review (FPPCRR)

Page 1 of 3

1. Station(s) / Unit(s): Watts Bar 1 & 2

Activity Document No: DCN 54347-A

2. Description:

Provide a brief description of, including the reason for, the proposed change (or refer to change package that provides description):

Interim ABSCE rollup doors R001, R002, and R003 are located at the 757' auxiliary building equipment hatch. A problem exists when a significant pressure transient is caused by certain off normal auxiliary building general ventilation alignments. These pressure variations are severe enough to blow the roll up doors out of their tracks and render them inoperable, thus losing ABSCE boundary function (R002 & R003) and fire and security barrier (R001).

The proposed modifications of DCN 54347-A results in specific changes to the boundary of the Auxiliary Building Secondary Containment Enclosure (ABSCE) and the Fire Area Boundary. It closes and credits the Unit 2 Reactor Building Blast Doors for ABSCE boundary function. Revised ABSCE boundary includes Unit 2 shield building wall sections adjacent to interior of Auxiliary building and the corresponding Unit 2 shield building wall penetrations qualified for anticipated Unit 2 operation.

3. Screening:

Answer the following questions; include a reference to the applicable regulatory, licensing basis, or NFPA document(s), and a brief description of why the proposed change does or does not satisfy the referenced documents(s).

Note: If acceptance of the feature being changed was based on a commitment to "exceed" an applicable requirement or guidance document, then further evaluation may be necessary.

A. Does the proposed change satisfy applicable fire protection regulatory requirements (i.e. GDC, 10CFR 50.48 and Appendix R), guidance documents (i.e., NUREG 0800, NRC Generic Letters, NFPA Codes, or NRC-approved NEI guidance documents), and/or the fire protection licensing basis (i.e. previously approved alternate compliance strategy, exemption, deviation, SER, docketed correspondence, or NFPA Codes of Record, etc.)?

☒ Yes

☐ No

#### Basis for Determination:

When the equipment hatch opening is closed, the existing Reactor Building Blast Doors in combination with limited combustibles and an operable suppression & detection system will temporarily replace the existing Bio-Shield Wall as an alternate fire protection barrier.

The Fire Protection Report (FPR) is being changed by this revision to include this new physical arrangement.

DCN 54347-A relocates the ABSCE boundary to now include the existing Reactor Building Blast Doors.

The relocation of the ABSCE boundary also changes an existing Fire Area boundary. It affects the FPR as follows:

This DCN defeated Fire Rated Steel Curtain Rollup Door (0-DOOR-410-R001) as a fire rated door and will leave it in an open position. FPR Part VII - Deviations And Evaluations will be updated to address these changes of 0-DOOR-410-R001 and the addition of the Blast Door 0-DOOR-410-ABD2. When the equipment hatch opening is closed, the existing Reactor Building Blast Door in combination with limited combustibles and a suppression & detection system will maintain the integrity of the deviation justification for Fire Area 10 when the bioshield blocks are removed. The existing ABSCE rollup door R003 will also be used as an admin control aid for combustible loading.

## ATTACHMENT 1

### Fire Protection Program Change Regulatory Review (FPPCRR)

#### Page 2 of 3

FPR Part VII - Deviations And Evaluations, Paragraph 4.7 current evaluation addresses when out of normal configuration (i.e. bloshield blocks are removed), the doors that close the opening to the Unit 2 Reactor Building (blast door and over head rolling door) are not fire rated door assemblies. DCN 52283-A installed a combination Fire Rated Rollup Door (WBN-0-DOOR-410-R001) and a Fire Barrier Wall that will temporarily replace the current deviation configuration for closing of the hatch opening. Fabric door WBN-0-DOOR-410-R002 (acting as a ABSCE pressure boundary) was installed in parallel to the new fire rated steel rollup door. The second fabric door (WBN-0-DOOR-410-R003) was installed adjacent to the interior of the Unit 2 Reactor Bldg hatch way.

This DCN defeated Fire Rated Steel Curtain Rollup Door (0-DOOR-410-R001) as a fire rated door and will leave it in an open position. Door R001 will be deleted from Table 14.8.1 in the Fire Protection Report.

The justification paragraph in FPR VII section 4.7 will have to be modified to reflect the new alternate physical description.

If no, then complete step 3.B.

B. Was the plant licensed prior to January 1, 1979

- ☐ Yes  
☐ No  
☒ N/A

If yes, then complete to Step 3.C.

If no, then check Step 3.C N/A and proceed to Step 4 (see Appendix A for additional guidance).

C. Does the proposed change satisfy the detection, suppression and/or separation requirements within the fire area or zone affected by the change specified in Appendix R Sections III.G.2 and/or III.G.3?

- ☐ Yes  
☐ No  
☒ N/A

If yes, then proceed to Step 4 (see Appendix A for additional guidance).

If no, then NRC approval is required prior to implementing the proposed change. Proceed to Step 5.

## ATTACHMENT 1

### Fire Protection Program Change Regulatory Review (FPPCRR)

Page 3 of 3

#### 4. Evaluation:

Does the proposed change adversely affect the ability to achieve and maintain safe shutdown in the event of a fire (provide justification below or attach Generic Letter 86-10 type or equivalent evaluation)?

☐ Yes

☒ No

☐ N/A

#### Basis for Determination:

The existing blast doors and limited combustibles in the hatch area in combination with a operable suppression and detection system on the Auxiliary Building side of the blast doors will provide an alternate fire barrier configuration when the bioshield blocks were removed. This new configuration replaces the existing fire hazards evaluations. Review of this new configuration indicates that this justification of this deviation remains unchanged for DCN 54347-A. Relocation of the ABSCE boundaries will entail modification to door WBN-0-DOOR-410-R001. The Balance magnetic Switch (BMS) from door R001 will be relocated to the blast doors to provide a security balanced magnetic switch for ingress & egress control.

The following two conditions will now exist:

1. With the Blast Door (0-DOOR-410-ABD2) in the closed position, the fire would have to overcome the insignificant combustible load in front of door (0-DOOR-410-ABD2), overcome the Blast Doors, overcome the operable sprinkler and detection system and cross the low combustible loading room or
2. With the Blast Doors open, the fire would have to overcome the operable suppression and detection system, cross the low combustible loading room on the Auxiliary Building side, and be unnoticed by the required personnel in constant attendance.

