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

June 27, 2012

10 CFR 50.4

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

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

Subject: WATTS BAR NUCLEAR PLANT (WBN) UNIT 2 – RESOLUTION OF CONCERNS WITH FIRE PROTECTION REPORT (FPR) OPERATOR MANUAL ACTION (OMA) 732 AND RESPONSE TO REQUESTS FOR ADDITIONAL INFORMATION (TAC NO. ME3091)

References:
1. Email from Justin Poole (NRC) to Gordon Arent (TVA), dated May 17, 2012 (ML12142A026)
2. TVA letter to NRC dated May 30, 2012, "Watts Bar Nuclear Plant (WBN) Unit 2 - Response to Request for Additional Information (RAI) (TAC No. ME3091)"
3. TVA letter to NRC dated June 7, 2012, "Watts Bar Nuclear Plant (WBN) Unit 2 – Transmittal of Revised Unit 1/Unit 2 As-Designed Fire Protection Report (TAC NO. ME3091)"
4. Email from Justin Poole (NRC) to Gordon Arent (TVA), dated June 7, 2012 (ML12163A053)
5. Email from Justin Poole (NRC) to Gordon Arent (TVA), dated June 25, 2012 (ML12179A169)

The purpose of this letter is to address a commitment regarding Operator Manual Action (OMA) 732 (listed below) that was made in TVA's May 30, 2012, response (Reference 2) to NRC's RAI (Reference 1):

> Depending on the changes that must be implemented for OMA 732, TVA will by June 28, 2012, either submit an update to the FPR or coordinate with NRC a schedule for the submittal of the updated FPR.

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NRR

Enclosures:

1. Response to NRC's June 7 2012, RAI
2. Part II of the FPR
3. Part III of the FPR
4. List of Supporting Calculations for Section 7.4 "Multiple High Impedance Faults," of Part III of the FPR
5. Commitment List

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

This letter also addresses the RAI provided via Reference 4 and NRC's concerns discussed with TVA on June 13, 2012, regarding TVA's May 30, 2012, response (Reference 2) to RAI Question 5 and the update to the corresponding FPR section submitted via Reference 3.

The problems impacting OMA 732 are being addressed under Problem Evaluation Report 558202 in TVA's Corrective Action Program. Once the required corrective actions are implemented, the FPR will be revised accordingly, and an update to the report will be submitted to NRC by July 26, 2012.

TVA's response to NRC's June 7, 2012, RAI (Reference 4) is provided in Enclosure 1. TVA clarifies in the RAI response that a minor change was made to Part II of the FPR, and an updated version of Part II is provided in Enclosure 2. In response to NRC's RAI dated June 25, 2012 (Reference 5), Section 7.4, "Multiple High Impedance Faults," of Part III of the FPR has been revised and an updated version of Part III is provided in Enclosure 3. The version of Section 7.4 provided as part of Enclosure 3 indicates that WBN's compliance to the base case condition is supported by calculations. A list of the supporting calculations is provided in Enclosure 4.

Please note that the format of the version of Part II and Part III provided in Enclosures 2 and 3 has been updated. TVA is currently in the process of updating the layout of the existing headings and paragraphs of the complete FPR to a format consistent with the format currently used in the WBN Unit 1 Updated Final Safety Analysis Report (UFSAR). The intent of this action is to establish a consistent format that will be used in the key licensing basis documents such as the merger of the UFSAR with the Unit 2 Final Safety Analysis Report. Action is being taken to ensure that the format update is not introducing errors in the FPR, and as part of this update, administrative errors (spelling or typographical errors) are being corrected as they are identified. Revision bars were not provided for administrative or editorial changes made to Parts II and III of the FPR.

The new regulatory commitments made in this submittal are listed in Enclosure 5. If you have any questions, please contact Gordon Arent at (423) 365-2004.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 27th day of June, 2012.

Respectfully,

R. A. Hruby, Jr.

Raymond A. Hruby, Jr.
General Manager, Technical Services
Watts Bar Unit 2

NRC QUESTION:

1. *Describe the actuation mechanisms for dampers and doors (within CO_2 boundaries) that need to close when a CO_2 system actuates (i.e., electro-thermal links, system pressure actuated mechanisms, etc.).*

TVA RESPONSE

An overview of the design of how the dampers and doors for CO_2 boundaries are activated to close is provided in the following sections of the Fire Protection Report (FPR):

- Part II, Section 12.3.3 describes the CO_2 system and the associated dampers/doors:

  "A signal from either the fire detection system or a push button station activates the area alarms, CO_2 discharge timer which actuates the master control valve and the area selector valve permitting the CO_2 to be discharged into the selected area. In addition, the system can be manually operated via the electro-manual pilot valve for each hazard protected on the loss of power to the system.

  Actuation of the CO_2 system causes selective closure of dampers and doors to the area protected and shut down HVAC air flows to the protected area."

- Part II, Section 12.10.4 describes the doors:

  "Sliding fire doors are provided in selected locations. These sliding fire doors are closed by heat melting a fusible link, and in CO_2 protected areas, when a CO_2 system pressure-activated release occurs."

- Part II, Section 12.10.5 describes the dampers:

  "The fire dampers provided with CO_2 suppression system isolation capability are actuated by CO_2 system pressure activated release mechanism and/or by thermal link."

The fire detection system is described in Part II, Section 12.5. As described above, the CO_2 system (including the dampers/doors for CO_2 retention) is actuated when a fire is detected.

The following provides specific design details of how the dampers and doors are activated to affect the CO_2 boundaries.

Required operational openings in the CO_2 boundaries are provided with fire rated dampers, HVAC dampers, architectural swinging doors and sliding fire doors. Fire rated dampers and sliding fire doors are provided with CO_2 gas operated blow-off clips in series with a fusible link.

The vendor supplied CO_2 gas operated blow-off clips are a combination device. The first part is the fitting attached to the CO_2 piping. Inside this fitting is a piston with an extension on the outboard side that slides into an outlet of the fitting when the piping is pressurized on the inboard side of the piston. The second part is the clip that has an extension that fits into the fitting's outboard outlet. When the piping is not pressurized, the clip extension fits into the outlet and a cable is attached at an approximate 90 degree angle to hold the device in question (e.g., door or damper release) in place. When the CO_2 piping is pressurized, the fitting's piston extension drives into the outlet forcing the clip off the fitting and thus releasing the held device. For additional information, please refer to the attached vendor sketch and the picture provided on the last page of this enclosure.

The actuation mechanisms for dampers (HVAC or fire) in CO_2 boundaries are as follows:

1. Unit 1 and 2 Auxiliary Instrument Rooms - CO_2 operated fire dampers for air supply and exhaust (blow-off clips).

2. Control Building Computer Room - CO_2 operated fire damper for air supply and exhaust (blow-off clips).

3. Diesel Generator (DG) Rooms - HVAC system operated air supply and exhaust dampers that close on fan stop signal at initial detection system signal (same time the pre-discharge horns begin to sound for personnel evacuation).

4. DG Electrical Board Rooms - CO_2 operated fire damper for air supply (blow-off clips).

5. DG Electrical Board Rooms - HVAC system operated exhaust dampers for air exhaust that close on fan stop signal at initial detection system signal (same time the pre-discharge horns begin to sound for personnel evacuation).

6. Fuel Oil Transfer Pump Room - CO_2 operated fire damper for air exhaust. Air supply is through the louvers in the architectural door (see below).

7. Lube Oil Storage Room - CO_2 operated fire damper for air exhaust. Air supply is through the louvers in the architectural door (see below).

The actuation mechanisms for door openings in the CO_2 boundaries are as follows:

1. Unit 1 and 2 Auxiliary Instrument Rooms - None, normally closed architectural swinging doors.

2. Control Building Computer Room - None, normally closed architectural swinging doors.

3. DG Rooms - None, normally closed architectural swinging doors.

4. DG Electrical Board Rooms - None, normally closed architectural swinging doors.

5. Fuel Oil Transfer Pump Room - CO_2 operated release for sliding fire door (blow-off clips) that cover the louvers in the architectural door.

6. Lube Oil Storage Room - CO_2 operated releases for two sliding fire doors (blow-off clips), one of which covers the louvers in the architectural door.

NRC QUESTION:

2. *Do any of these dampers or doors rely solely on thermal links to close? If yes, justify the acceptability of this configuration.*

TVA RESPONSE

No dampers or doors that provide the boundary for a total flooding CO_2 protected room rely solely on a thermal link to close. The CO_2 system, electrically (shutdown of the associated HVAC system) or mechanically (CO_2 blow-off clip), closes these devices to provide the CO_2 boundary.

ADDITIONAL INFORMATION REGARDING TVA'S RESPONSES:

1. Minor Change to Part II of the FPR:

   The wording of Section 12.10.4 (referred to above) in the previous versions of Part II submitted to NRC, read as follows:

   > "Sliding fire doors are provided in selected locations. These sliding fire doors are closed by heat melting a fusible link, and in ~~selected~~ CO_2 protected areas, when a CO_2 system pressure-activated release occurs."

   The word "selected" was removed because this implies that there are sliding fire doors that are not closed by CO_2 system pressure. This change is reflected in the version of Part II provided in Enclosure 2.

2. Basis for CO_2 Areas Addressed in the RAI Reponses:

   Provided below is a list of the plant areas that are protected by the CO_2 system. This list is from Section 4.2.1.2, "Gas Suppression System," of Appendix FF, "Safety Evaluation: Watts Bar Nuclear Plant Fire Protection Program," of Supplemental Safety Evaluation Report (SSER) 18:

   - emergency diesel generator rooms 1A-A, 2A-A, 1B-B, 2B-B
   - ***turbine lube oil dispensing room***
   - computer room
   - ***paint shop and storage room***
   - auxiliary instrument rooms
   - 480-V board room

- lube oil storage room
- fuel oil transfer room
- ***lube oil purification room***

The rooms highlighted with the bold-italicized text are not addressed in TVA's RAI responses. Provided below is the basis for why each of the rooms was omitted:

Plant Area (Room)	Basis for Omitting Room
Paint shop and storage room	Room has been abandoned.
Turbine lube oil dispensing room	No FPR Operating Requirements are applicable to these rooms.
Lube oil purification room	

3. Statement in SSER 18 Inconsistent with Plant Configuration:

   The following statement regarding the Lube Oil Storage Room is made in Section 5.8, "Diesel Generator Fuel Oil Storage Areas," of Appendix FF of SSER 18:

   "...At each opening, the applicant installed hollow side-hinged metal doors, which are normally closed. These doors will prevent smoke and hot gases from a fire from passing through the opening until the fire doors close and the fire suppression system actuates..."

   During the preparation of TVA's response to NRC's June 7, 2012, RAI regarding the FPR, TVA's response (above) stated that the sliding fire doors for the Lube Oil Storage Room close to cover the louvers in the architectural doors. This statement is inconsistent with the SSER statement above which indicates that the hinged metal doors will block the passage of gas from the room. TVA initiated Service Request (SR) 571113 on June 26, 2012, to capture the discrepancy between the installed louver door and the SSER statement in TVA's Corrective Action Program. TVA will provide an update for this issue along with the submittal of the FPR update for OMA 732 on July 26, 2012.

