



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

March 16, 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 FINAL SAFETY ANALYSIS  
REPORT (FSAR) AMENDMENT RELATED TO SECTION 9.5.1 “FIRE  
PROTECTION SYSTEM” (TAC NO. ME3091)**

**Reference: NRC Letter to TVA dated February 9, 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.  
M/E3091)”**

The purpose of this letter is to respond to the referenced NRC request for information pertaining to Unit 2 FSAR amendment section 9.5.1 and to address NRC's questions received in February 11, 2011 and March 3, 2011 emails. 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.

DOBO  
NRC

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I declare under the penalty of perjury that the foregoing is true and correct. Executed on the 16<sup>th</sup> day of March 2011.

Sincerely,

A handwritten signature in black ink, appearing to read 'David Stinson', with a stylized flourish at the end.

David Stinson  
Watts Bar Unit 2 Vice President

Enclosures:

1. Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1 "Fire Protection System" and Questions Received During NRC Meeting Held on February 3, 2011
2. Regulatory Commitments

Attachments to Enclosure 1:

1. Revision Log for Unit 1 Fire Protection Report, Revision 41
2. Unit 2 Fire Protection Report Figures Part II-1A thru II-40A
3. Unit 2 Fire Protection Report Part III Figures
4. Unit 1/2 FPR Part II, Reference 4.2.59, Excerpt of Calculation WBN-EEB-EDQ-00099920090016-Appendix R-Unit 1 and 2 Manual Actions Requirements

cc (Enclosures):

U. S. Nuclear Regulatory Commission  
Region II  
Marquis One Tower  
245 Peachtree Center Ave., NE Suite 1200  
Atlanta, Georgia 30303-1257

NRC Resident Inspector Unit 2  
Watts Bar Nuclear Plant  
1260 Nuclear Plant Road  
Spring City, Tennessee 37381

## ENCLOSURE 1

### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

Reference: 1. NRC letter to TVA dated February 9, 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 response to:

**Item I:** The referenced NRC request for information (RAI) pertaining to the WBN Unit 2 FSAR amendment, Section 9.5.1 (Reference 1)

**Item II:** NRC's RAI received in February 11, 2011 and March 3, 2011 emails in support of their review of the WBN Unit 2 Fire Protection Report (FPR)

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

#### **I. TVA's Response to the Referenced NRC RAI:**

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

*A conflict exists in that Part I, Table 1-1 of the submitted Fire Protection Report does not reflect the change identified for Revision 40 in the "WBN Fire Protection Report Revision Summary 6 thru 40" table in Tennessee Valley Authority's (TVA's) December 20, 2010, letter.*  
**[A]** Resolve this conflict.

**[B]** Confirm that an extent of condition review has been conducted to ensure that: a) all of the identified changes have been incorporated into the submitted Fire Protection Report, and b) all changes have been identified. Any conflicts or discrepancies thus identified must be resolved.

#### **TVA Response:**

**[A]** Table 1-1 in Part I has been revised to resolve this conflict. It should be noted that Unit 1 FPR, Revision 41, was issued on February 22, 2011. Attachment 1 contains a copy of the revision log for Revision 41. Also, see response to RAI FPR General-3 in which TVA commits to provide a side-by-side comparison between the Unit 1/Unit 2 "As-designed" FPR that was submitted in TVA's letter to NRC, dated January 14, 2011 and the Unit 1/2 FPR that will be submitted by March 16, 2011, which includes changes made in Unit 1 FPR, Revisions 40 and 41.

**[B]** TVA performed an extent of condition review of this issue and determined that WBN Unit 1 FPR, Revision 39, was used as the starting point for the WBN Unit 1/2 report instead of Revision 40. Since Revision 39 from TVA's controlled document program was used, Revisions 5 through 39 were already contained in the document. There have been no additional discrepancies caused by this issue. The changes contained in Revision 41 have been incorporated into the Unit 1/2 fire safe shutdown analysis and this FPR submittal, as appropriate.

## ENCLOSURE 1

### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

#### 2. NRC Request (RAI FPR General-2):

*[A] Provide a copy of the final "as-designed" Fire Protection Report.*

*[B] Provide an identification and justification of the changes to the Fire Protection Report between Revision 40 and the final "as-designed" version of the report, similar to those provided for Revision 6 through 40.*

*[C] Also provide a digital copy of Revision 40 of the Fire Protection Report.*

#### TVA Response:

**[A]** The "as-designed" FPR will be provided by March 16, 2011, except for Part V, which will be provided by April 29, 2011. (See Question 3. RAI FPR V-1 below)

**[B]** The changes between the Unit 1/Unit 2 "As-designed" FPR that was submitted in TVA's letter to NRC, dated January 14, 2011 and the Unit 1/2 Final "as-designed" FPR will be marked with Revision Bars in the file. Justification will be provided for non-editorial changes which are not directly related to Unit 2 operation by March 25, 2011.

**[C]** The digital copy of Revision 41 (current version) of the FPR will be included as part of the Unit 1/Unit 2 "as-designed" FPR submittal.

#### 3. NRC Question (RAI FPR V-1):

*Fire Protection Report Section 2.1, states that:*

*Abnormal Operating Procedure AOI-30.2, "Fire Safe Shutdown" has been developed to specify the manual actions which may be required for fires that damage equipment necessary to achieve and maintain safe shutdown. The fire safe shutdown procedures contained in AOI-30.2 were developed based on calculations EEB-ED-Q000-9992009-0012, "Equipment Required for Safe Shutdown per 10 CFR 50 Appendix R" and WBNEEB-EDQ00099920090016, "Manual Actions Required for Safe Shutdown Following a Fire." The procedure documents the required manual action(s) that must take place given an Appendix R fire in any room of the plant.*

*Fire Protection Report Part V only discusses "Manual Actions Prior to Main Control Room Abandonment" (Section 2.2) and "Manual Action in Location of the Fire" (Section 2.4). No information is provided regarding the assumptions or criteria for the other manual actions. No information is provided regarding the criteria that were analyzed to demonstrate feasibility and reliability.*

*TVA's August 9, 2010, letter to the U.S. Nuclear Regulatory Commission (NRC) includes an attachment titled, "Operator Manual Actions Added for Unit 2 Safe Shutdown (baseline)." In this attachment, a number of Unit 2 manual actions have very little margin documented:*

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- 1053, 1046, 1018, 1021, 1186 - 2 minutes margin, equivalent to 10 percent of required time,
- 1287, 1207, 1047 - 3 minutes margin, equivalent to 17 percent of required time,
- 1184, 1185 - 4 minutes margin, equivalent to 20 percent of required time.

*The minimal amount of margin included in these and other manual actions, some have 5, 6, and 10 minutes of margin, provide little confidence that the manual actions can be feasibly and reliably performed. In addition, no information is provided regarding diagnosis time or manual actions performed simultaneously for the same fire since fire area of origin is not provided in the August 9, 2010, letter.*

**[A]** *Provide a description of the criteria and assumptions used to ensure that Unit 2 manual actions (including manual actions for alternate or dedicated shutdown) are feasible and reliable. This should include the criteria and assumptions for feasible and reliable diagnosis time, implementation time, and time margin for the other operator manual actions not explicitly described in Part V.*

*A specific discussion of each of the manual actions is not needed, except for components as part of the safe shutdown success path - see RAI FPR V-2, where manual actions are used to resolve a multiple spurious operation scenario - see RAI FPR V-2, or where Unit 2 manual actions for reentry are needed in less than approximately 1-hour - see RAI FPR V-7. Only the criteria and assumptions that are used in the calculations to assure that the manual actions are both feasible and reliable.*

**[B]** *Additionally, a number of entries in the "Operator Manual Actions Added for Unit 2 Safe Shutdown (baseline)" table from TVA's August 9, 2010, letter to the NRC contain "XXX" entries (for example "2-HS-3-XXX-B," "2-JB-292-XXX-B," and "Added by DCN XXX" for Manual Operator Action 1028). Provide the correct information and confirm that an extent of condition review has been conducted to identify and correct other similar instances.*

**[C]** *Also, provide an explanation of the entries in the "Notes" column of the same table.*

#### **TVA Response:**

**[A]** Response to this item will be provided by March 25, 2011.

**[B]** Response to this item is provided in Question 19 (NRC Question (RAI FPR VI-3)).

**[C]** The entries in the "Notes" column refer to clarifying notes contained in the Manual Actions calculation (see Unit 1/2 FPR Part II, Reference 4.2.59, Excerpt of Calculation WBN-EEB-EDQ-00099920090016-Appendix R-Unit 1 and 2 Manual Actions Requirements (Attachment 4)).

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### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

#### 4. NRC Question (RAI FPR V-2):

*Regulatory Guide 1.189, Revision 2, provides information regarding components required as part of the safe shutdown success path and components important to safe shutdown. The criteria for equipment required for the safe shutdown success path are included in Regulatory Guide 1.189, Revision 2, Section 5.3.1.1, and examples are provided in Sections 5.3.1.5 of the guide. These reviews should have been performed for Unit 1 operator manual actions; see Enforcement Guidance Memoranda 07-004 and 09-002.*

**[A]** *For Unit 2, manual actions that restore or that otherwise involve safe shutdown success path equipment or are part of a multiple spurious operation scenario resolution, provide a technical justification of the feasibility and reliability of each of the manual actions.*

**[B]** *For manual actions that do not involve safe shutdown success path components, but involve important to safe shutdown components, a description of the criteria and assumptions for feasibility and reliability for the manual actions is sufficient; see RAI FPR V-1.*

#### TVA Response:

**[A] [B]** Response to this item will be provided by April 29, 2011.

#### 5. NRC Question (RAI FPR V-3):

*Fire Protection Report Section 2.1.1 states:*

*Plant walk downs are conducted prior to unit 1 initial operations and will be prior to Unit 2 operations to sequence operator actions, verify the amount of time required to accomplish the manual action, and identify the minimum number of operators required to support manual actions given a fire in any plant location.*

*If plant walk downs have not yet been performed for Unit 2 manual actions, provide the bases for the timing provided in the Section 2.4.3 and letter dated August 9, 2010.*

*A conflict exists between the quoted statement and the statement in section 2.3 that states "Plant walk downs were conducted to verify the viability of the operator actions." Resolve these conflicting statements.*

*If final confirmed walk down information can't be made available in the near term, TVA shall provide a commitment to review the final walk downs and submit to the NRC the results of those walk downs for NRC approval if they differ from the assumptions and details provided in Part V or the other parts of the Fire Protection Report.*

#### TVA Response:

The wording in the draft FPR is intended to reflect the final disposition/configuration of the plant. The final plant walkdowns will be performed when construction is complete.

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Upon performing the final plant walk downs as prescribed in the FPR, Section 2.1.1, TVA will review the information and submit the results for NRC approval if they differ from the assumptions and details provided in Part V or the other parts of the FPR. Otherwise, TVA will inform the NRC when the walkdowns are complete and that no revisions to the FPR were required.