The above two conditions will maintain the integrity of the deviation justification for Fire Area 10 when the bioshield blocks are removed.

Based on the review of the FPR, this DCN change will not adversely affect the plants ability to mitigate a fire emergency in Unit 1 and Unit 2 during construction and does not violate the FP License Conditions.

If yes, then the proposed change may not be implanted without prior NRC approval.

If no, then the proposed change does not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire, and NRC approval is not required.

#### 5. Conclusion:

☒

Proposed change may be implemented without prior NRC approval.

☐

NRC approval is required prior to implementing the proposed change.

#### 6. I have determined that the documentation is adequate to support the above conclusion.

Preparer: George Senicz

Print

George Senicz

Signature

10/30/2009

Date

Reviewer: ERNEST T. HASTON

Print

Ernest T. Haston

Signature

10/30/2009

Date

# TVAN FIRE PROTECTION LICENSE CONDITION IMPACT EVALUATION (LCIE)

## WATTS BAR Nuclear Plant

A. Document No. / Rev. No.: PER 121905 / A R1 LCIE Rev. No.: 0

### B. Description of Change:

PER 121905 identified that the Fire Protection Report (FPR) was reviewed during the NA Audit SSA0605, and several issues were identified. (1) Part VII, Section 4.6 of the FPR discusses a deviation. However, the fire hazards analysis in Part VI of the FPR describes any deviations in specific fire areas, and this specific deviation was not identified (page VI-436). (2) NFPA 12, Section 1433, it requires that "all devices shall be located, installed or suitably protected so that they are not subject to mechanical, chemical, or other damage which would render them inoperative." The back side of the non-rated panel that contains the manual control valves for the CO2 system in the Fuel Oil Transfer Pump Room is exposed to a fire in that room. The back side of the panel has been evaluated in the deviation Part VII, Section 4.6 of the FPR, as not affecting the fire rating of the fire barrier. However, the manual control valves in the panel should also be evaluated as a part of this deviation. (3) FPR Part II, Section 3.0 states that the plan meets the requirements of 10 CFR 50.48 paragraphs (a) and (e). Paragraph (e) has a reserved status and should be deleted. The current deviations in the FPR have been reviewed to ensure that they've been captured in the fire hazard analysis. The sections where the deviations were not in the fire hazard analysis have been added.

PER 121969 identified that the current TVA Nuclear organizational structure indicates the Program Manager Fire Protection reports to Mechanical/Nuclear Engineering/Codes Manager, which reports to the General Manager Nuclear Engineering which reports to the VP Engineering & Technical Services. The WBN FPR indicates that the Corporate Engineering Chief Engineer assumes or delegates responsibility but does not appear to exist on the TVAN organizational structure. The Fire Protection Report (FPR) is being revised to address the current TVA nuclear organizational structure.

PER 160715 identified that Part II of the Fire Protection Plan, Table 14.10 (Fire Safe Shutdown Equipment) requires clarification for Temperature Control Valves (TCVs) for the Lower Contmt Coolers (LCCs) and CRDM Coolers. Table 14.10 Defines the Fire Safe Shutdown (FSSD) Condition for these TCVs as "OPERABLE." However, Engineering Calculation WBNOSG4-31 defines the Appendix R requirement for the TCVs as: The TCVs must not close, that is, the TCV shall be in the OPEN position. (Reference Technical Evaluation for WO 05-815967-000). Therefore, Table 14.10 should be revised to clarify that Appendix R Operability includes the TCV either Open or capable of being Opened, etc. In addition, the Table should provide detail (number and combination of cooler and fans) which will satisfy OR-14.10 as stipulated elsewhere in the FPR and in the referenced calculation. It is noted that WBN currently has two coolers (LCC A-A, 01/02/2009) and LCC C-A, 3/24/2008) in "OR Tracking" due to the TCVs not functioning correctly in AUTO. Therefore these coolers' TCVs have been placed in the OPEN position. However, because the FPR requires either 3 of 4 LCC Operable or any combination of 2 LCCs and 2 CRDM Cirs, OR 14.10 is currently considered "Tracking Only" and the FPR Actions listed in Part II, Section 14.10 (Fire Safe Shutdown Equipment) do not appear to apply. These actions would have required a PER initiated to request engineering evaluations if the TCVs were not "OPERABLE." Since the TCVs have been placed in OPEN and the remaining LCCs and CRDM as a group remain OPERABLE, these actions were not taken when the TCVs malfunctioned. This PER resolution should evaluate the appropriateness of these actions.

PER 161040 identified that the Fire Safe Shutdown Analysis (FSSA) for AV38 identifies a Manual Operator Action (MOA) # 560 to pull a fuse set to close four FCVs. The Fire Protection Report (FPR) identifies that the End Device for this action as 1-FCV-43-55-A, STEAM GEN 1 DRUM/BLDN SAMPLE ISOL, but does not identify the other three valves (1-FCV-43-58-A STEAM GEN 2 DRUM/BLDN SAMPLE ISOL, 61-A STEAM GEN 3 DRUM/BLDN SAMPLE ISOL and 64-A STEAM GEN 4 DRUM/BLDN SAMPLE ISOL). TVA drawing 45A897-1, "Manual Actions Required for Safe Shutdown Following a Fire" (design output) and Abnormal Operating Instruction AOI-30.2, "Fire Safe Shutdown" have the correct valves listed. The action to pull the fuse set will close all four valves. Therefore, the FPR is revised to note all 4 valves for this MOA.

PER 161116 identified that Local Switch 1-HS-3-116A/C is not tested for P Auto when Hand Switch 1-HS-3-116B is in the Aux position. The FPR Part VII, Section 2.1.2 requested a NRC Deviation from providing CST level indication in the ACR. This deviation was based on the automatic switchover from CST to ERCW which the NRC granted in SER Supplement 18. The other Local Switches for MDAFW Pumps that provide this function need to be verified that this function is tested.