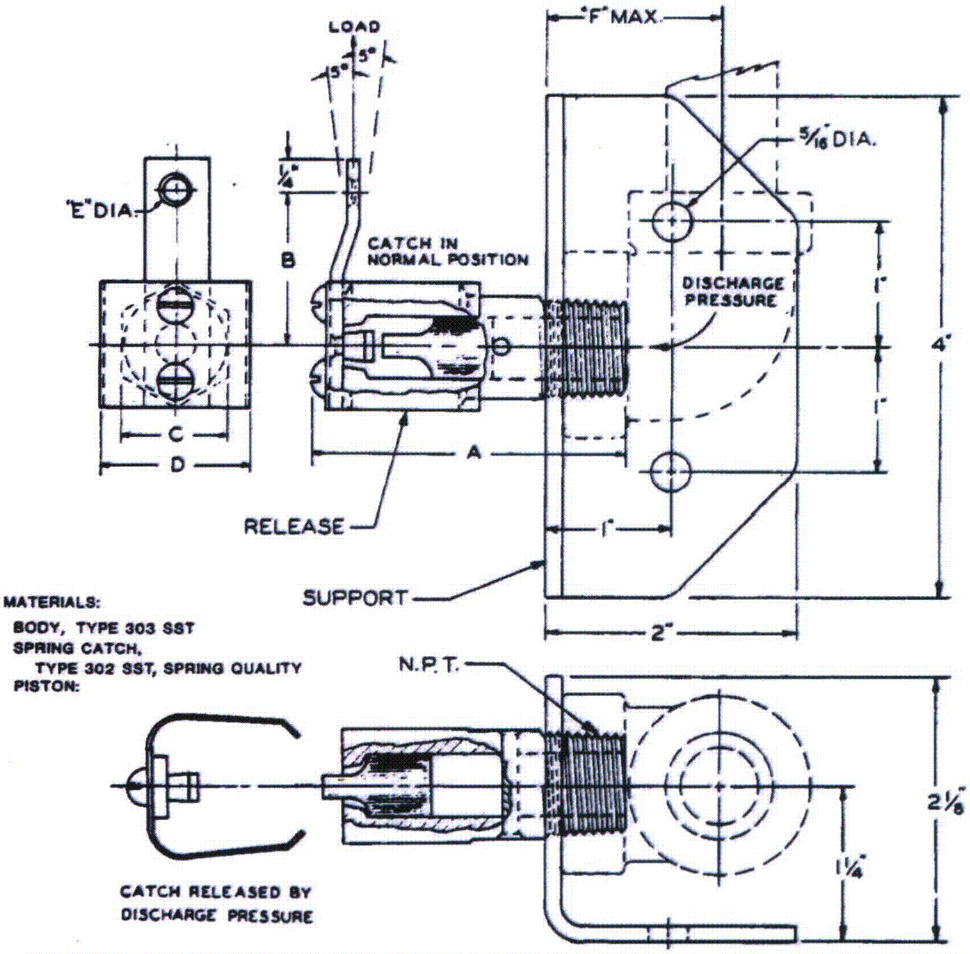
4. Organizational Information and Building Names Incorrect:

   During the updating of Part II of the Unit 1/Unit 2 FPR it was noted that the organizational information provided in Section 7.0, "Fire Protection Organization/Programs," may not match TVA's current organization. One example noted was that TVA's current "Quality Assurance" organization is referred to as "Nuclear Assurance" in the FPR. A similar issue was noted in Part III of the FPR in that the names for certain buildings used in the FPR are not consistent with the current names for the building. The example noted was the use of "Temporary Service and Office Building (TSOB)" instead of the building's current name "Modifications Building (MDB)." TVA intends to correct the organizational and building information as part of the FPR update for OMA 732 which will be provided by July 26, 2012. These issues were captured in TVA's Corrective Action Program on June 26, 2012, as SR 571121.

Blow-Off Clip - Sketch & Picture

WBN-VTD-AS06-0160

CHEMETRON fire extinguishing equipment....



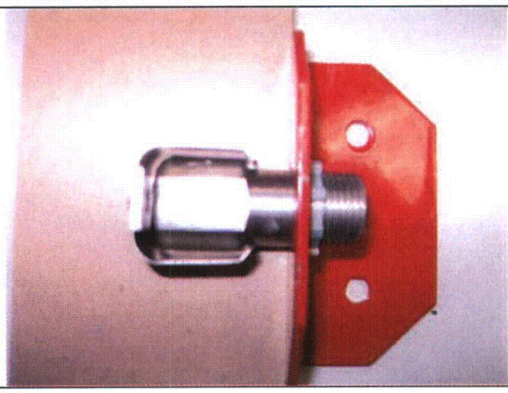
RELEASE SIZE	MODEL NO.	STOCK NO.	A	B	C	D	E	MAX. LOAD	SUPPORT NO.	STOCK NO.	F
½	FA-21915	1-063-0015	2 15/32	1 ¼	⅞	1 5/32	3/16	25 LBS.	A 45630	5-039-0749	1 ⅜
1	FA-21932	1-063-0016	3 15/32	1 ¾	1 ⅜	1 21/32	7/32	100 LBS.	A 45631	5-039-0750	1 ⅞

CARDOX
PRESSURE RELEASE

WBN REV. 0
WBN PAGE 9

Revised 5-'86

PLATE NO. H-58 5



Enclosure 2
Part II of the Fire Protection Report (FPR)

PART II – FIRE PROTECTION PLAN

1.0 PURPOSE AND SCOPE

Part II of the Watts Bar Nuclear Plant (WBN) Fire Protection Report describes the Fire Protection Plan (Plan) developed for WBN to ensure compliance with the requirements of 10 CFR 50.48, 10 CFR 50, Appendix R, Sections III.G, J, L, and O and the guidelines of Appendix A to Branch Technical Position (BTP) APCSB 9.5-1.

2.0 OBJECTIVES OF THE FIRE PROTECTION PLAN

The Plan describes the controls associated with the WBN Fire Protection Program (FPP); identifies the organizations and positions that are responsible for the FPP; describes the authority of positions responsible for implementing the FPP; and outlines the plans for fire protection, fire detection and suppression capability, and limitation of fire damage. The Plan describes the features necessary to implement the FPP such as: administrative controls; personnel requirements for fire prevention and manual fire suppression activities; automatic and manually operated fire detection and suppression systems; and the means to limit fire damage to structures, systems, and components important to safety so that the capability to safely shutdown the plant is ensured.

The Plan describes the measures that are established at WBN to extend the concept of defense-in-depth to fire protection in areas important to safety. These measures are established:

- to prevent fires from starting,
- to rapidly detect, control, and promptly extinguish those fires that do occur, and
- to provide protection for systems important to safety, so that a fire that is not promptly extinguished by the fire suppression activities, will not prevent the safe shutdown of the plant.

3.0 BASIS OF THE FIRE PROTECTION PLAN

The Plan at WBN has been developed to comply with and is based upon the requirements of General Design Criterion 3 in Appendix A to 10 CFR 50, 10 CFR 50.48, paragraph (a) and TVA's commitment to implement Sections III.G, III.J, and III.O to 10 CFR 50, Appendix R and Appendix A to Branch Technical Position APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976" (August 23, 1976). The requirements contained in Section III.L of Appendix R to 10 CFR 50 are also applicable to areas where alternate shutdown capability is selected. This Plan establishes the policy for and describes the manner in which TVA conforms to these requirements and the guidelines which have been promulgated to describe acceptable implementation methods. The applicable guidelines used as the basis for the Plan are listed in Section 4.1, Regulatory Documents.

4.0 REFERENCES

4.1 Regulatory Documents

4.1.1 Branch Technical Position (Auxiliary Power and Control Systems Branch) 9.51 Appendix A

4.1.2 10 CFR 50.48 - Fire Protection

4.1.3 10 CFR 50, Appendix A, Criterion 3 - "Fire Protection"

4.1.4 10 CFR 50 Appendix R - Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979

4.1.5 NRC letter dated August 29, 1977 - Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance

4.1.6 Generic Letter 81-12 - Fire Protection Rule and NRC Memorandum of Clarification for Generic Letter 81-12, dated March 22, 1982

4.1.7 Generic Letter 82-21 - Technical Specifications for Fire Protection Audits

4.1.8 Generic Letter 83-33 - NRC Positions on Certain Requirements of Appendix R to 10CFR50.

4.1.9 Generic Letter 86-10 - Implementation of Fire Protection Requirements

4.1.10 Generic Letter 86-10 - Supplement 1 - Fire Endurance Acceptance Criteria for Fire Barrier Systems Used to Separate Redundant Safe Shutdown Trains within the Same Fire Area

4.1.11 Generic Letter 88-12 - Removal of Fire Protection Requirements from Technical Specifications

4.1.12 NUREG-0452, Standard Technical Specifications for Westinghouse Pressurized Water Reactors, Revision 4 (referred to as standard Technical Specifications)

4.1.13 GL 92-08, Thermo-Lag 330-1 Fire Barriers

4.1.14 IN 84-09, Lesson Learned from NRC Inspections of Fire Protection Safe Shutdown Systems (10CFR50, Appendix R)

4.1.15 IN 91-47, Failure of Thermo-lag Fire Barrier Material to Pass Fire Endurance Test

4.1.16 IN 91-79 and Supplement 1, Deficiencies in the Procedures for Installing Thermo-Lag Fire Barrier Materials

4.1.17 IN 92-46, Thermo-Lag Fire Barrier Material Special Review Team Final Report Findings, Current Fire Endurance Tests, and Ampacity

4.1.18 IN 92-55, Current Fire Endurance Test Results for Thermo-Lag Fire Barrier Material

4.1.19 IN 92-82, Results of Thermo-Lag 330-1 Combustibility Testing

4.1.20 IN 94-22, Fire Endurance and Ampacity Derating Test Results for 3-Hour Fire-Rated Thermo-Lag 33-1 Fire Barriers

4.1.21 IN 94-34, Thermo-Lag 330-660 Flexi-Blanket Ampacity Derating Concerns

4.1.22 IN 95-27, NRC Review of Nuclear Energy Institute Thermo-Lag 330-1 Combustibility Evaluation Methodology Plant Screening Guide

4.1.23 IN 95-23, Thermo-Lag Flame Spread Test Results

4.1.24 IN 95-49 and Supplement 1, Seismic Adequacy of Thermo-Lag Panels

4.1.25 NUREG-1552, Fire Barrier Penetration Seals in Nuclear Power Plants

4.1.26 RG 1.189, Fire Protection for Nuclear Power Plants

4.1.27 NUREG-1852, Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire

4.2 <u>TVA Documents</u>

4.2.1 WB-DC-40-51 - Fire Protection of Safe Shutdown Capability (Unit 1/Unit2)

4.2.2 WB-DC-30-13 - 10 CFR 50 Appendix R Type I, II, III Circuits

4.2.3 WB-DC-40-62 - Fire Protection

4.2.4 N3-26-4002 - High Pressure Fire Protection

4.2.5 N3-13-4002 - Fire Detection System

4.2.6 N3-39-4002 - CO2 Storage, Fire Protection and Purging

4.2.7 Drawing Series 47W240 - Fire Compartmentation

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

4.2.9 WBP-EVAR-9004001 - Appendix R – Cables Required for Safe Shutdown Following a Fire

4.2.10 WBP-EVAR-9004002 - Required Cables Keys 7, 8, 28, 48 (Superseded by Ref. 4.2.9)

4.2.11 WBP-EVAR-9004003 - Required Cables Keys 38, 39 and 38A (Key 39 deleted, in title only) (Superseded by Ref. 4.2.9)

4.2.12 WBP-EVAR-9004004 - Required Cables Keys 37A, C, J, N, O (Key 37N deleted, in title only; calculation also includes Key 37K) (Superseded by Ref. 4.2.9)

4.2.13 WBP-EVAR-9004005 - Required Cables Keys 11, 12, 14, 15, 16, 19, and 26 (Key 15 deleted, appears in title only) (Superseded by Ref. 4.2.9)

4.2.14 WBP-EVAR-9004006 - Required Cables Keys 10, 20, 21, 22, 24, and 29 (Superseded by Ref. 4.2.9)

4.2.15 WBP-EVAR-9004007 - Required Cables Keys 30, 31, and 36 (Superseded by Ref. 4.2.9)

4.2.16 Drawing Series 45E893 - Appendix R Cable Routings (Historical Information)

4.2.17 WBP-EVAR-901011 - Appendix R - Cable Interaction Methodology (Historical Information)

4.2.18 EPM-DOM-012990 - Combustible Loading Summary

4.2.19 Deleted

4.2.20 WB-DC-30-4 - Separation/Isolation

4.2.21 WBN-EEB-EDQ00299920090013 – Unit 2 Post-Fire Safe Shutdown Cable Selection

4.2.22 TVA-NQA-PLN89-A - Nuclear Quality Assurance Plan

4.2.23 Mechanical Design Standard DS-M17.2.2, "Electrical Raceway Fire Barrier Systems"

4.2.24 General Engineering Specification G-98, "Installation, Modification, and Maintenance of Electrical Raceway Fire Barrier Systems"

4.2.25 General Engineering Specification G-73, "Installation, Modification, and Maintenance of Fire Protection Systems and Features"