#### **6. NRC Question (RAI FPR V-4):**

*Fire Protection Report Section 2.4.2, Rev. 5 states:*

*A few rooms require entry for valve position manipulations approximately 1-hour after reactor trip.*

*Fire Protection Report Section 2.4.2, of the submittal states:*

*A few rooms require entry for valve position manipulations less than 2-hours after reactor trip.*

*The staff could not identify this change occurring as part of Revisions 6 through 40.*

*TVA has apparently applied this change and reduced the amount of margin to reenter a fire area from approximately 1-hour to less than 1-hour. This occurred based on Section 2.4.3.3, and 2.4.3.4, where room reentry is needed at 42 minutes.*

**[A]** *Provide the technical basis for changing reentry time from approximately 1-hour to less than 2-hour. This has the potential to reduce the reentry time to less than 1-hour, as evidenced in the above examples. [B] Provide a justification for any Unit 2 manual actions that require reentry in less than approximately 1-hour.*

#### **TVA Response:**

[A] FPR Part V, Section 2.4.2 has been revised to restore the original wording. Section 2.4.2 now states: "A few rooms require entry for valve position manipulations approximately 1-hour after reactor trip." There are four rooms that require reentry to a fire area. Three of the rooms have at least 60 minutes of margin to perform the required manual action. One room has 45 minutes of margin. See response to NRC Question RAI FPR V-7 below.

"Margin" is defined as follows: If a manual action must be completed within 70 minutes and it takes 10 minutes to perform the action, then there is a "margin" of 60 minutes. This "margin" is the time after an Appendix R event is declared in which the fire must be extinguished and the operator gains access to the area and begins the required manual action.

[B] No Unit 2 manual action has a reentry with a margin time less than 60 minutes.

## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"**

#### **7. NRC Question (RAI FPR V-5):**

*Insufficient information is provided in Section 2.4.3 to positively identify the manual actions in this section as Unit 1, Unit 2, or both. Some of the actions have room access times reduced to less than approximately 60 minutes.*

*Identify which manual actions described in Section 2.4.3 are required for Unit 2.*

#### **TVA Response:**

The applicable Units for which the manual actions identified in Part V, Section 2.4.3 are required are as follows:

<u>Room</u>	<u>Unit</u>	<u>Margin</u>
692.0-A7	1	60 minutes
713.0-A7	1	60 minutes
713.0-A20	2	60 minutes
737.0-A5	1	45 minutes

See response to RAI FPR V-7 below for the action in a room in less than 60 minutes.  
See response to Question 6 (RAI FPR V-4) for definition of margin.

#### **8. NRC Question (RAI FPR V-6):**

*Fire Protection Report Section 2.4.3.1, Submittal revision, states that if a fire in Room 692.0-A22 occurs, manual actions are needed in Room 713.0-A1B and eventual reentry to this room is needed. This is in conflict with Part I, Table 1-1, which does not indicate for Room 692.0A22 that, "Man. Ops. Req'd in any room due to fire in room."*

*Resolve the conflict between Section 2.4.3.1 and Table 1-1. In addition, Fire Protection Report Section 2.4.2.1, related to Room 692.0-A25 and Fire Protection Report Section 2.4.3.2, related to Room 713.0-A20, also include the same conflict.*

*Confirm that an extent of condition review of Table 1-1 consistency with the remainder of the document has been performed to identify and resolve other conflicts.*

#### **TVA Response:**

Design changes have been issued that eliminate the need for the manual actions in rooms 692.0-A22 and 692.0-A-25. The manual action for room 713.0-A20 has a margin of 60 minutes (see Response to RAI FPR V-4 above). Table I-1 has been revised to include the Unit 2 fire areas/rooms and now includes the "as-designed" information for each room. A review of the other sections of the FPR that contain information from which Table I-1 was developed has been done to ensure consistency between the applicable sections.



## ENCLOSURE 1

### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

#### **9. NRC Question (RAI FPR V-7):**

*Fire Protection Report Section 2.4.3.3 includes a manual action that requires room access to Room 729-A14 within 42 minutes. This is inconsistent with the approved fire protection program, Revision 5, which states that room access would occur in approximately 1-hour. There is no indication whether these are Unit 2 manual actions.*

*This would also apply for Section 2.4.3.4 for Room 737.0-A5.*

*For any Unit 2 manual actions that require reentry, provide a specific discussion of:*

- *Room construction and dimensions*
- *A description of the type detection and any fixed suppression system, including if the systems are code compliant and which version of the code*
- *Number and types of ignition sources in the area*
- *Horizontal and vertical distance between ignition sources in the area and equipment needed for safe shutdown (targets)*
- *If there is separation between the ignition sources and the targets, describe any continuous combustibles between them, such as cable trays.*
- *If flammable or combustible liquids are in the area provide a discussion of how the targets are protected from a flammable or combustible liquid fire*
- *A discussion of the effectiveness of any available fixed suppression related to the ignition sources*
- *A discussion of the analysis performed to assure feasibility and reliability of the manual actions.*

#### **TVA Response:**

The combined unit safe shutdown analysis does not require the 42 minute reentry time in room 729.0-A14. The justification for the acceptability of the 42 minute reentry time in Room 737.0-A5 is as follows:

<b>RAI FPR V-7</b>	<b>Fire Area 15 / AV-41S (Ventilation and Purge Air Room 737.0-A5)</b>
<b>V-7.a</b>	<b>Fire Prevention</b>
<p>The room has a floor area of 2,933 ft<sup>2</sup> and a ceiling height of 19 feet. The total combustible load of the area equates to a fire severity of approximately 20 minutes. The majority of the combustible load is the charcoal in the HVAC filters (approximately 59%), a radcon trash hold point (approximately 16%) and the insulation on the cables in two cable trays (approximately 16%). The remaining 9% of the combustible loading is widely dispersed in the room and consists of plastics associated with control panels, junction boxes, lighting units, etc., and lube oil (approximately 3 gallons) in four valves.</p>	

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### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

<b>V-7.b</b>	<b>Detection, Control, and Extinguishment</b>
<p>The room is protected with a cross-zone smoke detection system that is monitored in the Main Control Room (MCR). The room is provided with an automatic pre-action suppression system, and the charcoal filters are also provided with detection and automatic suppression. The room is of reinforced concrete construction (walls, floor and ceiling are minimum 12-inches thick) with a minimum fire resistance rating of 2 hours that separate it from adjacent Auxiliary Building rooms. It is separated from the Unit 1 Reactor Building by 36-inch thick reinforced concrete with a minimum fire resistance rating of 3 hours. A standpipe system is also provided with a hose station located just outside Door A124 and A126 for Fire Brigade use.</p>	
<b>V-7.c</b>	<b>Preservation of Safe Shutdown Capability</b>
<p>(1) The major potential fire hazard is the charcoal filters, and they are more than 30 feet from the Nitrogen Station where the manual action is performed and more than 20 feet from the PORV control circuits (routed in conduit) that, if damaged by the fire, would require the manual action. These circuits and the Nitrogen Station are separated by more than 80 feet. The separation in conjunction with the high ceiling, large volume, automatic suppression and detection gives a high degree of confidence that this manual action is feasible.</p> <p>(2) The cable trays are not considered to be an ignition source due to the coordinated circuit protection.</p> <p>(3) The radcon waste is not an ignition source and is located at the north end of the room more than 80 feet from the Nitrogen Station.</p>	
<b>V-7.d</b>	<b>MOAs Credited for a Fire In This Area</b>
	<b>MOA #163 – Control of 1-PCV-1-5 (PORV for Steam Gen. 1)</b>
<p>This manual action is only required if the fire in the middle part of the room caused the loss of control air. It is highly unlikely that a credible fire in this area would cause the loss of control air. However, the MCR operation staff trains on having to perform this action for a postulated fire in this room and have demonstrated that the action (travel time and performance of the action) takes less than 15 minutes. (Reverification and Revalidation of Appendix R Manual Operator Actions 4/8/2009.) The action has up to 60 minutes before it must be completed; therefore, this provides a 45-minute margin.</p>	
<b>V-7.e</b>	<b>Conclusion</b>
<p>Given the limited amount of combustible material, ignition sources, area wide detection and automatic suppression and large volume of the room, it is unlikely that a fire would occur and go undetected and unsuppressed and cause damage to the safe shutdown components. Even if such circumstances were to occur, Manual Action #163 is available to provide additional assurance that safe shutdown capability is maintained. An additional level of confidence is provided by the results of the IPEEE which determined the core damage frequency due to a fire for this room is 6.59E-08, which is well below the acceptable number of 1.0E-06.</p>	

## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"**

#### **10. NRC Question (RAI FPR V-8):**

*Fire Protection Report Section 2.5.1, states:*

*The possibility exists, however, that residual smoke from the postulated fire may require the Operator to wear a self contained breathing apparatus (SCBA); therefore, SCBAs are available for use if needed.*

*Confirm that the calculation of the timing, the plant walk downs for the Unit 2 manual actions that required reentry, and the affected manual action completion times include the time to obtain and don SCBA. Availability of the SCBA on the operator path of travel should be considered. In addition, emergency lighting availability in the SCBA storage area and access thereto should be considered if a fire is in an alternate or dedicated safe shutdown area or if the fire itself has the capability to affect offsite power.*

#### **TVA Response:**

Time to obtain and don SCBA is considered in the timing and plant walkdowns. Adequate backup lighting is ensured for the donning areas, MCR, and Auxiliary Control Room Areas.

#### **11. NRC Question (RAI FPR V-9):**

*Section 2.5.2 states that, "Each of the rooms is also provided with an automatic suppression system."*

*Room 729.0-A14 is included in Section 2.4.3.3, should have suppression based on 2.5.2, but suppression is not listed in Part I, Table 1.1.*

*Resolve the apparent contradiction for Room 729.0-A14. Perform an extent of condition review to assure that no Unit 2 fire areas have similar conflicts with Part I, Table 1-1.*

#### **TVA Response:**

The manual action in 729.0-A14 is no longer required (see Response to RAI FPR V-5). There are no Unit 2 fire areas that have a similar conflict (see Response to RAI FPR V-6).

#### **12. NRC Question (RAI FPR V-10):**

*Fire Protection Report Section 4.0 states that, "The operators will carry a portable lantern when required to perform a manual action in an area that has experienced a fire." Confirm for Unit 2 manual actions that emergency lanterns are available and access to the lanterns has been considered in the walk down time lines.*

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### **Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"**

#### **TVA Response:**

Currently to support Unit 1 operation there are 5 hand-held portable lanterns (one for each AUO responding to the fire) already established, maintained, and dedicated to Appendix R use in the equipment cage located in the Auxiliary Building, 480V Shutdown Board Room 1B, 757.0-A5. This cage is located within 40 feet of the door on the Unit 1 side of the MCR accessing the Auxiliary Building. This cage is separated by fire barriers from the area of the fire indicated by FPR Section 4.0. These lanterns are in addition to any hand-held flashlights the Assistant Unit Operators (AUO) normally carry or any hand-held lanterns/flashlights available in the MCR. Since these 5 lanterns are already established, maintained, and dedicated to support the Unit 1's Appendix R Program, they will be available when Unit 2 is operational. The requirement for a portable lantern for the affected AUO from this equipment cage will be evaluated during the Unit 2 walkdowns of operator manual actions to ensure that existing lighting is adequate.

#### **II. TVA's Response to NRC RAI Received by E-mail dated February 11, 2011:**

##### **NRC General comment:**

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

##### **1. NRC Question (RAI FPR General-3):**

*The staff found the side by side comparison versions of the selected Parts of the FPR submitted on January 25, 2011, to be useful in their review.*

*Provide a side by side comparison between Revision 40 and the "as-designed" version for Parts V and VI of the FPR, similar to those provided for the other Parts [I - IV and VII - X] of the FPR.*

##### **TVA Response:**

TVA provides a side-by-side comparison between the Unit 1/Unit 2 "As-designed" FPR that was submitted in TVA's letter to NRC, dated January 14, 2011 and the Unit 1/2 FPR that will be submitted by March 16, 2011, which includes changes made in Unit 1 FPR, Revisions 40 and 41. The WBN Unit 1, Revision 41 was issued on February 22, 2011. Attachment 1 contains a copy of the revision log for Revision 41. The changes in Revision 41 include the replacement of seven battery chargers, the addition of two spare battery chargers, and the replacement of two transfer switches associated with battery charger 6-S with four transfer switches that mechanically interlock spare chargers 6-S and 8-S so that only one charger can be used at a time. Spare chargers 7-S and 9-S are interlocked in a similar manner.

## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"**

#### **2. NRC Question (RAI FPR General-4):**

*It is difficult for the staff to fully understand the details of the installed detection and suppression systems for Watts Bar Nuclear Plant, Unit 2, solely from the tabular system listings in the FPR.*

*Describe how the Unit 2 changes are represented in the as-designed drawings indicating installed fire detection and suppression systems. Also, provide the as-designed versions of these drawings that include all Unit 2 and common Unit 1/2 Fire Areas.*

*This item was discussed with TVA at a February 3, 2011 public meeting, where TVA agreed to provide this information.*

#### **TVA Response:**

The as-designed installed suppression systems for both Unit 1 and 2 (includes all Unit 2 and common Unit 1/2) are depicted on Figures II-1A thru II-26A (Attachment 2). The only changes to the Unit 2 suppression and detection systems were in the Unit 2 Annulus where 30 new sprinkler heads were added. Additionally 18 new smoke detectors were added to various fire zones in the Unit 2 Reactor Building. Figures representing the as-constructed plant configuration will be provided after construction completion.

#### **3. NRC Question (RAI FPR General-5):**

*It is difficult for the staff to fully understand the details of the safe shutdown systems for WBN Unit 2 solely from the summary equipment listings in the FPR.*

*Describe how the Unit 2 changes are represented in the as-designed drawings indicating the post-fire safe shutdown flow paths. Also, provide the as-designed versions of these drawings that include all Unit 2 and common Unit 1/2 Fire Areas.*

*This item was discussed with TVA at a February 3, 2011 public meeting, where TVA agreed to provide this information.*

#### **TVA Response:**

TVA provided a "For Information Only" copy of the Unit 1 flow diagrams for the safe shutdown systems on March 9, 2011. The Unit 2 "as-designed" flow diagrams do not currently exist since there are numerous outstanding modifications to these drawings which exist only as change paper. Eventually, the modifications will be shown on the Unit 2 drawings as they are "as-constructed." Since Unit 2 will eventually be configured very close to the Unit 1 configuration, the Unit 1 flow diagrams are very close to the expected Unit 2 "as-constructed" drawings.

## ENCLOSURE 1

### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

#### **4. NRC Question (RAI FPR II-1):**

*The submitted "as-designed" revision of the FPR deleted the following paragraph from Part II, Section 1.0 (pg. II-1):*

*The Plan is applicable to Unit 1 and common areas needed for safe operation of WBN Unit 1. Unit 2 equipment, components, and cables required for Unit 1 operation are specified and treated as Unit 1 equipment, components, and cables. The WBN fire protection program does not take credit for Unit 2 equipment, components, and cables which are not specified for normal operation of Unit 1.*

**[A]** *Provide a description of the "Unit 2 equipment, components, and cables required for Unit 1 operation."*

**[B]** *Provide a disposition of the identified equipment, components and cables. For example, is this equipment/components/cables now "dual unit," or have they been assigned to one unit or the other? If they have been assigned to Unit 1, has replacement equipment/components/cables been installed for Unit 2? Or, if it has been assigned to Unit 2, has replacement equipment/components/cables been installed for Unit 1? If the equipment/components/cables are now "dual unit," describe how dual unit operation will affect the availability of this equipment for Unit 1 operations and the steps taken to mitigate this effect.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

**[A]** In general, most equipment shared between units carries a zero (0) identifier prefix. The electrical power distribution systems contain equipment with Unit 1 or Unit 2 identifier prefixes, but some of the loads are actually required for operation of the opposite unit. For example, two of the emergency diesel generators (EDGs) have Unit 1 prefixes and two have Unit 2 prefixes, but all four are generally considered necessary for operation of either unit because plant common equipment (e.g., ERCW pumps) may be powered from each EDG. Unit 2 equipment that was required to support Unit 1 operation will continue to support Unit 1 in addition to Unit 2, during dual-unit operation. For a complete list of safe shutdown equipment required for Unit 1 only operation of the plant, refer to FPR, Revision 41, Part III, Table 3-2, "Safe Shutdown Equipment List."

**[B]** Component Cooling System (CCS) Pump 2B (2-MTR-70-33-B) is the only component which is normally Unit 2 only, but that was physically realigned to support Unit 1 during single-unit operation. It was realigned in parallel with CCS pump C-S (0-MTR-70-51-S) to supply train B cooling loads such as the oil cooler for charging pump 1B. For dual-unit operation, CCS pump 2B will be aligned to support Unit 2. To fill the void in the Unit 1 post fire safe shutdown strategy left by aligning CCS pump 2B for Unit 2 service, two major modifications were required. In one case power and control cables for CCS pump C-S have to be protected with Electrical Raceway Fire Barrier System (ERFBS) (thermolag) to ensure

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### **Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"**

operability of the pump for fires where CCS pump 2B was previously credited. In another case, power and control cables for charging pump 1A have to be relocated and/or protected with ERFBS where charging pump 1B was previously credited but now unavailable because CCS pump C-S is in the fire location and CCS pump 2B is aligned to serve Unit 2. With these modifications Unit 1 can be safely shutdown without the services of CCS pump 2B.

Unit 2 will have its full complement of CCS pumps (CCS pump 2A and 2B) to serve unit 2 train A loads and CCS pump C-S will be available when needed to service unit 2 train B loads because its cables have been protected as described above. For a complete list of safe shutdown equipment required for dual unit operation of the plant refer to FPR, as-designed, Table 3-2, "Safe Shutdown Equipment List."

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

*A number references in Part II, Section 4 are now marked "Historical Information." If this indicates that the information in these documents has been superseded, or is no longer current, identify the documents where the current, correct information is maintained. Otherwise, describe what this marking is intended to indicate, and state where the current information is maintained.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

The calculations identified in References 4.2.10 to 4.2.15 were superseded by the calculation identified in Reference 4.2.9. The information on the drawings in Reference 4.2.16 is available in calculation EDQ00099920090012 (Reference 4.2.8). The information in the calculations in References 4.2.17 and 4.2.29 through 4.2.36 is in calculation EDQ00099920090012 (Reference 4.2.8).

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

*Fire Area 15-1 does not appear to be correctly marked on the compartmentation drawings provided on January 25, 2011. Correct this error. Ensure that all Fire Areas are correctly identified on the as-designed compartmentation drawings and other submitted drawings.*

*This item was discussed with TVA at a February 3, 2011 public meeting, where TVA agreed to provide this information.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

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### **Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"**

#### **TVA Response:**

TVA inadvertently provided the WBN Unit 1 compartmentation drawings on January 25, 2011, instead of the Unit 2 drawings. Attachment 2 contains the correct set of compartmentation drawings (Figures II-27A to -40A) for dual-unit operation. The Fire Areas are correctly identified, including Fire Area 15-1. The other submitted drawings (Figures II-1A to II-26A) provided in Attachment 2 do not contain Fire Area designations.

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

*Describe how the Unit 2 changes are represented in the as-designed compartmentation drawings. Also, provide the as-designed versions of the compartmentation drawings that include all Unit 2 and common Unit 1/2 Fire Areas.*

*This item was discussed with TVA at a February 3, 2011 public meeting, where TVA agreed to provide this information.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

The Unit 2 changes are in Fire Areas 65 to 77 and are shown on the compartmentation drawings, Figures II-27A to -40A (Attachment 2). These drawings show the Fire Areas for two unit (i.e., Unit 1, Unit 2 and Common) operation at WBN.

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

*Describe how the Unit 2 changes are represented in the as-designed versions of the balance of the Figures in Part II. Also, provide the as-designed versions of the balance of the figures in Part II that include all Unit 2 and common Unit 1/2 Fire Areas.*

*This item was discussed with TVA at a February 3, 2011 public meeting, where TVA agreed to provide this information.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

See response to Part II, Question 2 (RAI FPR General-4) above.



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

*Part II, Section 12.3.3 of the FPR provides design basis concentrations for the installed carbon dioxide suppression systems. However, soak times and the required concentrations are provided only for the Auxiliary Instrument Rooms and Diesel Generator Engine Rooms, and not for all of the installed systems.*

*Correct this omission and provide the required concentrations and duration of these concentrations for all of the installed carbon dioxide suppression systems.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

The FPR, Part II, Section 12.3.3 specifies the carbon dioxide (CO<sub>2</sub>) 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 of the involved rooms have a requirement to reach a specified concentration within a specified time period. The Diesel Generator Engine Room and the Auxiliary Instrument Room have the additional requirement for maintaining a minimum concentration for a specified time (i.e., soak time). The Diesel Generator Engine Rooms contain rotating equipment and thus has a minimum soak at 30 percent for 20 minutes in accordance with Section 253 of the 1973 Edition of National Fire Protection Association (NFPA) 12. While not stemming directly from an NFPA requirement, the soak time requirement for the Auxiliary Instrument rooms was negotiated between TVA and NRC during the licensing of WBN Unit 1.

The CO<sub>2</sub> protection for the other rooms (i.e., Computer Room, DG Electrical Board Rooms, Lube Oil Storage Room, Fuel Oil Transfer Room) is considered for property protection only and not for Appendix R fire protection and thus does not have a soak time requirement. The TVA WBN System Description, N3-39-4002, "CO<sub>2</sub> Storage, Fire Protection, and Purging," provides additional information on concentration vs. time for property protection:

<u>Room</u>	<u>Required Soak Time</u>
Computer Room	None
DG Electrical Board Rooms	None
Lube Oil Storage Room	None
Fuel Oil Transfer Room	None

Since there is not a soak time requirement for these rooms (FPR Part II, Section 12.3.3, Carbon Dioxide Suppression Systems), the FPR accurately reflects this information, and a revision to the FPR is not needed. In addition, none of the CO<sub>2</sub> suppression systems are required for compliance to Appendix R, Section III.G.2 separation requirements.

This information also matches the information provided in the NRC's Supplemental Safety Evaluation Report (SSER), Number 18. In addition, the SSER states the CO<sub>2</sub> protection is provided for property protection for these rooms.

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### **Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"**

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

*"Ignition source fire watch" is a term used in Part II, Section 11.0, but not defined elsewhere in the document. Provide more detail for these fire watches, including whether they are continuous or roving.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

The FPR, Part II, Section 11.0, is the only place where the ignition source control program is addressed to provide an overview of the program that satisfies the requirements of NRC guidance. The implementing procedure for WBN as well as the other two TVA sites for ignition source work such as flame cutting and welding is NPG-SPP-18.4.8, "Control of Ignition Sources (Hot Work)." This procedure addresses work involving ignition source work performed outside of designated shop areas within the Owner Controlled Area. There are no designated shop areas in the seismic structures or structures important to power production such as the Turbine Building and Condenser Circulating Water Pump Station. This procedure is patterned on NFPA 51B, "Standard for Fire Prevention in Use of Cutting and Welding Processes"; NRC guidance provided in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," dated June 20, 1977; and Appendix A to the Branch Technical Position (BTP) Auxiliary Power Conversion Systems Branch (APCSB) 9.5-1.