PER 170296 identified that other administrative changes to the FPR were found and corrected. That is, Part VI, Section 3.5.2.1 in table "Major Equipment Credit" a typographical error was corrected with the component identifiers (IDs), and Part VI Section 3.44.2 is being revised to list Manual Operator Actions (MOAs) 729 and MOA 728 in the Local Manual Operator Actions table that are already contained in Part VI Section 3.40.2.1 and Section 3.49.2.1 in their respective Local Manual Operator Actions table. Also, Part II, Section 12.10 states that compartmentation drawings are in Part VI and Part II, Section B.14.8 states that fire-rated assemblies/fire barriers are in Part VI. The drawings and barriers are in Part II not in Part VI.

### C. Evaluation of the proposed change with respect to the FP License Conditions:

PER 121905 addresses several issues concerning the Fire Protection Report. (1) The current deviations documented in section VII of the FPR have been reviewed to ensure that they've been referenced as appropriate in Part VI of the Fire Protection Report. The sections where the deviations were not in Part VI have been revised. These additions are administrative changes only. The deviation in Part VII Section 4.4 listed the rooms associated with this deviation differently from design output. Specifically, the FPR lists the rooms as 742.0-A4, -A5, -A6, -A7, and -A9 rather than 742.0-4, -5, -6, -7, and -9. Also, for the deviation in Part VII Section 2.6, the 2 hour fire barrier does not correlate with the design output for the Unit 2 room 737.0-A9. Specifically, the walls are noted as the 2 Hour fire barriers for room 737.0-A9. Identifying the deviations in Part VI to make the FPR consistent with Part VII is considered an administrative change only, and will not be addressed further in this evaluation. (2) The carbon steel (A36) panel located inside of

the Fuel Oil Transfer Pump Room is 1/8" thick. This panel contains a manual control valve (0-FSV-39-27) for the CO<sub>2</sub> system and the valve is inside a metal box that is inside the panel. NFPA 12, Section 1433, it requires that "all devices shall be located, installed or suitably protected so that they are not subject to mechanical, chemical, or other damage which would render them inoperative." The back side of the panel has been evaluated in the deviation Part VII, Section 4.6 of the FPR, as not affecting the fire rating of the fire barrier. However, the valve in the panel should also be evaluated as a part of this deviation. This evaluation is addressed in detail in Section 4 below. (3) FPR Part II, Section 3.0 states that the plan meets the requirements of 10 CFR 50.48 paragraphs (a) and (e). Paragraph (e) has a reserved status and has been deleted from 10 CFR 50.48. The FPR has therefore been revised to delete Paragraph (e) from the Basis of the Fire Protection Plan section. This change is an administrative only, and will not be addressed further in this evaluation.

PER 121969 is a clarification in the TVA Nuclear organizational structure titles, which is an administrative change only, and will not be addressed further in this evaluation.

PER 160715 requires clarification for TCVs for the LCCs and CRDM Coolers since Table 14.10 requires these valve for FSSD condition to be "OPERABLE." The TCVs, during normal operation, modulate to control temperature; that is, the valves range from fully open to partially open. The FPR Bases Section 14.10.1 has been revised to clarify that "OPERABLE" for these valves means a position to ensure that their respective cooler has sufficient cooling flow to maintain the Reactor Building Lower Compartment temperature. This is an administrative change only. The PER also states that Table should provide detail (number and combination of cooler and fans) which will satisfy OR-14.10 as stipulated elsewhere in the FPR and in the referenced calculation. The FPR was searched, and number and combination was not contained in the FPR. The number and combination was contained in the calculation. The calculation for Logic Classification (Key 37J), "Containment Cooling System" logic diagram shows that either 3 of 4 LCCs, or any combination of 2 LCCs and 2 CRDM Coolers will meet the performance goal. That is, depending on the location of an Appendix R fire, and the cables and supporting equipment that are affected, the analysis must demonstrate that this performance goal is satisfied. Therefore, the logic diagram is for use in the analysis, and is not being added to the FPR. The clarification for "OPERABLE" for these valves is considered an administrative change only, and will not be addressed further this evaluation.

PER 161040 is an enhancement to the Fire Protection Report that will identify all four valves associated with the Manual Operator Action 580. Design Output 45A897-1, "Manual Actions Required for Safe Shutdown Following a Fire" and Abnormal Operating Instruction AOI 30.2, "Fire Safe Shutdown" correctly identifies all four valves. This change is an administrative change only, and will not be addressed further in this evaluation.

PER 161116 has added a testing requirement from the Fire Protection Report Part VII for the deviation of the automatic switchover from the CST to ERCW when using MDAFW pumps. The Flow Control Valves (1-FCV-3-116A-A, 1-FCV-3-116B-A, 1-FCV-3-126A-B, and 1-FCV-3-126B-B) are safety related, are required to be operable in accordance with the Technical Specification (TS), and are currently tested in accordance with Surveillance Instructions (1-SI-3-21 and 1-SI-3-22). These FCVs were tested with the transfer switch is placed in the Aux position, and verified that the FCVs would open with the hand switch in the Auxiliary Control Room (ACR). When the hand switch is in P-AUTO and the transfer switch is placed in the Aux position, the FCV associated with each hand switch was not tested for automatic opening upon receiving a 2/3 logic signal for depletion of the CST. As apart of the immediate actions for this PER, testing was performed on these components and the valves were verified to be operable. This is in addition to the TS function and will be tested in every 18 months. The testing has been added to FPR Part II "Testing and Inspection Requirements (TIR)" which makes the FPR in compliance with the deviation.