4.2.26 Drawing Series 47W243 - Thermo-Lag Details

4.2.27 SSP-12.15, Fire Protection

4.2.28 NPG-SPP-18.4.5, Fire Protection Quality Assurance (Q07)

4.2.29 WBP-EVAR-9501001 - Interaction Analysis Input Data (Historical Information)

4.2.30 WBP-EVAR-9501002 - Interaction Analysis, Aux Bldg El 676 and 692 (Historical Information)

4.2.31 WBP-EVAR-9501003 - Interaction Analysis, Aux Bldg El 713 and 729 (Historical Information)

4.2.32 WBP-EVAR-9501004 - Interaction Analysis, Aux Bldg El 737 (Historical Information)

4.2.33 WBP-EVAR-9501005 - Interaction Analysis, Aux Bldg El 757 (Historical Information)

4.2.34 WBP-EVAR-9501006 - Interaction Analysis, Aux Bldg El 772 and 782 (Historical Information)

4.2.35 WBP-EVAR-9501007 - Interaction Analysis, DGBs, DBANKS, IPS, Yard, TB, Unit 2, CDWE (Historical Information)

4.2.36 WBP-EVAR-9501008 - Interaction Analysis, Reactor Building and Annulus (Historical Information)

4.2.37 WBNEEB-MS-TI07-0018, "120 VAC Short Circuit (1E), Coordination Study and Protection"

4.2.38 WBNEEB-MS-TI08-0028, "LV Electrical Penetration Protection Analysis"

4.2.39 WBNEEB-MS-TI07-0005, "125 VDC Vital Control Power System Fault"

4.2.40 WBNEEB-MS-TI08-0008, "480 VAC 1E Coordination/Protection"

4.2.41 WBNEEB-MS-TI15-0011, "480V Non-Class 1E Power Cables Associated Circuits"

4.2.42 WBNEEB-MS-TI08-0015, "Watts Bar NP Containment Penetration Protection Study, Voltage Level V4 and V5"

4.2.43 WBPEVAR9001006, "Reg. Guide 1.75 Associated Circuits and Appendix R Analysis for Non-Class 1E 120 VAC and 250 VDC Circuit"

4.2.44 WBPEVAR9001007, "Medium Voltage Appendix R and Reg. Guide 1.75 Associated Circuits Analysis"

4.2.45 Full Scale 3-Hour Testing of Internal Conduit Smoke & Gas Seals, 6/29/89, RIMS No. B22 890720 720

4.2.46 Letter from TVA to NRC dated 2/5/92

4.2.47 Letter from J. W. Hufham to E. Adensam (NRC) dated January 4, 1985

4.2.48 Letter from T. R. Davis to P. S. Smith, dated May 12, 1997, "Fire Watch Time Studies", RIMS T11 970512 665

4.2.49	Memorandum from J. J. Pierce and L. E. Perry to R. D. Hall, dated November 16, 1994. "Evaluation of Heavy Equipment Doors A154, W10A, and W10B Used as Fire Barriers", RIMS T24 941116 589
4.2.50	"Engineering Report for Penetration Seal Program Assessment", RIMS T28 960712 801
4.2.51	DCN No. 26366-A
4.2.52	DCN No. 35361-A
4.2.53	47W240 series drawings
4.2.54	47W381 series drawings
4.2.55	47W866 series drawings
4.2.56	Contract # 822493
4.2.57	DCN No. 54337-A, Vital Battery Chargers
4.2.58	WBN-EEB-EDQ00099920090017 – Appendix R – Units 1and 2 Emergency Lighting Requirements
4.2.59	WBN-EEB-EDQ00099920090016 – Appendix R – Units 1 and 2 Manual Actions Requirements
4.2.59A	WBN-MEB-MCQ00299920110381 – 10CFR50 APPENDIX R SAFE SHUTDOWN OPERATOR MANUAL ACTION EVALUATION
4.2.60	Memo from Ira M. Heatherly to Brian Briody dated October 26, 1998 – "High Pressure Fire Protection System Hydraulic Performance Review", RIMS B45 981026 001
4.2.61	General Engineering Specifications G96, "Installation, Modification, and Maintenance of Penetration Seals"
4.2.62	Drawing Series 45A883
4.2.63	Drawing Series 45W883
4.2.64	Drawing Series 47A472
4.2.65	TVA NPG Procedure – NPG-SPP-18.4.8, Control of Ignition Sources (Hot Work)
4.2.66	WBPEVAR9509001 – "Appendix R-Multiple High Impedance Fault Analysis"
4.2.67	Drawing Series 47W920
4.2.68	NPG-SPP-01.14 - Service Request Initial Review

4.2.69 NPG-SPP-06.1 - Work Order Process

4.2.70 NPG-SPP-07.1 - On Line Work Management

4.2.71 NPG-SPP- 09.3 - Plant Modifications and Engineering Change Control

4.2.72 NPG-SPP-18.4.6 – Control of Fire Protection Impairments

4.2.73 NPG-SPP-18.4.7 - Control of Transient Combustibles

4.2.74 WBPEVAR9602001, "Appendix R – Auxiliary Control Air Analysis"

4.2.75 EDQ00099920110005, "Appendix R – Fire Hazard Evaluation of Cables in the Unit 2 Annulus Required for 10CFR50 Appendix R Compliance"

4.2.76 WBPEVAR9205004, "Appendix R Analysis for Intraplant Communications"

4.2.77 EPM-BFS-041895, "Design Basis of Radiant Energy Shields (RES) Protecting Electrical Circuits in Secondary Containment"

4.2.78 EPM-BFS-053195, "Design Basis of Radiant Energy Shields (RES) Protecting Electrical Circuits in Primary Containment"

4.2.79 EPM-BFS-063095, "Non-Combustibility Analysis for Minnesota Mining and Manufacturing (3M) M20-A and M20-C Type Radiant Energy Shields"

4.2.80 Fleet Fire Brigade Training TPD-FBT

4.3 Other Documents

4.3.1 ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops

4.3.2 National Fire Protection Association Handbook, 17th Edition

4.3.3 ASTM E84 - Test for Surface Burning Characteristics of Building Materials

4.3.4 Report on the Test of Internal Conduit Seals

4.3.5 Letter from NRC dated 3/5/92

4.3.6 Conduit Fire Protection Research Program (Wisconsin Test Report), 5/18/87

4.3.7 Letter from Thomas M. Novak to H. G. Parris, dated November 6, 1984.

4.3.8 Letter from B. J. Youngblood to S.A. White, dated May 29, 1986

4.3.9 Supplemental Safety Evaluation Report (SSER) 18

4.3.10 SSER 19

4.3.11 Letter from NRC (R. E. Martin) to TVA (O. J. Zeringue) dated January 6, 1998, Completion of Licensing Action for Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers" and Supplemental Safety Evaluation Report on Ampacity Issues Related to Thermo-Lag Fire Barriers for Watts Bar Nuclear Plant, Unit 1.

4.3.12 NEI 00-01, Guidance for Post Fire Safe Shutdown Circuit Analysis, Revision 2

4.3.13 Report Number R1976-20-01, Multiple Spurious Operation Evaluation

4.3.14 Report Number 0006-0004-015-02, Expert Panel for Addressing Multiple Spurious Operations

4.3.15 NEI 09-14, Guidelines for the Management of Underground Piping and Tank Integrity

4.4 <u>NFPA Codes and Standards</u>

NOTE: Part X of this Fire Protection Report (FPR) documents the level of compliance with the NFPA codes and standards identified in Section 4.4. Other codes and standards referenced in Appendix A to BTP 9.5-1 are also addressed in Part X. Deviations from code criteria that impact operational capability of the systems are documented in Part VII of the FPR. Code deviations that do not impact operational capability of the systems are documented in the applicable system descriptions.

4.4.1 NFPA 10-1975, "Portable Fire Extinguishers"

4.4.2 NFPA 11B-1977, "Foam-Water Sprinkler Systems"

4.4.3 NFPA 12-1973, "Carbon Dioxide Extinguishing Systems"

4.4.4 NFPA 12A-1973, "Halon 1301 Extinguishing Systems"

4.4.5 NFPA 12B-1973, "Halon 1211 Extinguishing Systems"

4.4.6 NFPA 13-1975, "Installation of Sprinkler Systems"

4.4.7 NFPA 14-1974, "Standpipe and Hose Systems"

4.4.8 NFPA 15-1973, "Water Spray Fixed Systems for Fire Protection"

4.4.9 NFPA 20-1973, "Centrifugal Fire Pumps" for electric driven pumps, NFPA 20-1993 for diesel driven fire pumps.

4.4.10 NFPA 24-1973, "Outside Protection"

4.4.11 NFPA 25-1992, "Inspection, Testing, and Maintenance of Water-Based Fire Suppression Systems"

4.4.12 NFPA 26-1958, "Valve Supervision"

4.4.13 NFPA 30-1973, "Flammable and Combustible Liquids"

4.4.14 NFPA 49-1975, "Hazardous Chemical Reactions

4.4.15 NFPA 50A-1973, "Gaseous Hydrogen Systems

4.4.16 NFPA 51-1975, "Oxygen Fuel Gas Systems for Welding and Cutting"

4.4.17 NFPA 72D-1975, "Proprietary Protective Signaling Systems"

4.4.18 NFPA 72E-1974, "Automatic Fire Detectors"

4.4.19 NFPA 80-1975, "Fire Doors and Windows"

4.4.20 NFPA 90A-1975, "Air Conditioning and Ventilating Systems"

4.4.21 NFPA 220-1985, "Types of Building Construction"

4.4.22 NFPA 251-1985, "Fire Tests of Building Materials"

PART II – FIRE PROTECTION PLAN

5.0 DEFINITIONS

Analysis Volume – That portion of a fire area subjected to a detailed Appendix R safe shutdown analysis to ensure one train of Fire Safe Shutdown (FSSD) capabilities is always available. The analysis volume can consist of the entire fire area or a portion of the fire area. When the analysis volume is a portion of the fire area, it can consist of multiple rooms, a single room, portions of a room (as defined by column line locations), or any combination of the above. Analysis volumes involving only a portion of a room include a 20 foot wide (minimum) overlap with adjacent analysis volumes. Refer to Part III, Section 10.3 and Part VI, Section 2.2 for additional detail. (FPR Preparer)

Approved – Tested and accepted for a specific purpose or application by a nationally recognized testing laboratory (TVA General Engineering Specification G-73) or acceptable to the authority having jurisdiction. (FPR Preparer)

Aqueous Film Forming Foam (AFFF) – Synthetic foam concentrates based on fluorinated surfactants plus foam stabilizers, usually diluted with water to a 3-percent or 6-percent solution. The foam formed acts both as a barrier to exclude air or oxygen and to develop an aqueous film on the fuel surface capable of suppressing the evolution of fuel vapors. The foam produced with AFFF concentrate is dry chemical compatible; therefore, AFFF is suitable for combined use with dry chemicals. (G-73)

Authority Having Jurisdiction (AHJ) – The organization, office, or individual responsible for "approving" equipment, an installation, or a procedure. For TVA nuclear power facilities, the Corporate Engineering Chief Engineer is the AHJ per Section 7.1 and serves as the central point of contact with other organizations [NRC, Insurance Carrier]. (G-73)

Automatic – Self-acting, operated by its own mechanism when actuated by some impersonal influence such as a change in current, pressure, temperature or mechanical configuration. (G-73)

Barrier – A feature of construction provided to separate or enclose various occupancies to create a boundary limit based on functional requirements, or a flexible material designed to withstand the penetration of water, vapor, grease, or harmful gases. (G-96)

Combustible Control Zone (CCZ) – Designated locations (such as spaces, areas, elevations) where transient combustibles storage is prohibited unless adequate evaluation and/or compensatory actions are implemented. These zones are subdivisions of fire areas and serve as a form of fire barrier, providing fire separation of redundant fire safe shutdown (FSSD) equipment. Combustible material stored in these areas is controlled by site instructions. (FPR Preparer)

Combustible Material – Material which does not meet the definition of noncombustible. Any material which in the form in which it is used and under the conditions anticipated will ignite and burn (e.g., cable insulation, lube oil, plastic sheeting, charcoal, paper, etc.) (G-73)

Combustible Liquid - A liquid having a flash point at or above 100 °F (37.8 °C) (G-73)

Electrical Raceway Fire Barrier System (ERFBS) – A special type of Fire Barrier System designed to protect electrical raceways (e.g., conduits, cable trays, junction boxes, etc.) containing FSSD circuits required for 10 CFR 50, Appendix R safe shutdown. (DS-M17.2.2)

Engineering – The organization responsible for the design basis of the plant. (G-73)

Fire Area – That portion of a building or plant that is separated from other areas by boundary fire barriers. (G-73)

Fire Barrier – Those components of construction; walls, floors, ceilings, and their supports including beams, joists, columns, penetration seals or closures, fire doors, and fire dampers that are rated by approving laboratories in hours of resistance to fire and are used to prevent the spread of fire. (G-73) An ERFBS and radiant energy shields are also considered as fire barriers. (FPR Preparer)

Fire Break (Fire Stop) – A passive fire protection feature of construction intended to limit flame propagation along vertical or horizontal cable tray runs.