An ignition source fire watch is normally a continuous fire watch during the ignition source activity and for a period 30 minutes following the stopping of the activity as specified in NPG-SPP-18.4.7. There are select conditions where a continuous fire watch is not required if approved by the fire protection organization. These conditions are for ignition source work involving underwater welding, outside areas (fences, light poles, gates, piping, grating, etc.) where the potential for fire is minimal, and electric soldering. This exception is in accordance with NFPA 51B, which does not require a fire watch when the ignition source work is performed in a location where a minor fire might develop and as allowed by the NRC guidance provided in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

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

*In Part II, Section 13.0.A (and other places in Part II), the FPR describes reducing a continuous fire watch in any plant area to a roving fire watch when either Unit is in Mode 5, 6, or defueled.*

*Provide a summary evaluation and technical justification for reducing a fire watch from continuous to roving in areas containing safe shutdown equipment for a Unit that is in Modes 1 to 4, inclusive. Include a discussion of whether this reduction would also apply to ignition source fire watches.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

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#### TVA Response:

The reduction from continuous fire watch to hourly roving in Modes 5, 6, and core empty only applies to compensatory fire watches and not ignition source fire watches. The FPR, Part II, Section 14 specifies which compensatory fire watches can be changed based on this Technical Specification mode restriction. The FPR nor the site implementing document, NPG-SPP-18.4.8, "Control of Ignition Sources (Hot Work)," has any provision for reducing the ignition source fire watch from continuous to hourly roving based on Technical Specification mode.

However, WBN does not reduce a fire watch from continuous to hourly roving in areas containing fire safe shutdown equipment for a unit in Modes 1 to 4, inclusive. WBN does reduce a fire watch from continuous to hourly roving for areas where a fire would impact the units in Modes 5, 6, and core empty.

The FPR will be revised to clarify that this reduction only applies to areas and equipment affecting the unit in Modes 5, 6, and core empty and does not apply to areas that affect the other unit while in Modes 1 to 4 inclusive.

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

*Part II, Section 14.1.2 contains the following table:*

<b>AREA</b>	<b>INSTRUMENT(S)</b>
Upper Containment	U-9019 on Plant Computer
Lower Containment	U-9020 on Plant Computer
[Add Unit 2	To be determined]

*Provide the Unit 2 information for Part II, Section 14.1.2. Confirm that an extent of condition review of the document has been performed to identify and resolve similar instances.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### TVA Response:

Part II, Section 14.1.2 now contains the Unit 2 information. It now reads:

<b>AREA</b>	<b>INSTRUMENTS</b>
Upper Containment (U1)	U-9019 on U1 Plant Computer
Lower Containment (U1)	U-9020 on U1 Plant Computer
Upper Containment (U2)	U-9019 on U2 Plant Computer
Lower Containment (U2)	U-9020 on U2 Plant Computer

The FPR has been searched and no additional unit 2 information placeholders were found.

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### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

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

*Part II, Section 12.10.2, of the FPR states that Electrical Raceway Fire Barrier Systems (ERFBS) are used to provide raceway protection at WBN Unit 2. However, the fire protection report does not provide information regarding testing criteria, test standards, or regulatory guidance used to assure that installed ERFBS meet design requirements.*

**[A]** *Provide the technical basis that the installed ERFBS meet design requirements. Include references to the design requirements.*

**[B]** *For any deviations to the design requirements, special cases, etc., include in the FPR a summary evaluation and technical justification for those deviations.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

**[A]** Additional pertinent references have been added to Part II, Section 4; and Part II, Section 12.10.2 has been expanded to read as follows:

##### **12.10.2 Raceway Protection**

Cable raceways that require separation by Electrical Raceway Fire Barrier Systems (ERFBS) are provided with one-hour rated ERFBS and automatic suppression and detection in the area, or three-hour rated ERFBS. Inside the Reactor Building, (Annulus and Primary Containment), radiant energy shields or automatic suppression and detection are used to obtain separation where fire could potentially damage redundant safe shutdown components.

The ERFBS for WBN have been tested to the guidance provided in GL 86-10, Supplement 1 (Ref. 4.1.10) and GL 92-08 (Ref. 4.1.13) and the associated Information Notices (Ref. 4.1.15 thru 4.1.24) which have established the industry standards for acceptable ERFBS. Mechanical Design Standard DS-M17.2.2 (Ref 4.2.23), General Engineering Specification G-98 (Ref. 4.2.24) and drawing series 47W243 (Ref. 4.2.26) document the testing, design, installation, quality control, and maintenance requirements of the ERFBS. NRC reviewed and approved this program (Ref. 4.3.9).

From 1992 through 1995 TVA performed numerous fire tests on a large variety of ERFBS configurations (cable trays, conduits, junction boxes, air drops, etc.) to ensure the fire resistive rating assigned to the ERFBS was in accordance with the established industry/NRC standards. These tests also provided sufficient information to establish the bounding parameters (thickness of material, attachment methods, etc.) and thereby develop the design standards for the ERFBS at TVA. In addition to the fire testing, TVA also tested the ERFBS to ensure they could withstand a seismic event; ampacity derating requirements for the various ERFBS applications; and quality assurance standards for the acceptance of the ERFBS material from the vendor, material handling, and installation of the ERFBS.

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Standard drawings (Ref. 4.2.23 and 4.2.26) document the ERFBS configurations used at WBN. These drawings identify such critical attributes as material thickness, pre-buttering with trowel grade Thermo-Lag, scoring and folding requirements, tie wire/banding spacing, raceway support protection, interfering item protection, attachment of ERFBS to concrete barriers, etc.

The installation of ERFBS is by a modification package (design change notice [DCN]). If during the installation of an ERFBS, it cannot be installed as per the DCN, a field change request is generated to document the unique configuration. Each unique ERFBS configuration is evaluated per DS-M17.2.2 (Ref 4.2.23), Appendix H, "Guidelines for Evaluating Unique Thermo-Lag 330-1 ERFBS Configurations", by personnel cognizant of the important parameters. These people must be knowledgeable of the impact these important parameters have on the overall performance of the ERFBS assemblies. The evaluator judges the synergistic effects that may be experienced when one or more important parameter(s) is(are) different and ensures compensating design measures are incorporated into the unique ERFBS to overcome these differences. This evaluation ensures that the unique configuration is designed and installed within the list of important parameters that were communicated to utilities through a 50.54(f) letter to Generic Letter 92-08. The installed configuration is therefore ensured of being bounded by the acceptable parameters of a rated fire barrier.

The ERFBS are designed, procured and installed in accordance with the requirements of Appendix G, "Quality Assurance Program for Fire Protection," of Nuclear Power Standard NP-STD-3.2, "Augmented Quality Assurance Programs." TVA inspects the Thermo-Lag at the manufacturer to ensure chemical composition, material thickness and appearance, etc., are in accordance with TVA requirements. The installation of the ERFBS is monitored by TVA Quality Control personnel for adherence to the issued design. This overall program ensures that the design, procurement, installation and maintenance of the ERFBS meet the requirements for adequate separation as stated in Appendix R, Section III.G.2.

**[B]** When the Unit 2 ERFBS is installed, evaluation of any unique (not standard) installations will be documented in the design change documentation, as described above.

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

*In Part II, Section 14.10.3 [pg. II-58], a change was made to the approved version of the FPR to allow an evaluation to be performed to justify using alternate means to provide Fire Safe Shutdown (FSSD) when required equipment cannot be returned to Operable status within the required time.*

*Provide a summary evaluation and technical justification that supports this change. Additionally, discuss the status of the "alternate means" going forward. For example,*

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- *What would be the duration of the alternative?*
- *Would the alternative become the primary means of achieving FSSD?*
- *Would the new systems/equipment/components need to be added to the FSSD analysis, and the old systems/equipment/components removed from the analysis?*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

Part II, Section 14.10.3.c. "perform an evaluation to justify using alternate means to provide FSSD" acknowledges that all possible situations cannot be anticipated and a definitive response prescribed in advance. It allows the plant to consider any acceptable alternative means of providing FSSD capability. This change was added at revision 10 of the FPR. The FSSD Operational Requirements (OR) established in Section 14 of PART II are patterned after the plant technical specifications. The technical bases for each OR is provided in the BASES section of Section 14. Revision 10 of Section B.14.10.3 established requirements for evaluating alternative means of providing FSSD capability which included performance of a 10 CFR 50.59 review; in addition, WBN performs either a Fire Protection License Condition Impact Evaluation (LCIE) or a Fire Protection Program Change Regulatory Review (FPPCRR), and approval by the Plant Operation Review Committee (PORC). These requirements ensure that the "alternative means" will not adversely affect plant safety and will provide an acceptable means of FSSD.

The alternative FSSD means would be temporary in nature lasting only until the original equipment is returned to operation. The 10 CFR 50.59 review, LCIE or FPPCRR, and PORC approval would establish any necessary time limitations. If it was determined that the original equipment could never be returned to operation nor replaced with like equipment, a design change would be required to provide a new FSSD means. The FSSD analysis would be updated as part of the design change process.

FPR Part II, Section B.14.10.3 has been revised to emphasize and strengthen the 10CFR50.59 review and PORC approval requirements.

#### **15. NRC Question (RAI FPR III-1):**

*Note 5 to Table 3-3 identifies analyses related to the 5<sup>th</sup> Vital Battery that are to be completed in the future. This Note has not been updated between Revision 5 and the as-designed version of the FPR.*

*Have the analyses identified in Note 5 to Table 3-3 been completed?*

*If so, provide a summary of the results and any resolutions necessary for identified issues. Also, ensure that the FPR is updated to reflect the completed analyses.*

*If not, provide a schedule for: completion of the analyses; issue resolutions; and incorporation of the results into the FPR.*

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### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

The analyses identified in Note 5 to Table III-3 were completed as part of the pre-Unit 1 licensing safe shutdown analysis, and they have been re-evaluated as part of the dual unit safe shutdown analysis. The results are documented in the applicable Analysis Volumes in Part VI of the FPR. There are no outstanding issues requiring resolution. Note 5 has been revised indicating past performance of these evaluations.

#### **16. NRC Question (RAI FPR III-2):**

*Figures VI-1 through VI-14 are identified as compartmentation drawings in part III, Section 10.3.1 (page III-39) of the FPR, but not included in the submitted version. This appears to be an error. If it is, correct it. Otherwise, provide the figures.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

The compartmentation drawings are Figures II-27A through II-40A. References to the compartmentation drawing in the dual unit operation FPR are to Figures II-27A through II-40A, and the incorrect reference identified above has been corrected.

#### **17. NRC Question (RAI FPR III-3):**

**[A]** Describe how the Unit 2 changes are represented in the as-designed versions of Figures III-1 through III-5 in Part III of the FPR. **[B]** Also, provide the as-designed versions of the Figures for Part III.

*This item was discussed with TVA at a February 3, 2011 public meeting, where TVA agreed to provide this information.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

**[A]** The figures (Figures III-1 to III-5) are applicable to Unit 2 also. There is no change to the methodology for performing the combined unit's fire safe shutdown analyses. The "Reference Document and Calculations" box on Figures III-1 and III-2 has been revised to document the calculations for the dual unit's analyses. There is no change to Figures III-3, III-4, and III-5.

**[B]** A copy of the revised figures is attached (see Attachment 3) and they are included in Part III of the FPR that will be submitted by March 16, 2011.