PER 170296 identified changes to the FPR Part VI Section 3.44.2 is being revised to list Manual Operator Actions (MOAs) 729 and MOA 728 in the Local Manual Operator Actions table that are already contained in Part VI Section 3.40.2.1 and Section 3.49.2.1 in their respective Local Manual Operator Actions table. Part VI Section 3.44.1 is for an Appendix R fire in Analysis Volume AV-066 (Room 772.0-A8) and contains cables and/or equipment associated with the 5<sup>th</sup> Vital Battery. This AV has been analyzed to address the effects of a fire on the 125V DC system if the 5<sup>th</sup> Vital Battery is in service in replacement of any one of the other four normally credited batteries. There will be an additional four analyses performed for this AV to address the various combinations where the 5<sup>th</sup> Vital Battery can be used. Therefore, the Manual Operator Actions (MOA) for specific rooms depending on which solid state protection channel is available. For example, if Channel I (AV-066D) is available, perform MOAs for Room 772-A4, and if Channel III (AV-066F) is available, perform MOAs for Room 772-A14. These two MOAs were found in the FPR for Rooms 772-A4 and 772-A14 and have been added to Section 3.44.2 for consistency. These changes are administrative changes only, and will not be addressed further in this evaluation.

PER 170296 also identified that the FPR Part V1 page 82 a typographical error was corrected with the component identifiers (IDs) and descriptions for the Component Cooling System Pump C-S, and Motor-Driven AFW Pump 1B-B. Also, Part II, Sections 12.10 and Section B.14.8 have been revised to reference the correct location for drawings and barriers which are in Part II. These are administrative changes only, and will not be addressed further in this evaluation.

D. Does the proposed change adversely affect the ability to achieve and maintain safe shutdown in the event of a fire? Yes ☐ No ☒

If a YES box above is checked, either revise the change and re-evaluate, OR do not implement the change, OR obtain NRC approval before implementing the change.

|                         | Name             | Signature              | Date       |
|-------------------------|------------------|------------------------|------------|
| E. Preparer:            | Laura E. Amini   | <i>L. Amini</i>        | 5/19/2009  |
| F. Reviewers:           |                  |                        |            |
| SE - M/N Program Owner: | Ernest T. Haston | <i>Ernest T Haston</i> | 05/19/2009 |
| SE - EE Program Owner:  | Ronald E. Cox    | <i>Ronald E. Cox</i>   | 5/19/09    |

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| 1. Station(s) / Unit(s): | WBN / Unit 1 | Activity Document No: | Fire Protection Report PERs  |
|--------------------------|--------------|-----------------------|--|
|                          |              |                       |  |
| 2. Description:          |              |                       |  |
|                          |              |                       | <p>The Fire Protection Report (FPR) has been revised to incorporate the following Problem Evaluation Reports (PERs):</p> <p>PER 121905 identified that the Fire Protection Report (FPR) was reviewed during the NA Audit SSA0605, and several issues were identified. (1) Part VII, Section 4.6 of the FPR discusses a deviation. However, the fire hazards analysis in Part VI of the FPR describes any deviations in specific fire areas, and this specific deviation was not identified (page VI-436). (2) NFPA 12, Section 1433, it requires that "all devices shall be located, installed or suitably protected so that they are not subject to mechanical, chemical, or other damage which would render them inoperative." The back side of the non-rated panel that contains the manual control valves for the CO2 system in the Fuel Oil Transfer Pump Room is exposed to a fire in that room. The back side of the panel has been evaluated in the deviation Part VII, Section 4.6 of the FPR, as not affecting the fire rating of the fire barrier. However, the manual control valves in the panel should also be evaluated as a part of this deviation. (3) FPR Part II, Section 3.0 states that the plan meets the requirements of 10 CFR 50.48 paragraphs (a) and (e). Paragraph (e) has a reserved status and should be deleted. The current deviations in the FPR have been reviewed to ensure that they've been captured in the fire hazard analysis. The sections where the deviations were not in the fire hazard analysis have been added.</p> <p>PER 121969 identified that the current TVA Nuclear organizational structure indicates the Program Manager Fire Protection reports to Mechanical/Nuclear Engineering/Codes Manager, which reports to the General Manager Nuclear Engineering which reports to the VP Engineering &amp; Technical Services. The WBN FPR indicates that the Corporate Engineering Chief Engineer assumes or delegates responsibility but does not appear to exist on the TVAN organizational structure. The Fire Protection Report (FPR) is being revised to address the current TVA nuclear organizational structure.</p> <p>PER 160715 identified that Part II of the Fire Protection Plan, Table 14.10 (Fire Safe Shutdown Equipment) requires clarification for Temperature Control Valves (TCVs) for the Lower Contmt Coolers (LCCs) and CRDM Coolers. Table 14.10 Defines the Fire Safe Shutdown (FSSD) Condition for these TCVs as "OPERABLE." However, Engineering Calculation WBNOSG4-31 defines the Appendix R requirement for the TCVs as: The TCVs must not close, that is, the TCV shall be in the OPEN position. (Reference Technical Evaluation for WO 05-815967-000). Therefore, Table 14.10 should be revised to clarify that Appendix R Operability includes the TCV either Open or capable of being Opened, etc. In addition, the Table should provide detail (number and combination of cooler and fans) which will satisfy OR-14.10 as stipulated elsewhere in the FPR and in the referenced calculation. It is noted that WBN currently has two coolers (LCC A-A, 01/02/2009) and LCC C-A, 3/24/2008) in "OR Tracking" due to the TCVs not functioning correctly in AUTO. Therefore these coolers' TCVs have been placed in the OPEN position. However, because the FPR requires either 3 of 4 LCC Operable or any combination of 2 LCCs and 2 CRDM Ctrs, OR 14.10 is currently considered "Tracking Only" and the FPR Actions listed in Part II, Section 14.10 (Fire Safe Shutdown Equipment) do not appear to apply. These actions would have required a PER initiated to request engineering evaluations if the TCVs were not "OPERABLE." Since the TCVs have been placed in OPEN and the remaining LCCs and CRDM as a group remain OPERABLE, these actions were not taken when the TCVs malfunctioned. This PER resolution should evaluate the appropriateness of these actions.</p> <p>PER 161040 identified that the Fire Safe Shutdown Analysis (FSSA) for AV36 identifies a Manual Operator Action (MOA) # 580 to pull a fuse set to close four FCVs. The Fire Protection Report (FPR) identifies that the End Device for this action as 1-FCV-43-55-A, STEAM GEN 1 DRUM/BLDN SAMPLE ISOL, but does not identify the other three valves (1-FCV-43-58-A STEAM GEN 2 DRUM/BLDN SAMPLE ISOL, 61-A STEAM GEN 3 DRUM/BLDN SAMPLE ISOL and 64-A STEAM GEN 4 DRUM/BLDN SAMPLE ISOL). TVA drawing 45A897-1, "Manual Actions Required for Safe Shutdown Following a Fire" (design output) and Abnormal Operating Instruction AOI-30.2, "Fire Safe Shutdown" have the correct valves listed. The action to pull the fuse set will close all four valves. Therefore, the FPR is revised to note all 4 valves for this MOA.</p> <p>PER 161116 identified that Local Switch 1-HS-3-116A/C is not tested for P Auto when Hand Switch 1-HS-3-116B is in the Aux position. The FPR Part VII, Section 2.1.2 requested a NRC Deviation from providing CST level indication in the ACR. This deviation was based on the automatic switchover from CST to ERCW which the NRC granted in SER Supplement 18. The other Local Switches for MDAFW</p> |