NOTE: Functionally identical to "Fire Stop". (G-73)

Fire Damper – A device, installed in the air distribution system, designed to close automatically upon detection of heat or release as the result of a signal from a sensing device such as a CO_2 discharge signal or a smoke detector, to interrupt migratory air flow, and to restrict the passage of flame. A combination fire and smoke damper shall meet the requirements of both. (G-73)

Fire Detector – A device designed to automatically detect the presence of fire and initiate an alarm system and other appropriate action (see NFPA 72E, "Automatic Fire Detectors"). (G-73)

Fire Door – The door component of a fire door assembly. (G-73)

Fire Door Assembly – Any combination of a fire door, frame, hardware, and other accessories, that together provide a specific degree of fire protection to the opening. (G-73)

Fire Hazards Analysis (FHA) – An analysis performed by fire protection and systems engineers to consider potential in situ and transient fire hazards; determine the consequences of fire in any location in the plant on the ability to safely shutdown the reactor or on the ability to minimize and control the release of radioactivity to the environment and specify measures for fire prevention, fire detection, fire suppression and fire containment and alternative shutdown capabilities as required for each fire area containing structures, systems and components important to safety that are in conformance with NRC guidelines and regulations. The FHA demonstrates that the plant will maintain the ability to perform safe shutdown functions and minimize radioactive release to the environment in the event of a fire, and should verify that NRC FPP guidelines or equivalent level of protection have been met. (G-73)

Fire Loading – The amount of combustibles present in a given situation, expressed in Btu per square foot. (G-73)

Fire Rated Assembly – A passive fire protection feature that is used to separate redundant fire safe shutdown capabilities. A fire rated assembly includes fire rated walls, floors, ceilings, ERFBSs, equipment hatches, stairwells, doors, dampers, and penetration seals. (FPR Preparer)

Fire Rated Penetration Seal – An opening in a fire barrier for the passage of pipe, cable, etc., which has been sealed to the same fire resistive rating of the fire barrier. (DS-M17.2.2)

Fire Resistance Rating – The time that materials or assemblies have withstood a fire exposure in accordance with the test procedures of "Standard Methods of Fire Tests of Building Construction and Materials," NFPA 251. (G-73)

Fire Safe Shutdown (FSSD) Equipment – Structures, systems, or components required to shutdown the reactor and maintain it in a safe shutdown condition in the event of a fire. Structures, systems, and components used to satisfy fire safe shutdown requirement commitments do not have to be safety-related. (FPR Preparer)

Fire Severity – A unit of measure, in terms of time (hours or minutes) that is used to quantify the hazards associated with the fire loading in a given plant area. It is based on an approximate relationship between fire loading and exposure to a fire severity equivalent to the ASTM E119 standard time-temperature curve. The fire loading of ordinary combustibles such as wood, paper, and similar materials with a heat of combustion of 7000 to 8000 Btu per lb. is related to hourly fire severity. It should not be used with combustibles having a high heat-release rate. (FPR Preparer)

Fire Suppression – Control and extinguishing of fires. Manual fire suppression is the use of hoses, portable extinguishers, or manually-actuated fixed systems by plant personnel. Automatic fire suppression is the use of automatically actuated fixed systems such as water, Halon, or carbon dioxide systems. (G-73)

Fire Wall – A wall having adequate fire resistance and structural stability under fire conditions to accomplish the purpose of subdividing buildings to restrict the spread of fire. (DS-M17.2.2)

Fire Watch – A fire watch is a compensatory action used when fire protection systems or features are inoperable or impaired as required by Operating Requirements (ORs). Additionally, fire watches may be utilized for compensatory actions when limits are exceeded in administrative controls for areas (e.g., excessive transient fire loads). (FPR Preparer)

Fire Watch-Roving – Roving fire watch requires that a trained individual be in the specified fire area(s) within specified intervals. A margin of 25 percent is allowed for unforeseen emergencies and to identify, report, and/or minimize unacceptable fire hazards in the area(s). (FPR Preparer)

Fire Watch-Continuous – Continuous fire watch requires that a trained individual be in the fire area at all times, that the fire area contain no impediment to restrict the movements of the continuous fire watch, and that each compartment within the fire area is patrolled at least once every 15 minutes with a margin of 5 minutes. A fire area designated for a continuous fire watch consists of one or more rooms which are easily accessible to each other and can be patrolled within 15 minutes with a margin of 5 minutes. Exceptions are provided in Section 13.0.A where more than one fire area may be covered by one continuous fire watch. The location(s) that a single continuous fire watch can patrol are based on time studies and require approval of the Fire Protection Supervisor or designee. (FPR Preparer)

Fire (Protection) Water Distribution System – The piping and appurtenances on TVA property between a source of fire protection water and the base of the riser (flange or flange and spigot piece or base tee) for automatic sprinkler systems, fixed water spray systems, standpipe systems, and other water based fire suppression systems. (G-73)

Flammable Liquid – A liquid having a flash point below 100°F and having a vapor pressure not exceeding 40 lbs. /in2 (absolute) at 100°F shall be known as a Class I Liquid. (G-73)

Foam-Water Sprinkler System – An extinguishing system: pipe connected to a source of air-foam concentrate, and a water supply, and appropriate sprinklers, which distributes foam and water over the protected area. (G-73)

Frequency – Each Testing and Inspection Requirement (TIR) has a specified Frequency in which the TIR must be met in order to meet the associated Operating Requirement (OR). The "specified frequency" is discussed in Section 14.0. (FPR-Preparer)

Functional Test – Use of a simulated signal to the sensor or device to verify the operability, including alarm and/or activation functions. (FPR-Preparer)

Inaccessible Area – Those areas defined in FSAR Chapter 12.3 as a Zone IV, IVa, or IVb (High Radiation Area) or a Zone V (Very High Radiation Area). Areas may be designated as inaccessible by the Fire Protection Supervisor because operating conditions that pose immediate danger to life and health from environmental or operational conditions or would require the shutdown of essential operating equipment to perform the testing/inspection. Inaccessible areas are as follows:

Inaccessible Areas

Building	Elevation	Area/Room
Auxiliary Bldg	674.0	Waste Hold Up Tank Room, 674.0-A1**
	676.0	Hold Up Tank Room A, 676.0-A2**
	676.0	Hold-up Tank Room B, 676.0-A3**
	676.0	Floor Drain Collector Tank Room, 676.0-A4a
	676.0	Unit 1 Pipe Chase. 676.0-A16*
	676.0	Unit 2 Pipe Chase. 676.0-A17*
	692.0	Spent Resin Tank Room, 692.0-A15**
	692.0	Valve Gallery, 692.0-A16
	692.0	Unit 1 Pipe Gallery and Chase. 692.0-A8*
	692.0	Unit 2 Pipe Gallery and Chase. 692.0-A24*
	692.0	Spare Hold-up Tank Room, 692.0-A31*
	692.0	Gas Decay Tank Room, 692.0-A3**
	692.0	Gas Decay Tank Room, 692.0-A5**
	713.0	Unit 1 Volume Control Tank Room, 713.0-A7
	713.0	Unit 2 Volume Control Tank Room, 713.0-A20
	713.0	Unit 1 Pipe Gallery and Chase. 713.0-A28*
	713.0	Unit 2 Pipe Gallery and Chase. 713.0-A29*
	713.0	Unit 1 Mixed Bed and Cation Valve Gallery, 713.0-A9*
	713.0	Mixed Bed Valve Gallery, 713.0-A18*
	713.0	CVCS Valve Gallery, 713.0-A23*
	729.0	Railroad Bay, 729.0-A5*
	729.0	Unit 1 North Main Steam Valve Room (all elev.)
	729.0	Unit 1 South Main Steam Valve Room (all elev.)
	729.0	Unit 2 North Main Steam Valve Room (all elev.)
	737.0	Unit 1 Letdown Heat Exchanger, 737.0-A7
	737.0	Unit 2 Letdown Heat Exchanger, 737.0-A8

Building	Elevation	Area/Room
	757.0	Unit 1 Reactor Building Equip. Hatch, 757.0-A11
	757.0	Unit 2 Reactor Building Equip. Hatch, 757.0-A15
U1 Reactor Bldg	All	All
U2 Reactor Bldg	All	All

* Inaccessible only during resin transfer.

**Refer to Part VII for engineering evaluation.

Internal Conduit Seals

(1) Smoke and Hot Gas Seals - Seals installed inside conduit openings to prevent the passage of smoke and hot gasses through fire barriers. These seals may be located at the fire barrier or at the nearest conduit entry on both sides of the fire barrier. Smoke and hot gas seals are not required to have a fire resistance rating equal to the fire barrier in which they are installed. (G-96)

(2) Heat and Fire Seals - Fire rated seals installed inside conduits at or in close proximity to the fire barrier. Heat and fire seals have the same or greater fire resistance rating as the fire barrier they are installed in. (G-96)

Labeled - Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization acceptable to the authorities having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner. (G-73)

Limited Combustible Material - As applied to a building construction material, a material not complying with the definition of noncombustible material, which, in the form in which it is used, has a potential heat value not exceeding 3500 Btu per lb. (8141 Kj/Kg), and complies with one of the following paragraphs (a) or (b). Materials subject to increase in combustibility or flame spread rating beyond the limits herein established through the effects of age, moisture, or other atmospheric condition shall be considered combustible.

(1) Materials having a structural base of noncombustible material, with a surfacing not exceeding a thickness of 1/8 in. (3.2mm) which has a flame spread rating not greater than 50.

(2) Materials, in the form and thickness used, other than as described in (a), having neither a flame spread rating greater than 25 nor evidence of continued progressive combustion and of such composition that surfaces that would be exposed by cutting through the material on any plane would have neither a flame spread rating greater than 25 nor evidence of continued progressive combustion. (NFPA 220).

Listed – Equipment or materials included in a list published by an organization acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the

equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner. (G-73)

Mode – The term Mode is used with the numbers 1 through 6 to associate the plant's status with specific plant physical parameters. For the definition of these parameters see the Technical Specifications. (FPR Preparer)

Noncombustible Material –

(1) A material which in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat; having a structural base of noncombustible material, as defined above, with a surfacing not over 1/8-inch thick that has a flame spread rating not higher than 50 when measured using ASTM E84 Test, "Surface Burning Characteristics of Building Materials". (G-73)

(2) A material which, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials which are reported as passing ASTM E136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C, shall be considered noncombustible materials. (NFPA 220)

Operable-Operability – A fire protection feature (i.e., system, subsystem, train, component, or device) is Operable when it is capable of performing its specified function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required by the systems, subsystems, train, component, or device to perform its specified function(s) are also capable of performing their related support function(s). 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. (FPR Preparer)

Operating Requirement (OR) – The lowest level functional capabilities or performance levels of equipment required to ensure adequate fire protection capability is established and maintained to protect safety-related and FSSD equipment from the effects of fire. When an OR is not met, action statements are provided to describe remedial action until the OR can be met. (FPR Preparer)

Penetration – An opening through structural members or barriers such as walls, floors, or ceilings for passage of penetrating components. (G-96)

Penetration Seal – Materials, devices, or assemblies installed in communicating spaces across barriers, which provide effective sealing against defined environmental exposure criteria to achieve the same functional requirement as that originally intended by the structural member or the barrier. (G-96)

Portable Fire Extinguisher – A portable device containing powder, liquid, or gases which can be expelled under pressure for the purpose of suppressing or extinguishing a fire. (FPR Preparer)

Preaction Sprinkler System – A system employing automatic sprinklers attached to a piping system connected to a water supply containing air that may or may not be under pressure, with a supplemental fire detection system installed in the same area as the sprinklers. Actuation of the fire detection system (as from a fire) opens a valve that permits water to flow into the sprinkler piping system and to be discharged from any sprinklers that may be open. (G-73)

Primary Containment – A structure that contains the reactor vessel that acts as a barrier to the release of radioactive fission products or other radioactive substances. Primary containment is a gas-tight shell that receives and contains the water, steam, and fission products that flow from any break in the reactor coolant pressure boundary located within the structure. (FPR Preparer)

Safety-Related – Items that meet the following criteria:

Those functions necessary to ensure:

(1) The integrity of the reactor coolant pressure boundary.