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### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

**18. NRC Question (RAI FPR III-4):**

*There are a series of actions that operators must take to defeat an Safety Injection/Coolant Injection (SI/CI) signal for Unit 1 [Table 6-2]. TVA has stated that similar actions are not needed for Unit 2.*

**[A]** *Describe the plant changes that resulted in Unit 2 not needing to defeat an SI/CI signal.*

**[B]** *Provide a summary evaluation and technical justification for this change from the Unit 1 program. This material should be included in an appropriate location in the FPR.*

*This item was discussed with TVA at a February 3, 2011 public meeting, where TVA agreed to provide this information.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

**TVA Response:**

**[A]** Unit 2 plant modifications have been designed to prevent fire induced spurious safety injection/containment isolation (SI/CI) signals. Automatic SI/CI initiation requires multiple concurrent process monitoring instrumentation channel inputs to satisfy the 2-out-of-3 or 2-out-of-4 redundant SI/CI actuation logic. The Unit 2 design changes include relocation of instrumentation and cable protection (thermolag) or relocation to provide III.G.2 separation between redundant instrument channels such that postulated fire damage can not affect sufficient instrument channels to satisfy the redundant logic required for SI/CI initiation. A statement to this effect has been added to FPR Part VI, Section 2.2.

**[B]** These modifications to avoid spurious SI/CI signal are considered an overall program enhancement. By preventing fire induced spurious SI/CI actuations overall safe shutdown capability of Unit 2 is improved. Safety equipment will not be actuated unnecessarily due to the spurious signal and operator manual actions will not required to mitigate the effects of the spurious signal.

**19. NRC Question (RAI FPR VI-3):**

*In a number of instances in the Part VI tables, control designators in contain "XXX", for example, "2-HS-3-XXX-A" [pg VI-743]. Other, similar, controls seem to have numerical designators in place of "XXX." Is this the correct control designator or is it a placeholder? If it is a placeholder, correct the error.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

**TVA Response:**

For those devices that XXX was used as a placeholder, they now have their correct unique identifier in place of XXX. The entries "2-XX-47-3000" are valid unique identifiers.



## **ENCLOSURE 1**

### **Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"**

#### **20. NRC Question (RAI FPR VI-4):**

*In a number of locations in Part VI, Fire Area numbers have been deleted and no replacement information inserted. Two examples are the entries for Doors A157 and A158 on page VI-270.*

*Confirm that an extent of condition review of the document has been performed to identify and resolve these and similar instances.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

The entire Part VI has been reviewed, and information that was missing from the previous submittal has been corrected, including entries for Doors A157 and A158, and is now included in the FPR.

#### **21. NRC Question (RAI FPR VII-1):**

*The deviation and justification for the large equipment hatch between the refueling floor and the Unit 2 reactor building (Part VII, Section 4.7) has been deleted. Additionally, a reference to this deviation was deleted in Part II, Section 12.10. However, the deviation is still referenced in Part VI, Section 3.15.3 [pg. VI-269].*

**[A]** *Resolve this conflict. [B] Also, provide a technical justification for this change (the deletion of the deviation and accompanying justification).*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

**[A]** The reference in Part VI, Section 3.15.3 has been removed.

**[B]** The need for the deviation has been removed by the addition of the combined (Units 1 and 2) analysis. The barriers separating the Unit 2 Reactor Building from the Refueling Floor will be configured and controlled the same as the Unit 1 Reactor Building Equipment Hatch.

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### Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"

#### **22. NRC Question (RAI FPR VIII-1):**

*The "Plant Conformance" entry for item D.3.f: [the same addition is also made in a number of similar locations]*

*"New cable insulation is IEEE-383-qualified cable if possible." [pg. VIII-30]*

*The addition of "if possible" to this sentence brings it into conflict with one of the elements cited as mitigating intervening combustibles for safe shutdown:*

*"Limited flame spread of cable insulation/jacket material - New cables meet IEEE-383 vertical tray test and most old cables are covered with flame retardant coating." [pg. III-39]*

*Resolve this conflict. If TVA intends to keep the addition to Part VIII, provide a summary evaluation and technical justification for the change, including the requisite change to Part III.*

*This RAI involves an update to the FPR to incorporate the response to the RAI.*

#### **TVA Response:**

There is no conflict. It should be recognized that some specialty cables are not available with IEEE-383 flame test requirements. TVA was attempting to clarify that new cables purchased for use at WBN are required to meet the IEEE-383 requirements, but that some cables cannot be purchased that meet those requirements. If the cable cannot be purchased as IEEE-383 qualified, then the cable is evaluated to determine if it must be coated with a flame retardant coating. The licensing basis for cable coating is that up to 9 uncoated non-IEEE 383 cables are allowed in a tray. If 10 or more non-IEEE 383 cables are in a tray, then all of them will be coated with a flame retardant. Cables routed in conduit are not intervening combustibles; therefore, they are not required to be IEEE 383 cables. This does not conflict with nor change TVA's position for mitigating intervening combustibles.

## **ENCLOSURE 2**

### **Response to NRC's Request for Information Regarding Final Safety Analysis Report Amendment Related to Section 9.5.1, "Fire Protection System"**

#### **Regulatory Commitments**

1. The "as-designed" Fire Protection Report (FPR) will be provided by March 16, 2011 except for Part V, which will be provided by April 29, 2011. [RAI FPR General - 2 Item A]
2. The changes between Unit 1/Unit 2 "As-designed" FPR that was submitted in TVA's letter to NRC, dated January 14, 2011 and the Unit 1/Unit 2 "As-designed" FPR will be marked via Revision Bars in the file. Justification will be provided for changes not directly related to Unit 2 operation by March 25, 2011. [RAI FPR General - 2 Item B]
3. The digital copy of Revision 41 of the FPR will be included as part of the Unit 1/2 "as-designed" FPR submittal. [RAI FPR General - 2 Item C]
4. TVA will provide a side-by-side comparison between the WBN Unit 1/Unit 2 "As-designed" FPR that was submitted in TVA's letter to NRC, dated January 14, 2011 and the WBN Unit 1/Unit 2 FPR "as-designed" version following issuance of the next revision, scheduled for March 16, 2011. The WBN Unit 1, Revision 41 was issued on February 22, 2011. [RAI FPR General - 3]
5. Attachment 2 contains Figures II-1A thru II-26A, which are the as-designed installed fire detection and suppression system drawings. These drawings will be annotated to reflect changes made to the figures and provided to NRC by March 16, 2011. [RAI FPR General-4]
6. Figures representing the as-constructed plant configuration will be provided after construction completion. [RAI FPR General - 4]
7. Response to RAI FPR V-1 will be provided by March 25, 2011. [RAI FPR V-I]
8. Response to RAI FPR V-2 will be provided by April 29, 2011. [RAI FPR V-2]
9. Upon performing the final plant walkdowns as prescribed in FPR Sections 2.1.1, 2.4.3, and 2.3, TVA will review the information and submit the results for NRC approval if they differ from the assumptions and details provided in Part V or the other parts of the FPR. Otherwise, TVA will inform the NRC when the walkdowns are complete and that no revisions to the FPR were required. [RAI FPR V-3]
10. The requirement for a portable lantern for the affected AUO from this equipment cage will be evaluated during the Unit 2 walkdowns of operator manual actions to ensure that existing lighting is adequate. [RAI FPR V-10]
11. The FPR will be revised to clarify that this reduction only applies to areas and/or equipment affecting the unit in Modes 5, 6, and core empty and does not apply to areas where the other unit is in Modes 1 to 4 inclusive. [RAI FPR II-8]
12. The barriers separating the Unit 2 Reactor Building from the Refueling Floor will be configured and controlled the same as the Unit 1 Reactor Building Equipment Hatch. [RAI FPR VII-1]

**ATTACHMENT 1**

**Response to NRC's Request for Information Regarding Final Safety Analysis Report  
Amendment Related to Section 9.5.1, "Fire Protection System"**

**Revision Log for Unit 1 Fire Protection Report, Revision 41**

TVAN FIRE PROTECTION REPORT APPROVAL PAGE						
<b>WATTS BAR NUCLEAR PLANT FIRE PROTECTION REPORT</b>						
Revision No. <b>DCN 53437A</b> Effective Date: <span style="border: 1px solid black; padding: 2px 10px;">02/22/2011</span>						
Revision Sponsor: <div style="display: flex; justify-content: space-between;"> <div style="text-align: left;"> S&amp;L, LLC- Mech.  <small>Organization</small> </div> <div style="text-align: left;"> John D. Pangle  Roy S. Rosenfeld  <small>Name</small> </div> </div>						
Change Approval						
REF #.	Organization	Action Needed?	Type of Action	Impacts (see note 1)	Action Complete (Name / Signature)	Date
1	S&L, LLC- Mech.	N/A	Change Initiator	N/A	John D. Pangle <i>J. Pangle</i> Roy S. Rosenfeld <i>R. Rosenfeld</i>	N/A
2	SE - M/N Program Owner	Yes	T & I Reviews <sup>2</sup>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	<i>Ernest T. Maston</i> ERNEST T. MASTON	4/5/10
3	SE - EE Program Owner	Yes	T & I Reviews <sup>2</sup>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	<i>Ronald E. Cox</i> RONALD E. COX	4/5/10
4	OPS Procedures	Yes	T & I Reviews <sup>2</sup>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<i>David L. Askins</i> DAVID L. ASKINS	4/5/10
5	OPS Fire Protection	Yes	T & I Reviews <sup>2</sup>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	<i>Eddie J. List</i> EDDIE J. LIST	4/5/10
6	OPS FP System Engineer	Yes	T & I Reviews <sup>2</sup>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	<i>John S. Terom</i> JOHN S. TEROM	4/5/10
7	OPS FP System Engineer	Note 4	T & I Reviews <sup>2</sup>	Yes <input type="checkbox"/> No <input type="checkbox"/>	N/A	
8		Note 3	Impact Review	Yes <input type="checkbox"/> No <input type="checkbox"/>	N/A	
9	Plant Manager	Yes	Approval	N/A		

1. Record any impacts of the FPR change on form FPD-3-2, TVAN FPR Revision Impacts
2. Technical review of the FPR change and also impact review if change is outside the design change process.
3. Additional impact reviews - as determined needed by sponsor or technical reviewers. N/A rows not needed.
4. If more than one system/system engineer is affected by the change.