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|    |   |
|----|---|
|    | <p>Pumps that provide this function need to be verified that this function is tested.</p> <p>PER 170296 identified that other administrative changes to the FPR were found and corrected. That is, Part VI, Section 3.5.2.1 in table "Major Equipment Credit" a typographical error was corrected with the component identifiers (IDs), and Part VI Section 3.44.2 is being revised to list Manual Operator Actions (MOAs) 729 and MOA 728 in the Local Manual Operator Actions table that are already contained in Part VI Section 3.40.2.1 and Section 3.49.2.1 in their respective Local Manual Operator Actions table. Also, Part II, Section 12.10 states that compartmentation drawings are in Part VI and Part II, Section B.14.8 states that fire-rated assemblies/fire barriers are in Part VI. The drawings and barriers are in Part II not in Part VI.</p>   |
|    |   |
| 3. | <b>Screening:</b>   |
|    | <p>Answer the following questions; include a reference to the applicable regulatory, licensing basis, or NFPA document(s), and a brief description of why the proposed change does <u>or</u> does not satisfy the referenced document(s).</p> <p>Note: If acceptance of the feature being changed was based on a commitment to "exceed" an applicable requirement or guidance document, then further evaluation may be necessary.</p>   |
|    | <p><b>A. Does the proposed change satisfy applicable fire protection regulatory requirements (i.e., GDC, 10CFR 50.48 and Appendix R), guidance documents (i.e., NUREG 0800, NRC Generic Letters, NFPA Codes, or NRC-approved NEI guidance documents), and/or the fire protection licensing basis (i.e., previously approved alternate compliance strategy, exemption, deviation, SER, docketed correspondence, or NFPA Codes of Record, etc.)?</b></p>  |
|    | <p><input checked="" type="checkbox"/> Yes<br/> <input type="checkbox"/> No</p>   |
|    | <b>Basis for Determination:</b>   |
|    | <p>PER 121905 addresses several issues concerning the Fire Protection Report. (1) The current deviations documented in section VII of the FPR have been reviewed to ensure that they've been referenced as appropriate in Part VI of the Fire Protection Report. The sections where the deviations were not in Part VI have been revised. These additions are administrative changes only. The deviation in Part VII Section 4.4 listed the rooms associated with this deviation differently from design output. Specifically, the FPR lists the rooms as 742.0-A4, -A5, -A6, -A7, and -A9 rather than 742.0-4, -5, -6, -7, and -9. Also, for the deviation in Part VII Section 2.6, the 2 hour fire barrier does not correlate with the design output for the Unit 2 room 737.0-A9. Specifically, the walls are noted as the 2 Hour fire barriers for room 737.0-A9. Identifying the deviations in Part VI to make the FPR consistent with Part VII is considered an administrative change only, and will not be addressed further in this evaluation. (2) The carbon steel (A36) panel located inside of the Fuel Oil Transfer Pump Room is 1/8" thick. This panel contains a manual control valve (0-FSV-39-27) for the CO<sub>2</sub> system and the valve is inside a metal box that is inside the panel. NFPA 12, Section 1433, it requires that "all devices shall be located, installed or suitably protected so that they are not subject to mechanical, chemical, or other damage which would render them inoperative." The back side of the panel has been evaluated in the deviation Part VII, Section 4.6 of the FPR, as not affecting the fire rating of the fire barrier. However, the valve in the panel should also be evaluated as a part of this deviation. This evaluation is addressed in detail in Section 4 below. (3) FPR Part II, Section 3.0 states that the plan meets the requirements of 10 CFR 50.48 paragraphs (a) and (e). Paragraph (e) has a reserved status and has been deleted from 10 CFR 50.48. The FPR has therefore been revised to delete Paragraph (e) from the Basis of the Fire Protection Plan section. This change is an administrative only, and will not be addressed further in this evaluation.</p> <p>PER 121969 is a clarification in the TVA Nuclear organizational structure titles, which is an administrative change only, and will not be addressed further in this evaluation.</p> <p>PER 160715 requires clarification for TCVs for the LCCs and CRDM Coolers since Table 14.10 requires these valve for FSSD condition to be "OPERABLE." The TCVs, during normal operation, modulate to control temperature; that is, the valves range from fully open to partially open. The FPR Bases Section 14.10.1 has been revised to clarify that "OPERABLE" for these valves means</p> |