(2) The capability to shut down the reactor and maintain it in a safe condition.

(3) The capability to prevent or mitigate the consequences of an incident which could result in potential offsite exposures comparable to those specified in 10CFR100. (G-73)

Safety-Related Area – Any area containing safety-related equipment. Safety-related areas include: Unit 1 and 2 Reactor Buildings, Auxiliary Building, Control Building, Intake Pumping Station, Diesel Generator Building, duct banks, and portions of the Yard containing safety-related equipment. (FPR Preparer)

Secondary Containment – The structure that provides a plenum for the temporary, low pressure retention of gaseous leakage from primary containment. (FPR Preparer)

Smoke Detector – A device which detects the visible or invisible particles of incomplete combustion. (G-73)

Sprinkler System – A network of piping connected to a reliable water supply that will distribute the water throughout the area protected and will discharge the water through sprinklers in sufficient quantity either to extinguish the fire entirely or to prevent its spread. The system, usually activated by heat, includes a controlling valve and a device for actuating an alarm when the system is in operation. (G-73) Manually actuated systems do not contain a device for actuating an alarm when the system is in operation. (FPR Preparer).

Standpipe and Hose System – An arrangement of piping, valves, hose connections, and allied equipment installed in a building with the hose connections located in a manner that the water can be discharged in streams or spray patterns through attached hose and nozzles, for the purpose of extinguishing a fire and so protecting a building and its contents in addition to protecting its occupants. This is accomplished by connections to water supply systems or by pumps, tanks and other equipment necessary to provide an adequate supply of water to the hose connections (G-73).

Testable Valves – Refers to valves such as Outside Stem and Yoke (OS&Y), butterfly, and gate, (with or without automatic operators) that are designed to be cycled or exercised to ensure

operation and prevent binding. This does not refer to valves such as check valves, solenoid valves, alarm test valves, or suppression system water flow alarm valves. (FPR Preparer)

Testing and Inspection Requirement (TIR) – Physical attributes to be reviewed and re-verified to ensure the equipment specified can perform its intended function(s) of the protection of safety-related or fire safe shutdown systems. The frequency of this review and re-verification is also provided. (FPR Preparer)

Thermal Detector – A device that detects abnormally high temperature or rate of temperature rise. (FPR Preparer)

Transient Fire Loads – Any combustible material that is not permanently present in a given area, and may be introduced during maintenance, repair, rework, or may be transported to a final destination for permanent installation or maintenance, repair, rework of equipment systems and components present there. (G-73)

Water Spray Nozzle – A normally open water discharge device which, when supplied with water under pressure, will distribute the water in a special, directional pattern peculiar to the particular device. (G-73)

Water Spray System – A special fixed piping system connected to a reliable source of fire protection water supply and, equipped with water spray nozzles for specific water discharge and distribution connected to the water supply through an automatically or manually actuated valve which initiates the flow of water. An automatic valve is actuated by operation of automatic detection equipment installed in the same areas as the water spray nozzles. (In special cases the automatic detection equipment may also be located in another area.) (G-73)

Water Supply – An arrangement of pumps, piping, valves, and associated equipment necessary to provide an adequate, reliable supply of water for the extinguishment of fires. (FPR Preparer)

6.0 FIRE PROTECTION QUALITY ASSURANCE

TVA has developed an augmented Quality Assurance (QA) Program for fire protection which satisfies the guidelines for QA for Fire Protection established by Appendix A to Branch Technical Position BTPAPCSB 9.5.1 and "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance" (dated August 29, 1977) for fire protection features that provide protection for safety-related structures, systems or components and fire safe shutdown systems. Refer to Part VIII of the FPR for a comparison of the WBN Fire Protection Program with Appendix A guidelines. The QA program for fire protection uses the applicable parts of the TVA Nuclear Quality Assurance Plan (TVA-NQA-PLN89-A). More stringent QA requirements may apply to fire protection features that also perform nuclear safety-related functions such as secondary containment isolation. This QA program is described in corporate Standards and implemented in WBN procedures.

7.0 FIRE PROTECTION ORGANIZATION/PROGRAMS

7.1 TVA Corporate Management

The Senior Vice President, Chief Nuclear Officer, Nuclear Power Group (NPG) has the overall responsibility for establishing policies and programs related to fire protection. The Senior Vice

President, Chief Nuclear Officer, Nuclear Power Group, assumes or delegates the responsibility for "Authority Having Jurisdiction" (AHJ) for Operational fire protection matters.

The Engineering Vice President has the overall responsibility for establishing the design basis of the plant systems and features related to fire protection. The Engineering Vice President assumes or delegates the responsibility as the "Authority Having Jurisdiction" (AHJ) for the design basis fire protection matters.

NPG has on staff or as a consultant, an individual(s) who meet the eligibility requirements as a Professional Member in the Society of Fire Protection Engineers.

7.2 Site Vice President (VP)

The Site VP is responsible for the development, implementation, and administration of the Fire Protection Program. Authority and accountability for overview and implementation of the program have been further delegated to the Plant Manager. Specific requirements and responsibilities related to tasks such as administrative control of fire hazards, manual fire suppression, and maintenance of fire protection equipment have been delegated to various site organizations. The Site VP also provides design, engineering, and construction resources for fire protection systems and features.

7.3 Plant Manager

The Plant Manager is responsible for management oversight of the development and implementation of the WBN Fire Protection Plan.

7.4 Operations Manager

The Operations Manager is responsible for the development, implementation, and control of the WBN Fire Protection Plan. Authority and accountability for overview and implementation of the program have been further delegated to the Operations Support Supervisor. The Operations Manager provides senior management assistance and departmental interface for the resolution of fire protection-related issues referred by the Fire Protection Supervisor.

7.4.1 Operations Support Superintendent

The Operations Support Superintendent has direct authority and accountability for overview and implementation of the Fire Protection Program (FPP) and provides direct supervision of the Fire Protection Supervisor.

7.5 Fire Protection Supervisor

The Fire Protection Supervisor has overall responsibility for fire protection activities at the site. The Fire Protection Supervisor has available an individual who meets the eligibility requirements as a Professional Member in the Society of Fire Protection Engineers to oversee the fire protection administrative program.

Fire Protection Engineers are provided, for fire protection systems and features, to provide technical leadership to plant personnel for assigned fire protection systems and features, proactive identification and resolution of technical issues affecting fire protection systems and

features, initiation of fire protection-related design modifications, and technical assistance to fire protection management, operations, and maintenance organizations.

The Fire Protection Supervisor has the following responsibilities:

a. Ensures that the Fire Protection Report is maintained.

b. Provides oversight to the Appendix R FPP.

c. Represents WBN management concerning site fire protection-related issues with regulators, insurance representatives, state and local authorities, and other outside agencies such as the local fire department.

d. Ensures that fire protection systems and features are tested, inspected, and maintained in accordance with provisions set forth in this Plan.

e. Supervises WBN's fire protection emergency response organization.

f. Ensures appropriate modification (design changes) and other complex work packages are evaluated for compliance with established fire protection codes and standards and regulatory commitments.

g. Ensures the overall readiness of the fire protection organization and site personnel, to combat, suppress, and report fires, perform tests, and provide technical programmatic oversight.

h. Ensures that prefire plans and procedures for fire emergencies are maintained.

i. Administers the process that controls fire protection systems and feature impairments and restorations, and associated compensatory actions to ensure compliance with regulatory requirements.

j. Develops and implements administrative and physical controls of transient combustibles and ignition sources.

k. Ensures that work initiating documents (WID) are reviewed for impact on the elements of the Fire Protection Plan.

l. Provides advice and assistance to plant personnel on fire protection matters.

m. Ensures the fire protection system/equipment surveillance and maintenance program and its associated instructions are developed and maintained.

n. Ensures fire protection system test and surveillance results are evaluated for determination of operability status and deficiencies are correctly dispositioned

o. Establishes and implements the periodic site training and drill requirements as outlined in this plan.

p. Ensures that fires are investigated.

q. Ensures the implementation of the augmented Quality Assurance Program for Fire Protection.

r. Ensures adequate staff and firefighting equipment are available on site for the onsite emergency response organization.

7.6 Site Engineering

The Site Engineering Manager is responsible for fire protection related design activities at the site. Site Engineering has available an individual who meets the eligibility requirements as a Professional Member in the Society of Fire Protection Engineers to assist in fire protection design. Site Engineering has the following responsibilities:

a. Maintains the WBN Fire Protection Report.

b. Reviews and evaluates applicability of regulations and standards to fire protection system design activities.

c. Reviews the design, installation and modification of plant fire protection equipment and systems for conformance to regulatory requirements, general industry fire protection standards, and soliciting and integrating operational considerations into these documents.

d. Provides technical advice and assistance to plant personnel on fire protection engineering design activities.

e. Reviews design activities for impacts on Appendix R Safe Shutdown and the Fire Hazards Analysis.

f. Establishes design bases for fire suppression, fire barrier, fire detection, and alarm systems.

g. Ensures the technical adequacy of permanent fire protection features installed in nuclear power plants.

h. Ensures that plant and system design considers the safety to life from fire in buildings and structures.

i. Coordinates the development of positions to generic fire protection-related engineering issues and provides support in the development of positions to site-specific licensing and insurance issues.

j. Participates in fire protection presentations, submittals, and commitments made to the NRC that involve engineering.

7.7 Nuclear Assurance

Nuclear Assurance ensures that audits are performed in accordance with the Nuclear Quality Assurance Plan (NQAP). The Fire Protection Program, uses the applicable parts of the TVA Nuclear Quality Assurance Plan (TVA-NQA-PLN89-A) to manage the audit frequencies. This QA program is further described in corporate standards and implementing procedures. Any changes to the NQAP are controlled under 10CFR50.54(a).

7.8 Site Personnel

The WBN Fire Protection Plan applies to Nuclear Generation employees and contractors performing activities at WBN. Fire prevention and protection are essential for the safe operation of WBN.

Site personnel who have duties or perform work activities at WBN are responsible for being familiar with procedures applicable to them during a fire emergency and conducting day-to-day work activities in accordance with plant fire protection administrative procedures.

General employee's fire protection-related responsibilities and requirements are provided in annual general employee training.

8.0 FIRE PROTECTION PROGRAM ADMINISTRATIVE AND TECHNICAL CONTROLS

This section of the WBN Plan provides the administrative process and controls for implementation of the Fire Protection Program.

8.1 Program Changes and Associated Review and Approval

a. The Nuclear Safety Review Board (NSRB) provides independent review, oversight, and technical reviews.

b. The Fire Protection Supervisor reviews proposed changes to the Fire Protection Report and fire protection administrative procedures to ensure adequacy and compliance with established regulatory commitments in accordance with site specific procedures.

c. WBN may make changes to the approved Fire Protection Report without prior approval of the NRC only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

d. The Fire Protection Report is updated in accordance with 10CFR50.71.

8.2 Modification Control

A fire protection evaluation is performed (when required) for plant modifications in accordance with established Nuclear Engineering procedures. This evaluation is performed to ensure that adequate fire protection measures are maintained, combustible loading considerations are addressed, the overall Fire Protection Program is not degraded, and requirements and guidelines of regulatory agencies have been considered. The evaluation also addresses specific commitments to the applicable sections of 10CFR50, Appendix R.

8.3 Audits/Inspections of the Fire Protection Program

Generic Letter No. 82-21, "Technical Specifications for Fire Protection Audits" provides for a 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 audit program is provided in the NQAP. The frequency of audits is different from GL 82-21 per industry guidance as documented in the NQAP.

8.4 Assessment of Information Notices, Generic Letters, Bulletins, etc.

The Watts Bar Nuclear Experience Review (NER) Program ensures that NRC Information Notices, Generic Letters, Bulletins, and other relevant documents that provide information on generic or specific fire protection and/or fire safe shutdown issues are assessed for applicability to WBN. The responsible organizations (i.e., Licensing, Engineering, Operations, etc.) for addressing the applicable issues are determined upon assessment of the issues identified in the documents.