Title: WBN Fire Protection Report		REVISION LOG
Revision No.	DESCRIPTION OF REVISION	DATE APPROVED
41	<p>DCN 53437 replaces battery chargers 0-CHGR-236-1-D, 0-CHGR-236-2-E, 0-CHGR-236-3-F, 0-CHGR-236-4-G, 0-CHGR-236-5, 0-CHGR-236-6-S, &amp; 0-CHGR-236-7-S and adds two additional back up spare battery chargers 0-CHGR-236-8-S and 0-CHGR-236-9-S. 8-S is a backup spare for 7-S. The two transfer switches (0-XSW-236-6AC-S &amp; 0-XSW-236-6DC-S) associated with battery charger 6-S are replaced with four transfer switches (0-XSW-236-68AC1-S, 0-XSW-236-68AC2-S, 0-XSW-236-68DC1-S, &amp; 0-XSW-236-68DC2-S) that mechanically interlock spare chargers 6-S and 8-S so that only one charger can be utilized at a time. Spare Chargers 7-S and 9-S are interlocked in a similar manner.</p> <p>Revise Fire Protection Report Part III, Section 4.10.4 to reflect the two additional spare chargers. Revise Fire Protection Report Part III, Table 3-2 (Safe Shutdown Equipment List) to add battery chargers 0-CHGR-236-8 and 0-CHGR-236-9 and replace transfer switches 0-XSW-236-6AC, 0-XSW-236-6DC, 0-XSW-236-7AC, 0-XSW-236-7DC with transfer switches 0-XSW-236-68AC1-S, 0-XSW-236-68AC2-S, 0-XSW-236-68DC1-S, 0-XSW-236-68DC2-S, 0-XSW-236-79AC1-S, 0-XSW-236-79AC2-S, 0-XSW-236-79DC1-S, &amp; 0-XSW-236-79DC2-S.</p> <p>Revise Fire Protection Report Part VI, Section 3.25.2.1 Local Manual Operator Actions and Repairs where the control operated is 0-XSW-236-6DC-S and 0-XSW-236-7DC-S. Replace with 0-XSW-236-68DC1-S and 0-XSW-236-79DC1-S, respectively.</p> <p>Revise Fire Protection Report Part VI, Section 3.32.2.1 Local Manual Operator Actions and Repairs where the control operated is 0-XSW-236-6DC-S. Replace with 0-XSW-236-68DC1-S.</p> <p>Revise Fire Protection Report Part VI, Section 3.38.2.2 Local Manual Operator Actions and Repairs where the control operated is 0-XSW-236-6DC-S. Replace with 0-XSW-236-68DC1-S.</p> <p>Revise Fire Protection Report Part VI, Section 3.47.2.1 Local Manual Operator Actions and Repairs where the control operated is 0-XSW-236-7DC-S. Replace with 0-SXW-236-79-DC1-S.</p> <p>Pages added: None</p> <p>Pages revised: i-xvi (Coverdata), II-5, III-21, III-56, VI-240, VI-274, VI-314, &amp; VI-359</p> <p>Pages deleted: None</p>	02-22-2011

**ATTACHMENT 2**

**Response to NRC's Request for Information Regarding Final Safety Analysis Report  
Amendment Related to Section 9.5.1, "Fire Protection System"**

**Unit 2 Fire Protection Report Figures Part II-1A thru II-40A**

Attachment 2 Redacted



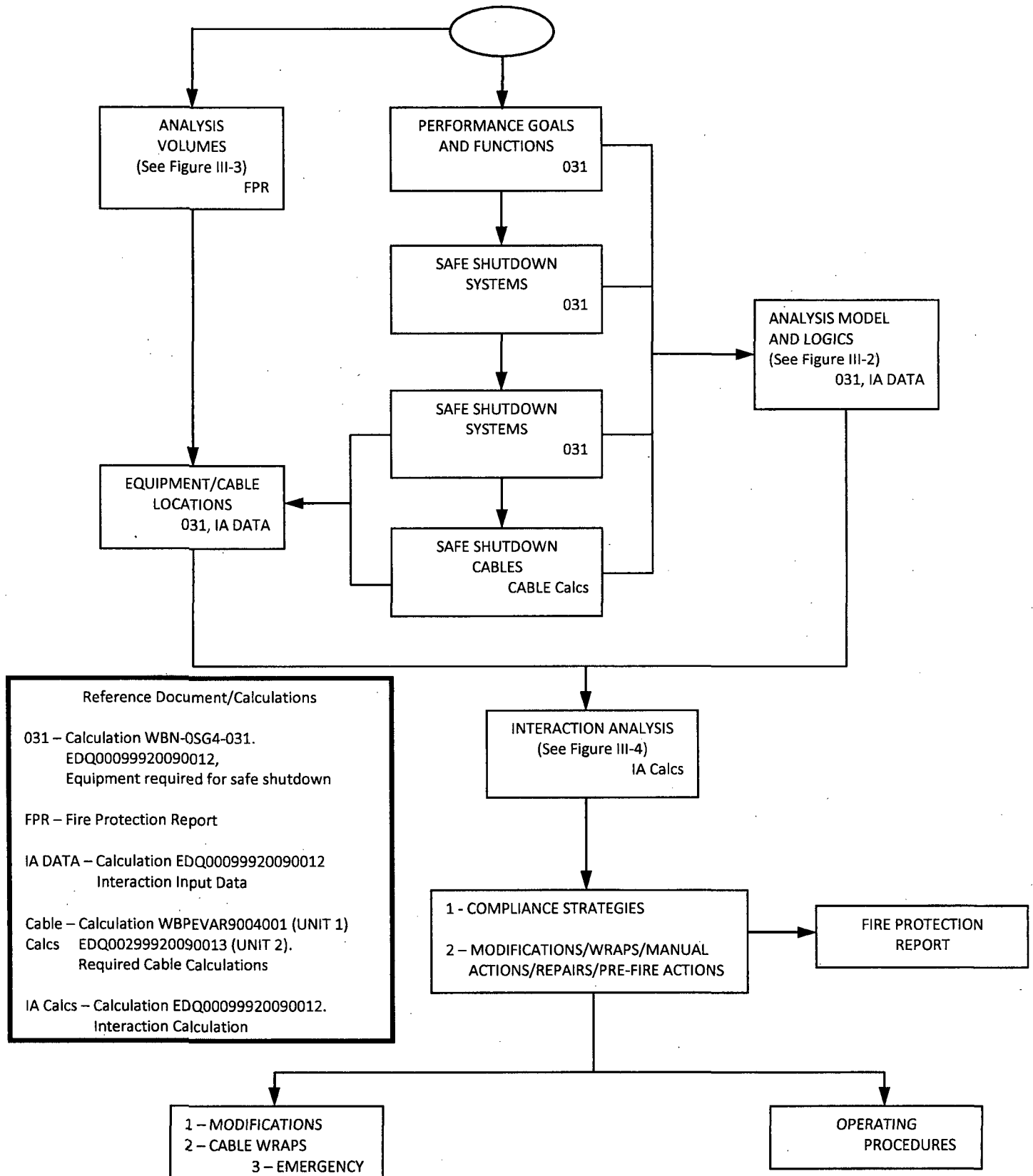
**ATTACHMENT 3**

**Response to NRC's Request for Information Regarding Final Safety Analysis Report  
Amendment Related to Section 9.5.1, "Fire Protection System"**