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|  |  |
|--|--|
|  | <p>a position to ensure that their respective cooler has sufficient cooling flow to maintain the Reactor Building Lower Compartment temperature. This is an administrative change only. The PER also states that Table should provide detail (number and combination of cooler and fans) which will satisfy OR-14.10 as stipulated elsewhere in the FPR and in the referenced calculation. The FPR was searched, and number and combination was not contained in the FPR. The number and combination was contained in the calculation. The calculation for Logic Classification (Key 37J), "Containment Cooling System" logic diagram shows that either 3 of 4 LCCs, or any combination of 2 LCCs and 2 CRDM Coolers will meet the performance goal. That is, depending on the location of an Appendix R fire, and the cables and supporting equipment that are affected, the analysis must demonstrate that this performance goal is satisfied. Therefore, the logic diagram is for use in the analysis, and is not being added to the FPR. The clarification for "OPERABLE" for these valves is considered an administrative change only, and will not be addressed further in this evaluation.</p> <p>PER 161040 is an enhancement to the Fire Protection Report that will identify all four valves associated with the Manual Operator Action 580. Design Output 45A897-1, "Manual Actions Required for Safe Shutdown Following a Fire" and Abnormal Operating Instruction AOI 30.2, "Fire Safe Shutdown" correctly identifies all four valves. This change is an administrative change only, and will not be addressed further in this evaluation.</p> <p>PER 161116 has added a testing requirement from the Fire Protection Report Part VII for the deviation of the automatic switchover from the CST to ERCW when using MDAFW pumps. The Flow Control Valves (1-FCV-3-116A-A, 1-FCV-3-116B-A, 1-FCV-3-126A-B, and 1-FCV-3-126B-B) are safety related, are required to be operable in accordance with the Technical Specification (TS), and are currently tested in accordance with Surveillance Instructions (1-SI-3-21 and 1-SI-3-22). These FCVs were tested with the transfer switch is placed in the Aux position, and verified that the FCVs would open with the hand switch in the Auxiliary Control Room (ACR). When the hand switch is in P-AUTO and the transfer switch is placed in the Aux position, the FCV associated with each hand switch was not tested for automatic opening upon receiving a 2/3 logic signal for depletion of the CST. As apart of the immediate actions for this PER, testing was performed on these components and the valves were verified to be operable. This is in addition to the TS function and will be tested in every 18 months. The testing has been added to FPR Part II "Testing and Inspection Requirements (TIR)" which makes the FPR in compliance with the deviation.</p> <p>PER 170296 identified changes to the FPR Part VI Section 3.44.2 is being revised to list Manual Operator Actions (MOAs) 729 and MOA 728 in the Local Manual Operator Actions table that are already contained in Part VI Section 3.40.2.1 and Section 3.49.2.1 in their respective Local Manual Operator Actions table. Part VI Section 3.44.1 is for an Appendix R fire in Analysis Volume AV-066 (Room 772.0-A8) and contains cables and/or equipment associated with the 5<sup>th</sup> Vital Battery. This AV has been analyzed to address the effects of a fire on the 125V DC system if the 5<sup>th</sup> Vital Battery is in service in replacement of any one of the other four normally credited batteries. There will be an additional four analyses performed for this AV to address the various combinations where the 5<sup>th</sup> Vital Battery can be used. Therefore, the Manual Operator Actions (MOA) for specific rooms depending on which solid state protection channel is available. For example, if Channel I (AV-066D) is available, perform MOAs for Room 772-A4, and if Channel III (AV-066F) is available, perform MOAs for Room 772-A14. These two MOAs were found in the FPR for Rooms 772-A4 and 772-A14 and have been added to Section 3.44.2 for consistency. These changes are administrative changes only, and will not be addressed further in this evaluation.</p> <p>PER 170296 also identified that the FPR Part V1 page 82 a typographical error was corrected with the component identifiers (IDs) and descriptions for the Component Cooling System Pump C-S, and Motor-Driven AFW Pump 1B-B. Also, Part II, Sections 12.10 and Section B.14.8 have been revised to reference the correct location for drawings and barriers which are in Part II. These are administrative changes only, and will not be addressed further in this evaluation.</p> |
|  |  |
|  | <p>If yes, <u>then</u> the proposed change does not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire and NRC approval is not required, check Steps 3.B and 3.C N/A, and proceed to Step 4 B (see Appendix A for additional guidance).</p>   |



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|    |   |
|----|---|
|    | If no, <u>then</u> complete Step 3.B.   |
|    |   |
| E. | Was the plant licensed prior to January 1, 1979   |
|    | <input type="checkbox"/> Yes  |
|    | <input checked="" type="checkbox"/> No  |
|    | <input type="checkbox"/> N/A  |
|    |   |
|    | If yes, <u>then</u> complete to Step 3.C.   |
|    | If no, <u>then</u> check Step 3.C N/A and proceed to Step 4 (see Appendix A for additional guidance). |
|    |   |

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- C. Does the proposed change satisfy the detection, suppression and/or separation requirements within the fire area or zone affected by the change specified in Appendix R Sections III.G.2 and/or III.G.3?

☐ Yes  
☐ No  
☒ N/A

If yes, then proceed to Step 4 (see Appendix A for additional guidance).

If no, then NRC approval is required prior to implementing the proposed change. Proceed to Step 5.

## 4. Evaluation:

Does the proposed change adversely affect the ability to achieve and maintain safe shutdown in the event of a fire (provide justification below or attach Generic Letter 86-10 type or equivalent evaluation)?

☐ Yes  
☒ No

Basis for Determination:

PER 121905 Item 2 and PER 161116 will be addressed in this evaluation.

**PER 121905** Item 2 deals with the carbon steel (A36) panel located in the wall of the Fuel Oil Transfer Pump Room. This panel contains a manual control valve (0-FSV-39-27) for the CO<sub>2</sub> system and the valve is inside a metal box that is inside the panel. The valve does contain metallic and compressible materials. NFPA 12, Section 1433, it requires that "all devices shall be located, installed or suitably protected so that they are not subject to mechanical, chemical, or other damage which would render them inoperative." The back side of the panel has been evaluated in the deviation Part VII, Section 4.6 of the FPR, as not affecting the fire rating of the fire barrier. However, the valve in the panel should also be evaluated as a part of this deviation. Fuel Oil Transfer Pump Room is in Fire Area 53, Analysis Volume AV-081B, and has full automatic detection (thermals) and full CO<sub>2</sub> suppression. The combustible loading for this room is 3,740 BTU/ft<sup>2</sup> which contains 16 lb of plastic (all cables are enclosed in conduit except for lighting, a speaker, and valves), and the lighting and motor for pump 1-PMP-18-9B are the sources of ignition. The fire severity the room is insignificant. This room is such that it is highly unlikely that a fire could progress past the incipient stages without detection, controlled by the subsequent suppression of the automatic CO<sub>2</sub> system, and the plant fire department putting out the fire. This is based on the following: (1) lack of ignition source(s) with sufficient energy to introduce thermal insult to more than a local area of exposed cables; (2) existence of a detection system which ensures prompt detection of a fire in its incipient stages; (3) a room configuration such the cables are located less than 2 feet below the ceiling and are not routed together to create a mass large enough that would even sustain any significant type fire in the room that would create a temperature high enough to damage the valve, and (4) the path the heat transfer would have to travel from the room through back side of the panel, through dead air space, and through the metal box that contains the valve would take a certain amount of time after the fire was established, which results in the heat in the room having little influence on the valve before fire fighting activities are completed.