8.5 Violation and Reportability

Violations of an Operating Requirement (OR) or a Testing and Inspecting Requirement (TIR) described in Section 14.0 shall be evaluated for reportability in accordance with 10 CFR 50.72 and 10 CFR 50.73. Violations occur when the limits of the TIR (including allowable extensions) are exceeded or conditions of the OR and its associated action statement are not met.

9.0 EMERGENCY RESPONSE

9.1 Fire Brigade Staffing

Effective handling of fire emergencies is an important aspect of the WBN Fire Protection Program. This is accomplished by trained and qualified emergency response personnel. The fire response organization is staffed and equipped for firefighting activities. Each shift fire brigade is comprised of a fire brigade leader and four fire brigade members. The fire brigade shall not include the Shift Manager or the other members of the minimum shift crew necessary for safe shutdown of the unit, nor any personnel required for other essential functions during a fire emergency. Additional firefighting support is available when needed through an agreement with a local fire department.

An Incident Commander is available to direct each shift fire brigade. The Incident Commander meets the requirements of a Unit Supervisor-or Shift Technical Advisor and has sufficient training in or knowledge of plant safety-related systems to understand the effects of fire and fire suppressants on safe shutdown capability.

The fire brigade composition may be less than the minimum requirements for a period of time not to exceed two hours, in order to accommodate unexpected absence, provided immediate action is taken to fill the required positions. The following are examples of emergencies that would prevent the full fire brigade from being available onsite:

a. a life-threatening medical emergency, requiring the plant ambulance and appropriately trained medical personnel to leave the site for transport of the patient, and

b. the fire brigade may respond to fires outside the site area, but still on the TVA Reservation, that has the potential to or is affecting the ability for WBN to maintain the ability to safely shut down. This would include areas such as the Watts Bar Hydro and Fossil Plant switchyards. This response would be at the direction of the Shift Manager based on a concern for plant stability due to the fire or fire's threat. These are expected to be rare occurrences.

9.2 Fire Brigade Support Personnel

a. Site Nuclear Security provides access to the security controlled area for the fire brigade and offsite fire response personnel during fire emergencies. This includes traffic and crowd control, when necessary.

b. Site Radiation Protection (RP) personnel provide radiological support for the fire brigade to advise them on radiological hazards and assist in radiological decontamination efforts if necessary. RP personnel also provide radiological support for offsite fire response personnel.

9.3 Training and Qualifications

WBN fire brigade training ensures that each fire brigade's capability to combat fires is established and maintained. In addition each fire brigade member and leader annually receives:

1. Training on the use of special respiratory equipment
2. Training to maintain qualification for unescorted access to the plant
3. A medical evaluation to ensure ability to perform strenuous physical activity

The training program consists of initial (classroom and practical) training and recurrent training which includes periodic instruction, fire drills and annual fire brigade training.

a. Initial training

Initial training consists of classroom instruction and practical exercises to include actual fire extinguishment and use of firefighting and related equipment under strenuous firefighting conditions. Training includes:

1) Identification of the fire hazards and associated types of fires that could occur in the plant and an identification of the location of such hazards.

2) Identification of the location of firefighting equipment for each fire area, and familiarization with layout of the plant including access and egress routes to each area.

3) The proper use of available firefighting equipment, and the correct method of fighting each type of fire. The types of fires covered include electrical fires, fires in cables and cable trays, hydrogen fires, flammable liquid fires, waste/debris fires, and record file fires.

4) Indoctrination on the plant firefighting plan with specific coverage of each individual's responsibilities.

5) The proper use of communication, lighting, ventilation, and emergency breathing apparatus.

6) The toxic characteristics of expected products of combustion.

7) The proper methods for fighting fires inside buildings and tunnels.

8) Detailed review of firefighting procedures and procedure changes.

9) Review of latest plant modifications and changes in firefighting plans.

10) The direction and coordination of the fire fighting activities (fire brigade leaders only).

In addition, fire brigade leaders receive additional training that provides the fire brigade leader with the knowledge and skills necessary to supervise and direct the activities of the fire brigade during an incident.

b. Recurrent training

Training and qualification will be scheduled with a maximum allowed extension of 25 percent of the listed frequency interval. Performance deficiencies of the fire brigade or individual brigade members are remedied by scheduling additional training. Any individual who misses or fails to complete recurrent training is placed in an ineligible status until the missed training is make-up in accordance with site procedure (Ref. 4.2.80).

1) Periodic Classroom Instruction (PCI)

Regular planned training sessions will be held every three months. These planned training sessions will repeat the initial training subject matter over a two-year period. These sessions will normally be held on-site. If the appropriate quarterly session's subject matter is covered during the Annual Fire Brigade Training, credit may be given for the quarterly PCI.

2) Fire Drills

Drills are preplanned to establish the objectives and are conducted by the fire training instructor or designated representative. Drills are conducted as follows:

a) A minimum of one on-site drill per shift every 92 days.

b) A minimum of one unannounced drill per shift per year.

c) At least one drill per shift per year on a "backshift" for each fire brigade.

d) At three-year intervals, a randomly selected, unannounced drill critiqued by qualified individuals performing a triennial audit of the fire protection plan.

e) An annual fire drill, which includes participation by the offsite fire departments that have an active agreement to provide firefighting and equipment response to the plant.

f) Fire brigade members including leaders shall participate in at least two on-site drills per year.

g) When assigned as the shift Incident Commander, the Incident Commander should attend all fire drills occurring during that shift.

3) Annual Fire Brigade Training

Annual Fire Brigade Training will be held for the fire brigade on the proper method of fighting various types of fires similar in magnitude, complexity, and difficulty as those that could occur. These types of fires will include Class A (ordinary combustible material such as wood, cloth, paper, rubber, may plastics, etc.) and/or Class B (flammable liquids, combustible liquids, petroleum greases, oils, flammable gasses, etc.). In addition, some fires may address Class C (energized electrical) fires in combination with a Class A and/or B. This training will include actual fire extinguishment of a live fire similar to that which could occur in the plant of sufficient magnitude to exceed the capacity of a single hand held fire extinguisher and require the use of emergency breathing apparatus under strenuous conditions.

Annual briefings are provided to the local fire departments to assure their continued understanding of their role in the event of a fire emergency at the plant. The annual briefings are required for only those local fire departments that have aid agreements with the plant.

9.4 Firefighting Equipment

Firefighting equipment is provided throughout the plant. The availability of firefighting equipment is such that delays in obtaining equipment by the fire brigade for fire emergencies will be minimized.

Firefighting equipment may, alternatively, be staged adjacent to or at the access to areas/locations to facilitate equipment availability. This may be necessary to address equipment surveillance test concerns relative to life safety and ALARA practices.

Examples of the types of firefighting equipment available are as follows:

- motorized apparatus
- portable ventilation equipment
- fire extinguishers
- self-contained breathing apparatus and reserve air bottles
- fire hose
- nozzles, gated wyes, fittings, and foam applicators
- personal protective equipment such as turn-out coats, boots, gloves, and helmets
- communication equipment

- portable lights
- ladders for firefighting use

9.5 Fire Emergency Procedures and Prefire Plans

Fire emergency procedures and prefire plans specify actions taken by the individual discovering a fire and actions considered by the emergency response organization. Included in these procedures are operational instructions for response to the fire detection system annunciation. These procedures provide different levels of response based on whether there is an actual fire or an annunciation (e.g., a single zone annunciation in a cross zoned area will not carry the same level of response as a cross zone annunciation in the same area). An annunciation may or may not carry the same level of response as the report of a fire by site personnel. Prefire plans are not intended to establish a procedure or step-by-step process but to provide guidance, depending upon the particular circumstances, to aid in firefighting efforts. It is recognized that many different firefighting techniques or strategies exist which would be acceptable for fire suppression efforts.

Prefire plans are developed to support firefighting activities in safety-related areas, in fire safe shutdown system areas, and areas which may present a hazard to safety-related or FSSD equipment inside the boundaries of the Site Perimeter. The prefire plans include the following information, as appropriate:

- Identification of plant equipment
- Access and egress routes for fire areas
- Fire fighting strategy and tactics
- Location of fire protection features
- Identification of special fire, toxic material, and radiological hazards
- Special consideration of hazards
- Ventilation methodology

Safe shutdown procedures are available in the event a fire occurs in safety-related or FSSD equipment areas of the plant.

10.0 CONTROL OF COMBUSTIBLES

Combustibles are controlled to reduce the severity of a fire which might occur in a given area and to minimize the amount and type of material available for combustion.

The use and application of combustible materials at WBN are controlled utilizing the following methods:

- Instructions/guidelines provided during general employee training/orientation programs

- The chemical traffic control program
- Periodic plant housekeeping inspections/tours by management and/or the plant fire protection organization
- Design/modification and installation process review
- Administrative procedures (e.g., NPG-SPP-18.4.7 (Ref. 4.2.73) Control of Transient Combustibles)

The fire protection organization performs a periodic fire safety inspection of the safety-related areas of the plant to identify and minimize potential fire hazards.

The use and handling of combustible materials such as fire retardant-treated lumber, paper, plastic, and flammable/combustible gases and liquids are controlled in safety-related areas. The use of untreated lumber in safety related and selected power production structures requires specific approval of the fire protection organization.

Combustible materials generated as a result of work activities are removed/cleaned up from the work area at the end of the shift or at the conclusion of the work activity, whichever is sooner.

The storage of combustible materials within safety-related areas is controlled by the fire protection organization.

The control of hazardous waste and hazardous materials is conducted in accordance with the chemical control and hazardous material processes.

Design considerations in the control of combustibles are utilized when appropriate. These considerations include the application of noncombustible or limited combustible construction materials or components, use of noncombustible fluids in operating equipment, provision of dikes or containments for equipment containing combustible liquids, etc.

Combustible Control Zones (CCZs) are established at WBN to strictly control or prohibit the placement of transient combustibles. Transient combustibles brought into CCZs require an evaluation in accordance with site administrative procedures. The strict control or prohibition of combustibles by site procedures within the combustible control zone provides reasonable assurance that fire will not propagate and jeopardize redundant FSSD equipment. CCZs are shown on the compartmentation drawings (Figures II-27A though II-40A).

11. CONTROL OF IGNITION SOURCES

The use of ignition sources such as welding, flame cutting, thermite welding, brazing, grinding, arc gouging, torch applied roofing, and open flame soldering within safety-related areas is controlled through the approval and issuance of an ignition source permit. Permits are reviewed and approved by appropriate plant personnel. The ignition source permit is valid for one job. Job area inspection shall be performed and documented at the start of each shift that ignition source activities are being performed. If no ignition sources activities are performed, then re-inspection is not required.

Designated ignition source activity areas are located and approved by the fire protection organization. A fire watch system shall be established for all ignition source work activities that are performed in safety-related areas of the plant. These fire watches remain with the work activity in accordance with the requirements stated in NPG-SPP-18.4.8 (Ref. 4.2.65).

Smoking is not allowed in any safety-related or power production area.

12.0 DESCRIPTION OF FIRE PROTECTION SYSTEMS AND FEATURES

Fire protection systems and related features consist of the following subsystems:

- water supply
- standpipes, hoses, and hydrants
- automatic and manual fire suppression
- fire detection
- lightning protection, emergency lighting, and communications
- reactor coolant pump lube oil collection, and
- fire-rated assemblies.

The following subsections are summary discussions of these fire protection systems and related features.

Those portions of the fire protection systems and features within Seismic Category I structures, whose failure during a seismic event could result in damage to safety-related equipment, have been designed and installed to Seismic Category I(L) requirements. Those portions that satisfy safety-related functions have been designed and installed to Seismic Category I requirements if needed due to the design basis. Piping in the Annulus is Seismic I(L)A, pressure retention. This has been analyzed to ensure the primary safety function of maintaining secondary containment isolation boundary.

12.1 Water Supply

The High Pressure Fire Protection (HPFP) system water supply is common to both units and consists of four, ASME Section III, seismic Category I, high pressure, vertical turbine motor-driven pumps and one horizontal, centrifugal diesel fire pump. Each electric pump is rated at 1590 gpm at 300-foot head (130 psig). The diesel pump is rated at 2500 gpm at 288-foot head (125 psig). Electric fire pump capabilities are evaluated by testing at the rated head and at two diverse points, one above and one below the rated head. The diesel fire pump capability is evaluated by testing at three points on the fire pump curve. They are: 1) not to exceed 140% of rated pressure (175 psig/404-foot head) at shutoff capacity 2) develop a minimum 100% capacity (2500 gpm) at rated pressure (125 psig/288-foot head), and 3) develop a minimum 150% capacity (3750 gpm) at not less than 65% rated pressure (81 psig/187-foot head). The electric pumps are located in the seismic Category I Intake Pumping Station (IPS). A three-hour

fire-rated barrier is provided to separate two electric fire pumps from the other two. The diesel fire pump is remotely located in the Yard adjacent to the Unit 1 cooling tower.