**Unit 2 Fire Protection Report Part III Figures**

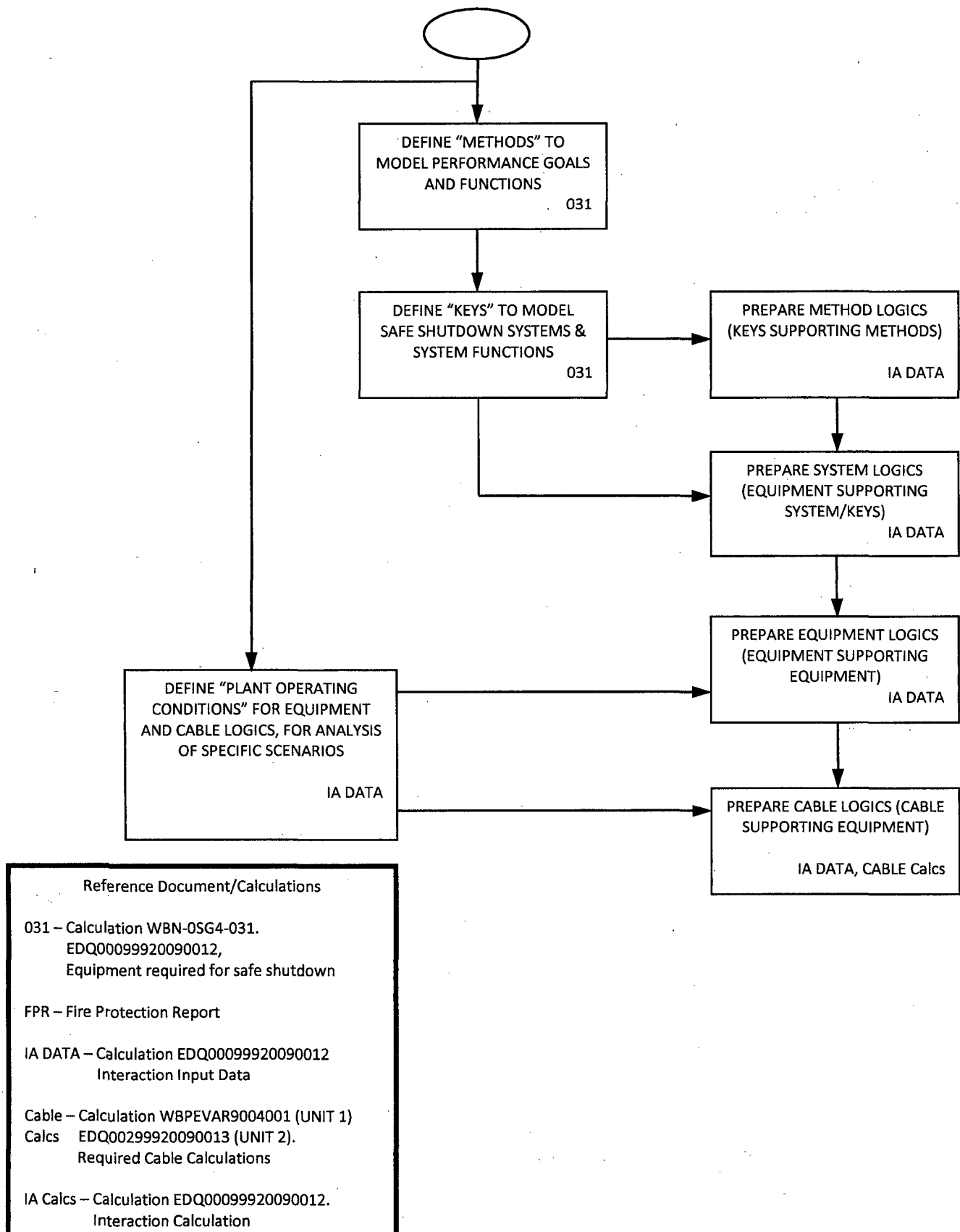
# PART III - SAFE SHUTDOWN CAPABILITIES

**FIGURE III-1  
INTERACTION ANALYSIS FLOW CHART**



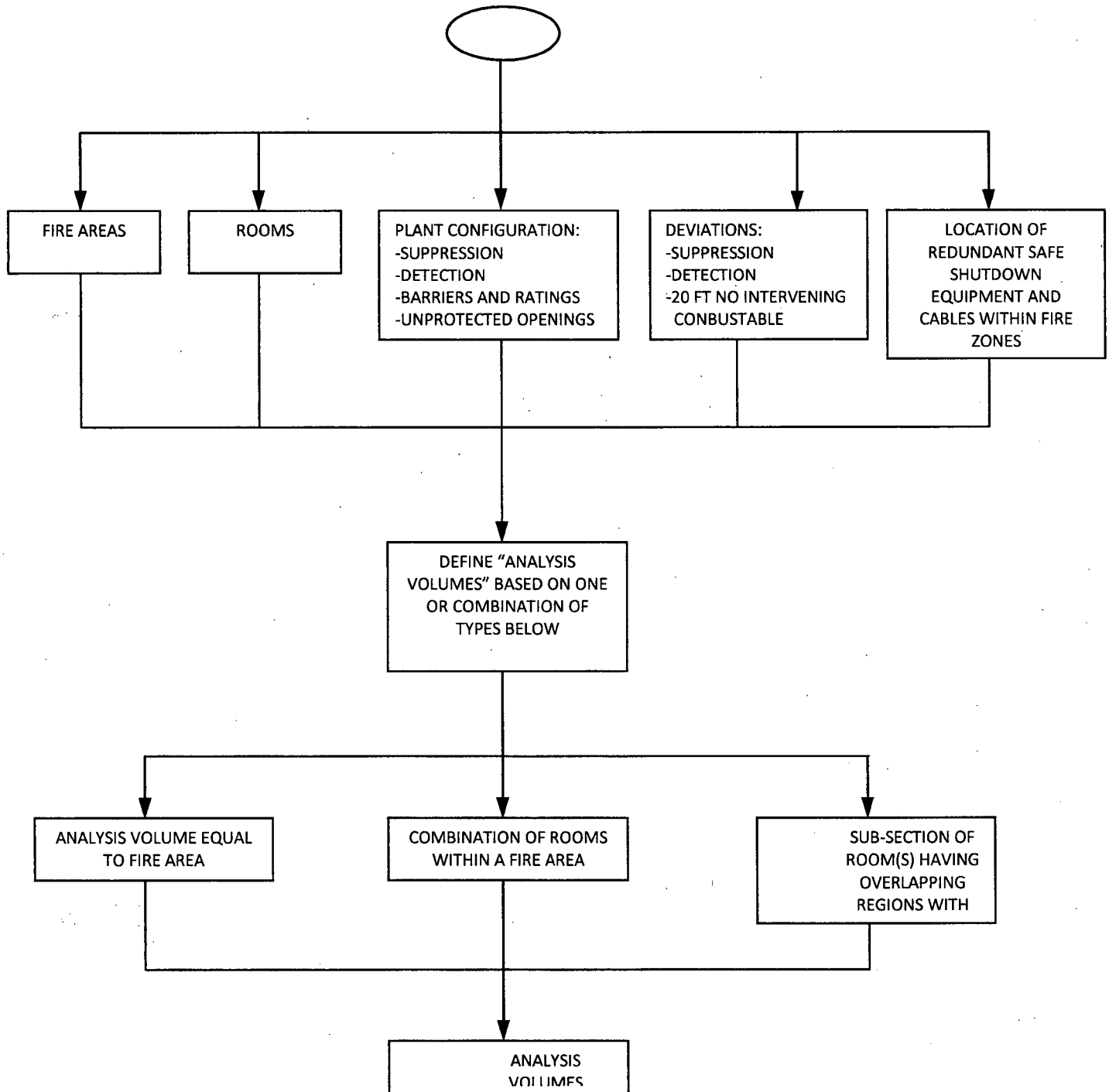
## PART III - SAFE SHUTDOWN CAPABILITIES

**FIGURE III-2  
ANALYSIS MODEL AND LOGICS**



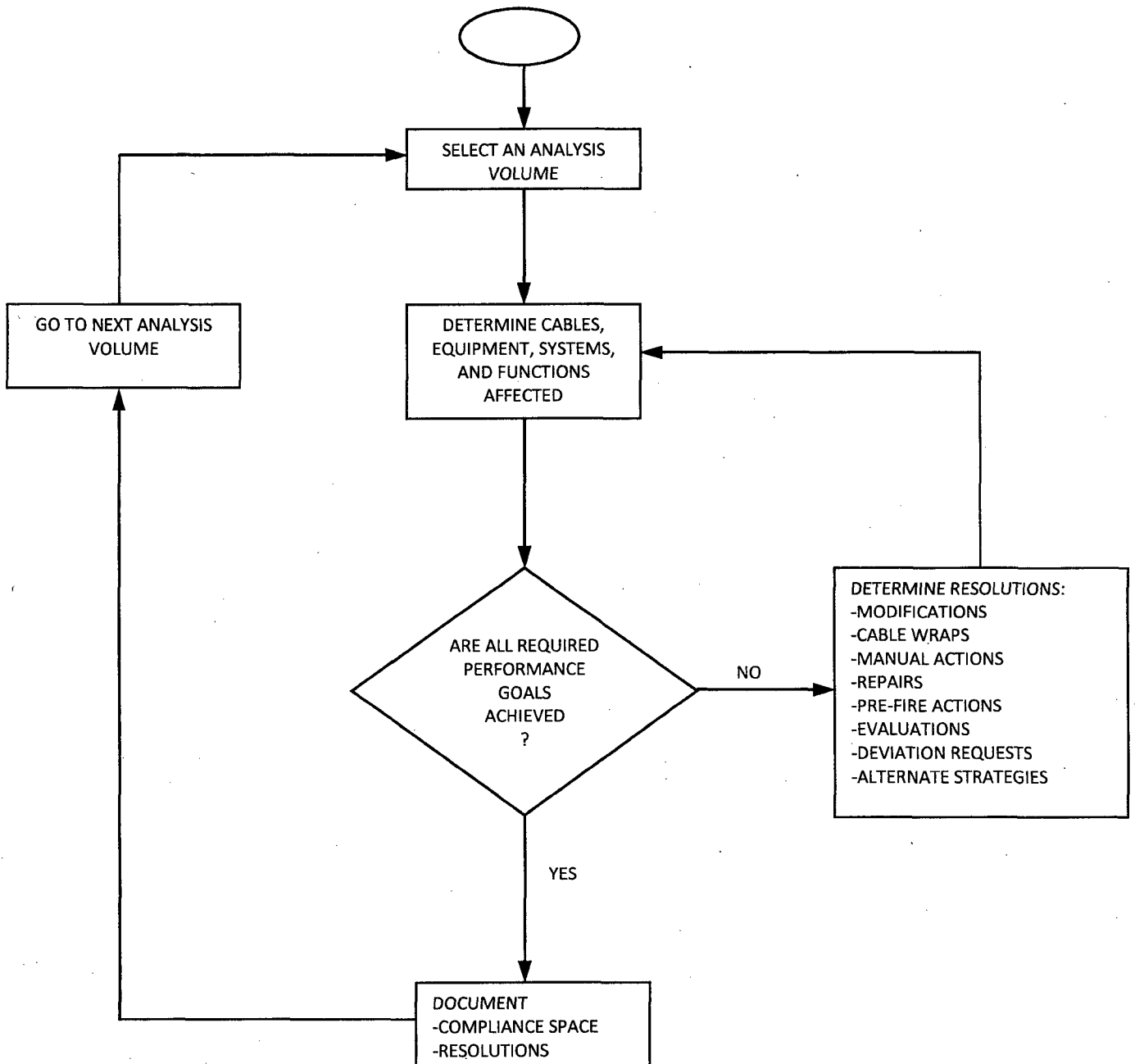
## PART III - SAFE SHUTDOWN CAPABILITIES

**FIGURE III-3  
ANALYSIS VOLUMES**



### PART III - SAFE SHUTDOWN CAPABILITIES

**FIGURE III-4  
INTERACTION ANALYSIS**



### SAFE SHUTDOWN LOGIC DIAGRAM



**ATTACHMENT 4**

**Response to NRC's Request for Information Regarding Final Safety Analysis Report  
Amendment Related to Section 9.5.1, "Fire Protection System"**

**Unit 1/2 FPR Part II, Reference 4.2.59, Excerpt of Calculation**  
**WBN-EEB-EDQ-00099920090016-Appendix R-Unit 1 and 2 Manual Actions Requirements**

## Page 1

**NEDP-2-1 [10-20-2008]**

ACCEPTED FOR ISSUE. All pages RD  
Amber Aboyltaida  
~~Amber Aboyltaida~~ 4/21/10  
SIGNATURE DATE



**NOTES**

If the action pertains to only one unit, this will be noted at the end of the note.

- A-1. The Turbine Driven Aux Feedwater Pump is used for fires in 713-A1A and 737-A1A, Manual actions related to the Motor Driven AFW Pumps are not required for these fire zones. (Unit 1 only)
- A-2. (Unused)
- A-3. (Unused)
- A-4. (Unused)
- A-5. (Unused)
- A-6. (Unused)
- A-7. MSIV closure (or steam load isolation) will be manually initiated along with Reactor trip and MFW isolation at t = 0.
- A-8. (Unused)
- A-9. (Unused)
- A-10. (Unused)
- A-11. A repair procedure may be required at the Reactor MOV Boards to open 1-FCV-74-1-A (-2-B, -8-A, -9-B), as only the power circuits and limit/torque switch cables are guaranteed in the Interaction Analysis. Select the valve(s) to be opened, transfer control to AUX, and disconnect the identified control cables. Install a jumper on the terminal block between the "FROM" and "OPEN" or "CLOSE" wire numbers, as appropriate, and close the 480V breaker. The "LIMIT CABLE" is for the limit/torque switches to stop the valve when it is full open or closed. (Unit 1 only)

VALVE	DISCONNECT CABLE	INSTALL JUMPER			LIMIT CABLE
		FROM	to OPEN	to CLOSE	
1-FCV-74-1-A	1V2782A 1V2786A	10DX1	10D02	10D02	1V1213A
1-FCV-74-2-B	1V2842B 1V2845B	10DX1	10D02	10D02	1V1215B
1-FCV-74-8-A	1V2142A 1V2145A	6DX1	6D02	6DC2	1V1217A

**APPENDIX A1, Manual Actions Outside Main Control Room Listed By Key (By Device)**

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1-FCV-74-9-B	1V2152B 1V2155B	5CX1	5C02	5CC2	1V1219B
--------------	--------------------	------	------	------	---------

A-12. (Unused)

A-13. DCN M-21432 and EDC 53178 installs a Nitrogen control station for local operation of valves 1-PCV-1-5-A, -12-B, -23-A, and -30-B; and 2-PCV-1-5-A, -12-B, -23-A, and -30-B respectively.

A-14. These Safety Injection Accumulator isolation valves must be closed within the 2280 minute limit (38 hours), for Key 36, only if the valves are accessible. Any fire which results in spilled reactor coolant (Outside the Pressurizer Relief Tank) will delay containment entry and access to the valves. If the valves are not accessible, Reactor coolant pressure must be maintained above 150 psi until the accumulators can be isolated. See Appendix B.19.

A-15. (Unused)

A-16. (Unused)

A-17. (Unused)

A-18. A repair procedure may be required to operate RHR pump 1,2-A (1,2-B) Room Cooler (1,2-MTR-30-175-A [-176-B]) for long term cooling. Repair consists of installing a jumper to bypass certain control circuit features (1,2PL3033A/3043B faulted), or replacement of power cable 1,2PL3031A/3041B as follows:

a) Disconnect all conductors of the below-listed cable(s):

RHR Pump Room Cooler	480V C&A Vent Bd/ Compartment	Cable	Wires
1,2A-A	1,2A1-A / 9A	1,2PL3033A (control)	9A2, 9A3, 9AX
		1,2PL3031A (power)	T1, T2, T3
1,2B-B	1,2B1-B / 9A	1,2PL3043B (control)	9A2, 9A3, 9AX
		1,2PL3041B (power)	T1, T2, T3

b) (1,2PL3033A/3043B only) Install a jumper from terminal block point 1 (9AX) to terminal point 14 (9A3).

c) (1,2PL3033A/3043B only) Replace fuses, if required. With the jumper in place, the room cooler will automatically start when the RHR pump starts.

**APPENDIX A1, Manual Actions Outside Main Control Room Listed By Key (By Device)**

Page 5

- d) *(1,2PL3031A/3041B only)* Pull a replacement power cable from the C&A Vent Board to the Room Cooler and reterminate connectors at the MCC and the Room Cooler terminal box.