In addition, WBN Fire Brigade has the capability, after they arrive on the scene, if the fire is not out to release an additional charge of CO<sub>2</sub> if available or put out the fire with a fire hose. The carbon steel (A36) plate is 1/8" thick, has a melting point of 2725° F, and has already been qualified as a fire barrier. The valve contains metallic and compressible materials. The compressible materials are the most limiting component for temperature, and assuming that they are rubber, has a maximum operating temperature of 170° F. Without any suppression (WBN has CO<sub>2</sub>) and by modeling the gas layer temperature and smoke layer height in the room (attached), the results show that the temperature reaches a maximum of 180° F in 10 minutes. The bottom of the hot gas layer is 6 feet from the floor and the top of the panel is 4' - 8" from the floor. The temperature is not sufficient for the heat to be transferred from the room through back side of the panel, through dead air space, and through the metal box that contains the valve to damage the compressible materials of the valve. Therefore, it is confirmed that a fire in the Fuel Oil Transfer Pump Room will not affect the operability of the manual CO<sub>2</sub> valves.

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**Fire Protection Program Change Regulatory Review (FPPCRR)**  
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**PER 161116** identified that Local Switch 1-HS-3-116A/C is not tested for P Auto when Hand Switch 1-HS-3-116B is in the Aux position. The FPR Part VII, Section 2.1.2 requested a NRC Deviation from providing CST level indication in the ACR. This deviation was based on the automatic switchover from CST to ERCW which the NRC granted in SER Supplement 18. The other Local Switches for MDAFW Pumps that provide this function need to be verified that this function is tested. The Flow Control Valves (1-FCV-3-116A-A, 1-FCV-3-116B-A, 1-FCV-3-126A-B, and 1-FCV-3-126B-B) are safety related, are required to be operable in accordance with the Technical Specification (TS), and are currently tested in accordance with Surveillance Instructions (1-SI-3-21 and 1-SI-3-22). These FCVs were tested with the transfer switch is placed in the Aux position, and verified that the FCVs would open with the hand switch in the Auxiliary Control Room (ACR). When the hand switch is in P-AUTO and the transfer switch is placed in the Aux position, the FCV associated with each hand switch was not tested for automatic opening upon receiving a 2/3 logic signal for depletion of the CST. As apart of the immediate actions for this PER, testing was performed on these components and the valves were verified to be operable. This is in addition to the TS function and will be tested in every 18 months. The testing has been added to FPR Part II "Testing and Inspection Requirements (TIR)" which makes the FPR in compliance with the deviation.

If yes, then the proposed change may not be implemented without prior NRC approval.

If no, then the proposed change does not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire, and NRC approval is not required.

**5. Conclusion:**

☒ Proposed change may be implemented without prior NRC approval.

☐ NRC approval is required prior to implementing the proposed change.

**6. I have determined that the documentation is adequate to support the above conclusion.**

Preparer: Ernest T. Haston

Print

Signature

Date

Reviewer: Robert R. Kirkpatrick

Print

Signature

Date

**ENCLOSURE 1**

**ATTACHMENT 2**

**Response to NRC's Request for Information Regarding "Fire Protection Report"**

**Unit 1/Unit 2 As-Designed FPR, Part II, Table Titled:**

**"Fire Pump Inoperability and Compensatory Actions"**

## PART II - FIRE PROTECTION PLAN

### FIRE PUMP INOPERABILITY AND COMPENSATORY ACTIONS

| Status                | 14.2.1.a  | 14.2.1.b  | 14.2.1.c  | 14.2.2         | 14.2.3                          | 14.2.4.a                        | 14.2.4.b                     | 14.2.5.a                      | 14.2.5.b                     |
|-----------------------|---|---|---|----------------|---------------------------------|---------------------------------|------------------------------|-------------------------------|------------------------------|
| <b>Operable</b>       | 2 EMDPs   | 2 EMDPs   | 2 EMDPs   | DFP AND 1EMDP  | DFP                             | 1 EMDP                          | 1 EMDP                       | NO PUMPS                      | NO PUMPS                     |
| <b>Inoperable</b>     | DFP   | DFP   | DFP   | 1 EMDP         | 2 EMDPs                         | DFP AND 1EMDP                   | DFP AND 1EMDP                | All Pumps                     | All Pumps                    |
| <b>Planned outage</b> |   | Ensure 3 EMDPs available AND establish fire watch                   | Provide backup pump AND establish fire watch                              |                |                                 |                                 |                              |                               |                              |
| <b>24 hours</b>       |   |   |   |                |                                 | Restore 1 EMDP AND Enter 14.2.1 | Restore DFP AND Enter 14.2.2 | Establish Back-up             | Establish Back-up            |
| <b>48 hours</b>       |   |   |   |                |                                 |                                 |                              | Restore 1 EMDP                | Restore DFP AND Enter 14.2.3 |
| <b>72 hours</b>       |   |   |   |                |                                 |                                 |                              | Restore 2nd EMDP,             |                              |
| <b>7 days</b>         | Restore DFP OR Enter 14.2.1.b OR Enter 14.2.1.c | Ensure 3 EMDPs available AND establish fire watch OR Enter 14.2.1.c | Provide backup pump AND establish fire watch Enter 14.2.1b OR Restore DFP |                | Restore 1 EMDP AND Enter 14.2.2 |                                 |                              | Restore DFP OR Enter 14.2.5.b | Restore 2 EMDPs              |
| <b>30 days</b>        |   |   |   | Restore 1 EMDP |                                 |                                 |                              |                               |                              |