The WBN fire protection system has four electric driven pumps and one diesel driven pump. As defined in Section 14.2.a below, fire protection Operability is based on only two of the four electric pumps and the diesel driven pump. The other two electric driven pumps are considered spares for fire protection purposes. The four electric pumps and associated main piping headers are ASME Section III, seismic class I available for supplying auxiliary feedwater during a design basis event (i.e., Flood Mode). During Flood Mode two electric pumps are aligned to each train header. Details of the Flood Mode are documented in several places in the FSAR such as Section 2.4.14.2, "Plant Operation During Floods Above Grade". The ASME and seismic requirements are beyond the requirements of the NFPA Code and are not required for fire protection purposes.

The electric pumps are automatically started by activation of the fire detection systems associated with the automatic water-based suppression systems. The electric pumps can be started manually from either the main control room or the respective 480V shutdown board. The diesel pump is auto-started on low system pressure or manually from the Main Control Room.

Each electric fire pump motor is powered from a separate 480V shutdown board. In the event of loss of offsite power, each shutdown board is powered by an emergency diesel generator. Indications of fire pump motor running and loss of line power on the line side of the switchgear are provided in the Main Control Room (MCR). Required annunciation signals for the diesel fire pump and its controller are automatically transmitted to the MCR.

Inspection of the strainers for the electric pumps is included in the WBN Preventative Maintenance Program. A single, automatic, motor-driven, self-cleaning strainer is provided for each power train to filter the discharge flow of the two electric pumps on that train. Each strainer is capable of straining 100 percent of the rated flow of two pumps. The strainers are located in the IPS. The strainers conform to the requirements of ASME Section III, Seismic Category I components. Mechanical screens are provided in the suction of the diesel fire pump and a strainer on the discharge.

Water supply for the electric fire pumps is taken from the Tennessee River and is considered unlimited for fire protection purposes. The diesel fire pump takes suction from the Unit 1 cooling tower basin, which has sufficient capacity for the diesel fire pump to run at 150% capacity for two hours. A fire protection water distribution system is provided to serve both units. Sectional isolation valves are provided so that maintenance may be performed on portions of the loop while maintaining firefighting capability. The sectional isolation valves in the underground and building loops are locked or sealed in position and surveillance is performed to ensure proper system alignment. The fire protection water distribution system is crosstied between units. The HPFP system is normally pressurized by the raw cooling water (RCW) system when the fire pumps are not running. The RCW system is automatically isolated when a fire pump starts.

The high pressure fire protection system is shared with the raw service water (RSW) system. Automatic isolation valves are provided to isolate selected large raw service water loads from the HPFP system when any fire pump is started. Specific RSW loads are automatically isolated from the fire protection water system when the fire pump(s) start due to a fire in safety-related areas to reduce the RSW load on the fire protection system to ensure adequate flow and pressure is available.

The electric fire pumps are also used for supplying auxiliary feedwater during a design basis event (i.e. Flood Mode) at which time two pumps are aligned to each train. Details of the Flood Mode operations are documented in the FSAR.

Measures were taken to account and compensate for the effects of corrosion on piping due to biological growth, such as microbiologically induced corrosion (MIC) nodules by designing normally raw water wetted, unlined carbon steel pipe using calculations that:

1. reduced the pipe diameter to account for diameter reducing inclusions, and
2. lowered the C-factor to C=55 in the Hazen-Williams formula to account for the added roughness.

The water used in both the HPFP and RCW system is chemically treated to address concerns resulting from the use of raw water. WBN has a comprehensive chemical treatment program for treating raw water systems. This treatment is a major part of WBN Raw Water Corrosion Program as specified by site procedures. The chemical treatment is used to control corrosion to control organic fouling, including slime, to minimize the effect of MIC and inhibit growth of Asiatic clams in carbon steel. Buried piping portions of the HPFP system are monitored by the buried piping program in accordance with NEI 09-14, "Guideline for the Management of Underground Piping and Tank Integrity," which provides for the risk ranking of buried piping relative to installed conditions (e.g., design and construction practices, as well as soil) and consequences of a failure and testing of the piping.

Silt from river water is addressed for fire protection in two methods. One method is the design of the IPS. For the fire pumps, water has to travel up two elevations, traverse the basin area that is just under one half the size of the IPS between elevation changes, and there is a weir at the entrance to the fire pumps wet wells. This relative movement of water to reach the fire pump wet wells allows for the majority of the silt to drop out. The other method is the design of the Raw Cooling Water (RCW) system, which provides normal makeup for the HPFP system. The RCW system pumps draw water remotely from the water's entrance to the IPS allowing for silt settlement. The cross tie of the RCW and HPFP is in the Turbine Building close to the service water load on the HPFP system. Thus, silt drawn into the HPFP system is in the paths of these service water loads.

The water used in both the HPFP and RCW system is chemically treated to address concerns resulting from the use of raw water. In 1995 (at licensing of Unit 1), a three year evaluation program was implemented to monitor the performance of the HPFP system by yearly testing of the HPFP distribution system. The results of this evaluation determined that testing on a three year basis (instead of yearly) was adequate (see Reference 4.2.60). Actions taken to improve the program include the addition of the buried pipe program with the associated risk ranking and testing using advanced technology, such as guided wave testing.

The chemical treatment for raw water systems, including HPFP, is consistent with other nuclear facilities and includes oxidizing biocide, non-oxidizing biocide, phosphate, and zinc. On the existing HPFP piping, the phosphate is used to sequester iron from existing corrosion products, the zinc is used to passivate the carbon steel surfaces, and the oxidizing and non-oxidizing biocide will control slime, which will help prevent MIC growth. This provides the most effective treatment that a nuclear plant may use to prevent corrosion in raw water systems.

12.2 Standpipes, Hose Stations, and Hydrants

Hydrants are located around the yard loop and provide coverage for exterior portions of significant structures. Normally open key operated curb valves or post indicating valves are provided for isolation of each hydrant off the yard loop. Motorized apparatus at WBN is provided with sufficient equipment to effectively fight fires in the yard area.

Interior manual hose installations are provided throughout the plant typically as back up for the automatic suppression systems and, in some cases, as the primary suppression system. Selected hazards in the Reactor Buildings have automatic suppression systems as primary protection. These hazards include closed head water spray systems installed for each reactor coolant pump (RCP) and preaction sprinklers in the annulus that serve as water spray on select cable concentrations and prevent specific cable interactions. These automatic suppression systems are the primary suppression for these hazards with standpipes as the backup. For other general areas in the Reactor Buildings the primary suppression system is the Reactor Buildings' standpipes with the Auxiliary Building standpipes serving as the backup system. Selected areas in the Intake Pumping Station have automatic preaction sprinkler systems as primary protection with the standpipe system serving as the backup system in these areas. In areas of the IPS without automatic preaction sprinklers the standpipe system serves as the primary system, with yard hydrants providing the backup system.

Selected areas in the Diesel Generator Building (DGB) have automatic CO2 and preaction sprinkler systems as primary protection with the standpipe system serving as the backup system in these areas. In areas of the DGB without automatic suppression, the standpipe system serves as the primary system, with yard hydrants providing the backup system. The primary and backup for the Diesel Generator Building's Conduit Interface Room is from yard hydrants. The design of manual hose stations were hydraulically verified per the guidelines of NFPA 14. The Diesel Generator Building (DGB) has two feeds from the fire protection water distribution system. One line feeds the fire suppression system and the other line feeds the standpipe and hose system.

Hose stations in safety-related areas of the plant are supplied from risers separate from those for the preaction sprinkler systems serving the same area. One exception is the Reactor Buildings in which both the hose station flow control valves and the automatic suppression system flow control valves are supplied from a single header for the systems in the respective Reactor Building.

Class II and III Hose stations are equipped with nozzles rated for the hazards present and with a sufficient amount of hose to support firefighting needs in that area. Hose station equipment may, alternatively, be staged adjacent to or at the access to areas/locations to facilitate equipment availability. This may be necessary to address equipment concerns relative to life safety and ALARA practices.

Most of the buildings are provided with a wet standpipe system. These systems have supply valves open and water pressure to the hose rack isolation valve. The Reactor Buildings (including the Annulus) is provided with a dry standpipe system. The standpipe systems within the Reactor Buildings are normally dry and are arranged to admit water into the systems through manual operation of push buttons located at each hose station. The systems are controlled by electrically or manually operated deluge valves which are located in the Auxiliary Building. The systems for each Reactor Building' RCP preaction sprinkler and dry standpipe are provided with automatic containment isolation capabilities for primary containment to address

nuclear safety concerns. In case a fire in primary containment causes a spurious containment isolation signal, administrative controls have been established to address reestablishing flow to these systems.

12.3 Automatic Fire Suppression

The automatic fire suppression systems are designed to extinguish a fire or control and minimize the effects of a fire until the fire brigade can respond and extinguish it. The automatic suppression systems consist of water based systems and total flooding CO_2 systems. In addition, manually actuated fixed water suppression systems are also addressed in this section. There are typically three types of automatic suppression systems provided in safety-related areas at WBN:

a. automatic preaction sprinkler systems

b. automatic fire suppression systems with closed water spray heads

c. automatic total flooding CO_2 systems

The annulus area of the Reactor Building has automatic preaction sprinklers that serve as water spray on select cable concentrations and prevent specific cable interactions.

Transformers in the Yard and specific hazards in the Turbine Building are protected with automatic fixed open head water spray systems.

12.3.1 Preaction Sprinkler Systems

Automatic preaction sprinkler systems generally are provided in areas where it is important to prevent accidental discharge of water. In a preaction sprinkler system, the piping network is maintained dry until water is needed for fire suppression. A deluge valve (sometimes referred to as a preaction valve when used in a preaction system) is used to control the water when the water is introduced into the piping network.

Operation of the preaction sprinkler system is initiated by a signal from a detection system in the protected area. This signal causes the preaction valve to open and fill the piping network. Actuation can also be initiated manually by mechanical operation at the preaction valve. Selected preaction sprinkler systems have manual actuation stations at strategic locations remote from the preaction valve.

Water is then applied to the fire when the heat from the fire melts the fusible element in the sprinkler head. Water flow is stopped by manually closing the associated isolation valve.

12.3.2 Fire Suppression Systems with Closed Water Spray Heads

Automatic fire suppression systems with closed water spray heads are provided for charcoal type filter units the reactor coolant pumps, and cable tray interactions in both Annulus areas . The actuation of the deluge valves is the same as that described for the preaction sprinkler systems section.

Operation of the fire suppression system is initiated by a signal from a detection system in the protected area. This signal opens the deluge valve, filling the piping network with water. Actuation can also be initiated manually by mechanical operation at the deluge valve.

Water is applied when the heat from the fire melts the fusible element in the closed water spray head. Water flow is stopped by manually closing the associated isolation valve.

12.3.3 Carbon Dioxide Suppression Systems

Automatic total flooding CO_2 suppression systems have been provided for the Auxiliary Instrument Rooms and Computer Room in the Control Building; and the Lube Oil Storage Room, each Diesel Engine Room (4), Fuel Oil Transfer Room, and each 480-V Board Room (4) in the Diesel Generator Building.

The design bases for the areas protected by CO_2 are as follows:

- Auxiliary Instrument Rooms - Deep seated fires. Must achieve 30% concentration within 2 minutes, 50% concentration within 7 minutes, and maintain at least 45% concentration for at least 15 minutes.
- Computer Room - Deep seated fire. Must achieve 30% concentration within 2 minutes and 50% concentration within 7 minutes.
- Diesel Generator Engine Rooms - Surface fire (diesel fuel) and rotating electrical equipment. Must achieve 34% concentration within 1 minute and maintain at least 30% concentration for at least 20 minutes.
- Diesel Generator Electrical Board Rooms - Deep seated fires. Must achieve 30% concentration within 2 minutes and 50% concentration within 7 minutes.
- Lube Oil Storage and Fuel Oil Transfer Rooms - Surface fire. Must achieve 34% concentration within 1 minute.