A-19. (Unused)

A-20. Any two of the following four sets of coolers and valves will provide sufficient cooling:

SET 1 -	1,2-MTR-30-74-A	1,2-MTR-30-83-A
	1,2-FCV-67-83-B	1,2-FCV-67-87-A
	1,2-FCV-67-88-B	1,2-FCV-67-89-A
SET 2 -	1,2-MTR-30-75-B	1,2-MTR-30-92-B
	1,2-FCV-67-99-A	1,2-FCV-67-103-B
	1,2-FCV-67-104-A	1,2-FCV-67-105-B
SET 3 -	1,2-MTR-30-77-A	1,2-MTR-30-88-A
	1,2-FCV-67-91-B	1,2-FCV-67-95-A
	1,2-FCV-67-96-B	1,2-FCV-67-97-A
SET 4 -	1,2-MTR-30-78-B	1,2-MTR-30-80-B
	1,2-FCV-67-107-A	1,2-FCV-67-111-B
	1,2-FCV-67-112-A	1,2-FCV-67-113-B

A-21. A fire in the Auxiliary, Reactor or Control Building could spuriously open pressurizer spray valves 1,2-PCV-68-340B or 1,2-PCV-68-340D or both, resulting in rapid depressurization of the RCS. Pressurizer spray flow must be terminated immediately by tripping the Reactor Coolant Pumps. For Control Building fires, this action should be taken prior to Main Control Room Abandonment.

A-22. (Unused)

A-23. Manual start of the CRDM and LCC fans at the 480vac Switchgear should include the following sequential steps:

1. Verify status of breaker amptector flag and if not showing, proceed to step 3;
2. If flag is showing, the power cable may be faulted and a different cooler should be used.
3. Place transfer switch in AUX mode;
4. Attempt handswitch electrical closure of breaker;
5. If electrical closure is unsuccessful, use mechanical release to close breaker.

A-24. (Unused)

A-25. (Unused)

**APPENDIX A1, Manual Actions Outside Main Control Room Listed By Key (By Device)**

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A-26. (Unused)

A-27. (Unused)

A-28 The Bit isolation valves (1-FCV-63-25-B and -26-A) are located in 713-A28 and require access to permit handwheel operation prior to 1 hour (key 2, RCS excess inventory concern). In order to avoid entering this room prior to 1 hour, the BIT path will be isolated and an alternate path to the RCP seals will be established as follows:

1. Open the RCP seal injection path isolation valve associated with the running charging pumps (1-ISV-62-526 [CCP-1A] or 1-ISV-62-534 [CCP-1B]) to establish bypass flow around 1-FCV-62-93 to the RCP seal injection line.
2. Unlock and close the CCP outlet isolation valve associated with the running charging pumps (1-ISV-62-527 [CCP-1A] or 1-ISV-62-533 [CCP-1B]) to isolate the normal charging path and the BIT path.
3. Close either 1-ISV-62-535 or -536, isolating 'backflow' to the BIT through 1-FCV-62-93.

(Unit 1 only)

A-29. To isolate the steam generator blowdown sample lines, (Unit 1)

1. Open the breaker feeding buss column C of 125vdc Battery Board II (closing valves 1-FCV-43-54D, 56D, 59D, and 63D), or
2. Pull fuse set C20 on 125vdc Battery Board I (closing valves 1-FCV-43-55, 58, 61, and 64), or
3. If the fire is in 757-A2, manually close the sampling inlet valves (Steam Generator Blowdown) located on the front of the Hot Sample Panel in Room 713-A13. This last manual action blocks steam generator blowdown through both of the sampling valves in series.

(Unit 1 only)

A-30. This set of actions addressed the effect of spurious actuation of Engineered Safety Features signals (Safety Injection, Containment Isolation, etc,) which could be caused by fire damage to sensing instruments. These actions range from 5 minutes to 38 hours and are documented in Appendix C to this calculation.

(Unit 1 only)

**APPENDIX A1, Manual Actions Outside Main Control Room Listed By Key (By Device)**

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- A-31. This action is required to block SI before it is spuriously initiated by the loss of DC power. In this area charging may be lost to one or more batteries, but enough batteries, battery boards, and necessary cables survive to avoid a spurious SI initiation until the batteries discharge. In this area it also may not be possible to restore charging power to enough batteries to prevent eventual SI actuation. Batteries will supply all necessary loads for two hours. See Appendix B.22. Refer to Attachment 1 for manual actions. (Unit 1 only)
- A-32. A repair is required to disable/jumper the ERCW pump-start interlock and load a second ERCW pump on 6.9kV Shutdown Board 1A-A.
- A-33. (Unused)
- A-34. (Unused)
- A-35. (Unused)
- A-36. (Unused)
- A-37. (Unused)
- A-38. (Unused)
- A-39. (Unused)
- A-40. Manually rotate ERCW strainer by removing motor shaft and cap and worm gear shaft bracket and rotating ERCW strainer motor shaft with a wrench. (Reference AOI-30.2.C.12)
- A-41. This action is only required if RHR train "B" is utilized.
- A-42. This action is only required if RHR train "A" is utilized.
- A-43. A repair procedure may be required to open RHR inlet valves 1-FCV-74-2-B and 1-FCV-74-9-B for long term cooling. Repair consists of:
1. Pull control Fuses from the indicated 480 Reactor MOV Board 1B1-B, Compartment.
  2. Disconnect all conductors for the below-listed cables from terminals in both the MCC and the junction box in 757-A10.

1-FCV-74-2-B			
1V2840B	Conductors	1-MCC-213-B1/10D-B Terminals	Junction Box ID
	T1	T1	JB-6900-B (See Step 4)
	T2	T2	
	T3	T3	
1V1215B	10DC1	3	JB-6900-B (See Step 4)
	10DO1	4	
	10DC2	7	
	10DO2	6	
1-FCV-74-9-B			
1V2150B	Conductors	1-MCC-213-B1/5C-B Terminals	Junction Box ID
	T1	T1	JB-6367-8 (See Step 4)
	T2	T2	
	T3	T3	
1V1219B	5CC1	3	JB-6367-B (See Step 4)
	5CO1	4	
	5CC2	7	
	5CO2	6	

3. Pull temporary cables from Reactor MOV Board 1B1-B to the applicable junction box in 757-A10.
4. Connect the temporary cables to the same terminal points in the MCC as were disconnected in step 2 above. Splice temporary cable at the applicable junction box in 757-A10.
5. Replace fuses, if required.
6. Close the MCC breaker. With the temporary cable connected, the valves can be operated from the MCR.

(Unit 1 only)

A-44. The charging flow control valve 1,2-FCV-62-93 is equipped with a pneumatic stop (Unit 2 EDC XXXXX) to ensure a minimum flow to the RCP seal for cooling. In the event this feature is disabled due to a fire (damage to valve positioner or 1,2-PNL-276-L112), RCP thermal barrier cooling (Key 9) will be credited for the first hour to prevent damage to the RCP seals until the seal injection flowpath can be restored. This is performed (Ref AOI-30.2.C.57) as follows:

1. Secure any running charging pumps

**APPENDIX A1, Manual Actions Outside Main Control Room Listed By Key (By Device)**

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2. After the fire is extinguished, close control air isolation valve 1,2-ISV-32-2934 to 1,2-FCV-62-93.
  3. Fail-open 1,2-FCV-62-93 by bleeding down the air supply.
  4. Restart previously running charging pumps.
  5. Throttle seal injection flow using 1,2-ISV-62-549 or -550.
- A-45. Cables for valves 1,2-FCV-74-2-B and 1,2-FCV-74-8-A are adequately separated except in RA4 and 2RA4 respectively. Appendix B.35 shows that for any fire on or near the valves the fire can be extinguished and the inoperable valve opened manually (handwheel) before containment becomes environmentally uninhabitable. The pressure boundary would be maintained by the other pair of RHR isolation valves (1,2-FCV-74-1-A and -9-B) located in RI(South) and 2RI(South), one of which can be operated remotely when needed to establish RHR operation. Conversely, for a fire in RI(South) or 2RI(South) on or near valves 1,2-FCV-74-1-A and -9-B, the fire can be extinguished and the inoperable valve opened manually (handwheel) before containment becomes environmentally uninhabitable. The pressure boundary would be maintained by the other pair of RHR isolation valves (1,2-FCV-74-2-B and -8-A), one of which can be operated remotely when needed to establish RHR operation.
- A-46. The RWST isolation valves (1,2-LCV-62-135-A or -136-B) are required to be opened for a fire in 692-A7 (Unit 1) or 692-A25 (Unit 2) and require access to permit handwheel operation. After the VCT level lowers to its minimum value, the CCP(s) will be secured and RCP thermal barrier cooling credited with protecting the RCP seals until 692-A7 or 692-A25 can be accessed and the RWST placed on service by manually operating either 1,2-LCV-62-135-A or -136-B and restarting the charging pump.
- A-47. Shift DC control power for the 6.9kV and 480V Shutdown boards as follows: Locate the appropriate Shutdown Board(s) in the table below, open the indicated panel to access the panel internals, and transfer the required Control Power knife switch (*either* the Normal or Emergency DC bus) to the ALT position:

Shutdown Board	Normal DC Control Power Bus Transfer Switch Location	Emergency (Backup) DC control Bus Transfer Switch Location
1-BD-211-A-A	Panel 2	Panel 17
1-BD-212-A1-A	Panel 5	Panel 6
1-BD-212-A2-A	Panel 5	Panel 6
1-BD-211-B-B	Panel 2	Panel 17
1-BD-212-B1-B	Panel 5	Panel 6
1-BD-212-B2-B	Panel 5	Panel 6
2-BD-211-A-A	Panel 2	Panel 17

**APPENDIX A1, Manual Actions Outside Main Control Room Listed By Key (By Device)**

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2-BD-212-A1-A	Panel 5	Panel 6
2-BD-212-A2-A	Panel 5	Panel 6
2-BD-211-B-B	Panel 2	Panel 17
2-BD-212-B1-B	Panel 5	Panel 6
2-BD-212-B2-B	Panel 5	Panel 6

A-48. The 2280 minutes (38 hours, from Evaluation B.18 for Keys 30 and 31 and from evaluation B.19 for Key 36) applies if a head vent is available. Shorter times are also determined in Evaluation B.26. The 960 minute limit (16 hours) applies if head vents are unavailable but seal flow indication is available. The 680 minute limit (9 hours 20 minutes) applies if neither head vents nor seal flow indication are available; in which case pressurizer level indication must be used to gage the seal injection rate.

A-49. Auxiliary instrument room air conditioning is not required for an Appendix R event if certain loads are de-energized. These loads include de-energizing lighting in the auxiliary instrument rooms by tripping breakers at associated lighting panels. The specific loads are identified below:

LOCATION	LOAD	PANEL	TIME
CB – Auxiliary Instrument Room C1	Lights	0-LAC-228-131 (BKRS 8,9 & 10)	3 hours
CB - Auxiliary Instrument Room C4	Lights	0-LAC-228- 231 (BKRS 8, 9 & 10)	3 hours

A-50. If necessary, reduce heat loads in the IPS Electrical Equipment Room by de-energizing RCW pumps at board 0-BD-226-1 such that only four pumps are operating. These four pumps should be in a balanced 2 and 2 alignment between the two 480 volt IPS transformers. The breakers and transformers for each pump are listed below:

BOARD	BREAKER	PUMP	TRANSFORMER
0-BD-226-1	0-BKR-24-7	0-PMP-24-7	A
0-BD-226-1	0-BKR-24-10	0-PMP-24-10	A
0-BD-226-1	0-BKR-24-13	0-PMP-24-13	A
0-BD-226-1	0-BKR-24-17	0-PMP-24-17	A
0-BD-226-1	0-BKR-24-20	0-PMP-24-20	B
0-BD-226-1	0-BKR-24-141	0-PMP-24-141	B
0-BD-226-1	0-BKR-24-144	0-PMP-24-144	B



- A-51. Monitoring of neutron flux is available at the control room from 1-NI-92-131-D for a fire within 20 feet of the channel E pre-amp. For a fire outside of a 20 feet radius, neutron flux is monitored at the local control station (DCN W-36179).