EMDP = Electric Motor-Driven Fire Pump

DFP = Diesel Engine-Driven Fire Pump

## **ENCLOSURE 2**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

#### **Regulatory Commitments**

1. TVA's response to Letter Item 3. [NRC Question RAI FPR II-13] states:

**[1]** Part II, Section 14.3.1.b.1 of the FPR should say "For either Reactor Building...".

**[2]** A review of the FPR revealed three other places where the discussion concerns both units:

1. Table 14.3, item 14.3.c should read "... Unit 1 and 2 Containment Purge Air Exhaust Filters, ...".
2. Part III, Section 4.7, third paragraph should read "The CCS system provides cooling for the following safe shutdown equipment per unit." The CCS system equipment is for both units.
3. Part IV, Section 3.3, second sentence should read "The number in ( ) is the number available for shutdown." This deletes the reference to Unit 1 only.

These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR.

2. For dual unit operation, CCS Pump 2B-B will be returned to its Unit 2 functional role and will be included in the Technical Specification Bases Section 3.7.7. (Letter Item 4. [NRC Question RAI FPR II-14])
3. Table 14.1 contains detectors that are for protection of components and areas required for fire safe shutdown. The detection zone 413 contains the detectors provided for the Motor Driven Main Feedwater Pump located in the Turbine Building. The Motor Driven Main Feedwater Pump is not required for fire safe shutdown; therefore, this line item for zone 413 is deleted from Table 14.1. These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR. (Letter Item 6. [NRC Question RAI FPR II-16])
4. Part II and Part VI were corrected to show the damper (2-1SD-31-3872) is in the fire barrier separating rooms 713.0-A29 (not 737-A9) and 737.0-A8. These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR. (Letter Item 8. [NRC Question RAI FPR II-18])
5. A review of the HVAC configuration control drawings (47A381 series, 47W866 series, and 47W920 series) has been performed to determine the correct identification number and fire resistance rating of the damper. The correct damper number is 1-1SD-31-2516 and correct fire rating of the damper is 3 hours. A review of the damper information contained in Table 14.8.2 against the Damper tables provided in Part VI has also been completed. The information in the tables (Table 14.8.2 and Part VI Damper tables) has been verified and the discrepancies corrected. These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR. (Letter Item 9. [NRC Question RAI FPR II-19])

## **ENCLOSURE 2**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

6. The referenced conflicts and inconsistencies between Part II, Section 14.2 "Water Supply" and the "Fire Pump Inoperability and Compensatory Actions" Table has been reviewed and Section 14.2 and the Table has been revised to reflect consistency between the two parts. The revised table is included as Attachment 2 to this letter and will be incorporated into the FPR as part of the As-Constructed update of the FPR prior to Unit 2 initial fuel load. (Letter Item 24. [NRC Question (RAI FPR II-34)])
7. It is TVA's position that only qualified personnel are allowed and required to make the decisions as to which of the three conditions apply to each individual circumstance. Only Sections 14.8.1.a and 14.8.1.b apply to ERFBS and radiant energy shields. Section 14.8.1.c does not apply to ERFBS configurations. Section 14.8.1.c will be clarified to denote that it does not apply to ERFBS and radiant energy shields. (Letter Item 27. [NRC Question RAI FPR II-36])
8. Part III, Sections 2.3 and 3.4.3 provide qualitative statements regarding the need to control RCS pressure to maintain sub-cooling margin such that natural circulation would not be adversely affected by large bubble formation in the reactor vessel. Both statements convey the desired information, but for consistency Section 3.4.3 will be revised to say "minimize void formation" rather than "prevent void formation" and thereby be consistent with Section 2.3. These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR. (Letter Item 33. [NRC Question RAI FPR III-7])
9. TVA's response to Letter Item 39 [NRC Question RAI FPR III-13] states:
  - [1] Part III, Section 4.7 is incorrect and the third paragraph should read "The CCS system provides cooling for the following safe shutdown equipment per unit." The CCS system equipment is for both units.
  - [2] A review of the FPR revealed three other places where the discussion concerns both units:
    1. Table 14.3, item 14.3.c should read: "... Unit 1 and 2 Containment Purge Air Exhaust Filters, ...".
    2. Part IV, Section 3.3, second sentence should read: "The number in ( ) is the number available for shutdown." This deletes the reference to Unit 1 only.
    3. Part II, Section 14.3.1.b.1 of the FPR should say "For either Reactor Building...".

These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR.
10. TVA's response to Letter Item 42 [NRC Question RAI FPR V-3] states:
  - [1] Part IV, Section 3.3 is incorrect. The second sentence should read "The number in ( ) is the number available for shutdown." This deletes the reference to Unit 1 only.

## **ENCLOSURE 2**

### **Response to NRC's Request for Information Regarding "Fire Protection Report"**

[2] A review of the FPR revealed three other places where the discussion concerns both units:

1. Table 14.3, item 14.3.c should read: "... Unit 1 and 2 Containment Purge Air Exhaust Filters, ...".
2. Part II, Section 14.3.1.b.1 of the FPR should say "For either Reactor Building...".
3. Part III, section 4.7 is incorrect. The third paragraph should read: "The CCS system provides cooling for the following safe shutdown equipment per unit." The CCS system equipment is for both units.

These changes will be incorporated into the next revision to the Unit 1/Unit 2 As-Designed FPR.

11. As described in Enclosure 2 to TVA letter to NRC dated March 31, 2011, most of WBN Unit 2 operator manual actions are preventative rather than reactive. That is, they are driven by procedure rather than reacting to changing plant conditions as indicated by instrumentation and alarms. While there are some actions that are taken in response to the fire itself (de-energize electrical board that is on fire), most WBN Unit 2 actions are in response to tripping the reactor. This clarification of T=0 is being included in the ongoing revision of Part V Section 2 which will be included in the next FPR revision. (Letter Item 43 [NRC Question RAI FPR V-11])