A signal from either the fire detection system or a push button station activates the area alarms, CO_2 discharge timer which actuates the master control valve and the area selector valve permitting the CO_2 to be discharged into the selected area. In addition, the system can be manually operated via the electro-manual pilot valve for each hazard protected on the loss of power to the system.

Personnel safety is considered by providing the pre-discharge alarm to notify anyone in the area that CO_2 is going to be discharged and by the addition of an odorizer to the CO_2 to warn personnel that CO_2 has been discharged.

Actuation of the CO_2 system causes selective closure of dampers and doors to the area protected and shut down HVAC air flows to the protected area. This prevents spread of the fire and ensures that the minimum concentration of CO_2 is maintained. Full discharge tests for representative rooms in conjunction with door fan pressurization tests have been conducted to validate CO_2 concentration and soak times. The duration of the discharge is determined by the area requirements and is controlled by the discharge timer.

The carbon dioxide system providing protection for the diesel generator building is stored in a tank at the diesel generator building. The diesel generator units are protected from the effects of a postulated failure of this storage tank by an 18-in thick reinforced concrete wall. Therefore,

any missiles or pressure buildup generated by a rupture of the carbon dioxide storage tank would not damage safety-related equipment. The vent path for the storage tank compartment is through one set of double doors into a stairwell then, if needed, through another set of double doors which open to the atmosphere from the stairwell.

Carbon dioxide for the powerhouse areas is supplied from another storage tank in an underground vault in the yard; therefore, rupture or explosion of the tank cannot pose a threat to any safety-related structure. This part of the carbon dioxide suppression system has a non-seismic portion. The rupture of the non-seismic portion of the carbon dioxide system cannot result in the total depletion of the carbon dioxide supply to areas protecting safety-related and FSSD equipment. A pneumatic timer is located in the carbon dioxide supply line to hazards in non-seismic areas. This timer will allow only the discharge equivalent to that required for the greatest hazard in a non-seismic area to be discharged from the system. After this specified length of time, the timer will cause closure of the master control valve on the supply line to non-seismic hazards.

12.4 Manual Suppression Systems and Features

12.4.1 Portable Extinguishers

Portable fire extinguishers of a size and type compatible with specific hazards are located throughout the plant.

12.4.2 Manual Sprinkler Systems

Manually activated sprinkler systems are provided for the 125-volt vital battery and battery board rooms I, II, III, and IV. The piping network isolation valve is maintained in the closed position. Personnel are alerted to a problem in these areas by the fire detection system. After confirming there is a fire, personnel then open the appropriate isolation valve to allow water to the system. Water is applied to the fire when the heat from the fire melts the fusible element in the sprinkler head.

12.5 Fire Detection Systems

Fire detection is installed to provide for prompt detection of a fire in its incipient stage and provide early warning capability. Prompt detection of a fire will reduce the potential for damage to structures, systems and equipment and is an important part of the overall fire protection program at WBN. The fire detection systems at WBN are designed to be operable with or without offsite power.

The fire detection systems consist of initiating devices, proprietary protective signaling devices, local control panels, remote transmitter/receiver units which provide remote multiplex (MUX) functions, and computerized multiplex central control equipment.

The system processes the following signal types:

1. Alarm - A signal indicating the actuation of smoke or heat detectors or the sensing of flow through fire suppression systems. Also, some suppression supervision monitoring devices transmit an alarm signal.

2. Trouble - A signal indicating the occurrence of a fault condition in the proprietary protective signaling system. Normally suppression supervision monitoring devices transmit a trouble signal.

A central processor unit (CPU) of the computerized multiplex central control equipment communicates with the local control panels via the remote transmitter/receiver units over looped circuits. The transmitting equipment allows the processor to interrogate each local control panel in turn and to receive data from the panels. When an initiating device changes from normal to a trouble or alarm status, it is detected at the local control panel and, when next interrogated, the remote transmitter/receiver will transmit this status change. The status change is evaluated by the CPU and visual and audible indications are provided. The computerized multiplex central control equipment is located in a constantly attended location.

Where detection is provided for the protection of safety-related or FSSD equipment, Class A, four wire, supervised circuits link the fire detectors to the local control panels. These circuits are used to annunciate status change to a constantly attended location.

A status change generally results in the following system responses:

1. Audible and visual annunciation by the computerized multiplex central control equipment. This annunciation includes identification of the location and the time of receipt of the status change on a monitor and a printer.

2. Illumination of indicating lamps on the local control panel indicating the status change.

3. Actuation of local control panel circuits for the control of automatic suppression systems, fire pumps, fire dampers, or ventilation equipment as appropriate for selected alarm status changes.

4. An alarm status change can be reset at the local control panel. Local control panel reset, in safety-related areas, can also be achieved through the computerized multiplex central control equipment.

A second CPU is provided in a constantly attended location as an alternate for the primary processor.

The fire detection system for safety-related areas is comprised of different types of devices, components, or parts that provide the system functions of detection, annunciation, and/or activation of automatic suppression systems. The devices used are:

1. Smoke Detectors

    a. Ionization

    b. Photoelectric

2. Thermal Detectors

The thermal detectors are the rate compensation/fixed temperature type and are self restoring. They have temperature ratings appropriate for the area environment.

3. Air Duct Detectors

The smoke-type air duct detectors are specifically designed to sense the presence of smoke or combustion products in HVAC ducts.

4. Monitoring Devices

The fire detection system utilizes the following devices to monitor the fire suppression systems status.

a. Pressure Switch - piping integrity

b. Pressure Switch - for water flow

c. Pressure Switch – CO_2 discharge

d. Status Switch - diesel fire pump running

5. Manual Pull Stations

6. Power Supply

Two sources of 120V AC power are provided to the portion of the fire detection system protecting the safety-related equipment. The primary power supply is from Class 1E power sources with a high degree of reliability and adequate capacity for the intended service. The standby power is from a diesel generator. An interim power supply is provided when the transfer from the main power supply to the standby power source takes longer than 30 seconds. The interim power supply consists of batteries that provide power to the remote transmitter/receiver modules only. Electrical isolation is provided between the fire detection system and the Class 1E power source from which it is supplied.

12.6 Lightning Protection

The basic principle to protecting life and property from damage or loss due to lightning is to provide a direct low impedance path for the lightning to travel to ground rather than through structures and/or equipment.

The lightning protection system consists of three basic parts which provide the low impedance path:

1. The air terminals on roofs and other elevated locations.

2. The ground grid.

3. The conductors connecting the air terminals to the ground grid.

Overhead shield wires and lightning arrestor protection is provided for the transmission lines, the switchyard, and the transformers.

12.7 Emergency Lighting

The plant design includes three lighting systems classifications:

1. Normal - powered only from offsite power,
2. Standby - powered from offsite or onsite power, and
3. Emergency - powered from 125V vital batteries or individual battery packs.

Normal and standby lighting are energized during normal plant operation. 125V emergency lighting comes on automatically during the transition from offsite to onsite power. The individual emergency battery pack lights come on automatically upon loss of voltage to the normal lighting circuit serving the area.

Standby and emergency lighting is designed to provide essential lighting to accomplish safe shutdown and for personnel access/egress. However, since fire damage could disable portions of the standby and 125V DC emergency lighting systems, and in accordance with the requirements of 10 CFR 50 Appendix R, Section III.J, eight-hour emergency battery pack lighting is provided in areas required for manual operation of safe shutdown equipment and in the access/egress routes thereto in all areas except the Turbine Building, Yard Area, and Containment.

Emergency Diesel Generator backed standby lighting is available and maintained for the Turbine Building. Diesel generator backed security lighting is provided and maintained for the Yard. Additionally, portable hand-held lighting is provided and maintained to provide task-lighting capability (e.g., breaker tripping) in these areas. Portable hand-held battery lights are provided and maintained for the Containment. Deviation 2.7 in Part VII, "Deviations and Evaluations," provides TVA's justification for the lighting available for these areas.

The illumination provided by emergency lighting in access routes to and in areas where shutdown functions must be performed is sufficient to enable a qualified operator to perform the shutdown functions. Illumination levels are adequate for personnel to perform their intended task(s).

Portable, hand-held lighting is available for predetermined locations for use by Operations personnel in those areas where emergency lighting is temporarily out of service for maintenance or repair.

12.8 Communications

There are several means of communication available to the Operations staff such as telephones; code alarm, and paging; sound powered phones; cellular phone; and two-way radios. The in-plant radio repeater system (used in the day-to-day operation of the plant by Operations and fire brigade personnel) will be the primary means of communication for performing manual actions and for the fire brigade use.

The In-plant radio repeater system consists of multiple VHF radio repeaters, remote control units, portable radios, and redundant antenna systems. The repeaters are identical in function but different in frequency. This difference in frequency is indicated by designating the two

repeaters as F2, & F3. These radios are primarily intended for use by operations and maintenance personnel, but one channel (F3) has been selected for the use of the fire brigade during fires or other emergencies. The VHF radio equipment is located on the turbine deck where it is unaffected by auxiliary building fires. The cellular phone equipment is also intended for use by operations and maintenance and is located on the turbine deck and in the owner controlled area outside the protected area fence. In addition to antennas on the turbine building roof, distributed antennas are located in the control and turbine buildings and two widely separated trunk lines feed the radio signal to redundant distributed antenna systems located throughout the auxiliary building.

Adequate radio communications are provided for areas of the plant that contain equipment that must be manually operated in the event of a fire. In some rooms such as the RHR heat exchanger room, two-way radio communications may not be adequate in the room; however, adequate communications are available immediately outside this room. The action to be performed does not require that communication be established at the device (e.g., for example open/close valve or breaker).

A sound powered phone system connects the auxiliary control room and various local control stations to supplement the VHF radio during alternative shutdown. Control of communication equipment outages are via the normal work control program. Fire protection impairment permits are not used to control this type of outage.

12.9 Reactor Coolant Lube Pump Oil Collection

The major fire hazard within the containment is the reactor coolant pump (RCP) lube oil system. To prevent a fire as a result of oil leakage WBN has provided an oil collection system for each RCP. The oil collection system includes enclosing the RCP oil lift pump and providing an oil collection basin at the access platform elevation of each pump to collect and drain away any combustible liquid and/or suppression system discharge. Any discharge is drained from the collection basin into the containment floor and equipment drain sump located inside primary containment. See Part VII for the deviation associated with the RCP oil collection system. Each RCP is provided with a heat collection hood to reduce the response time of the thermal detectors and the thermal-actuated closed head water spray nozzles installed below the heat collector hood.

12.10 Fire-Rated Assemblies

Fire rated assemblies at WBN are part of the passive fire protection features which ensure that the function of one set of redundant fire safe shutdown components necessary to achieve and maintain FSSD remains free of fire damage. Fire rated assemblies consist of fire barriers, raceway protection, equipment hatches and stairwells, fire doors, fire dampers, and penetration seals. Fire barriers and fire doors are identified on the compartmentation drawings in Part II of the FPR.

In general, the fire barriers are of either reinforced concrete or reinforced concrete block construction. The concrete barriers are normally a minimum of 12-inch thick (some are 8-inch thick) and the block barriers are normally 8-inch thick. National Fire Protection Association Handbook, 17th Edition Section 6, Chapter 5, Figure 6-5G (Reference 4.3.2) provides a correlation between the thickness of reinforced concrete and its fire resistance. Figure 6-5G shows that six inches of reinforced concrete has a fire resistance of approximately four-hours. Based on this, the 8-inch thick concrete barriers would far exceed the maximum three-hour

rating assigned to these barriers at WBN. The UL Fire Resistance Directory identifies similar concrete block barriers (designs U904, U905, U906, and U907) as two-hour to four-hour fire-rated barriers. The 8-inch thick concrete block barriers are only used when barriers are required to have a fire rating of 2-hours or less.

12.10.1 Walls, Floors, and Ceilings

Fire areas are separated by 2- or 3-hour equivalent fire barriers that are bounded by UL rated designs. Rooms within each fire area may be separated from other rooms in the same area by regulatory or nonregulatory fire barriers. (Only regulatory fire barriers are relied on for the fire safe shutdown separation analysis.) Where fire barriers are used to separate rooms in the same area, the barriers have equivalent 2-hour fire ratings, except for portions of the main control room elevation complex which is 1-hour rated. If the separation between rooms in the same fire area is less than 3-hour, then automatic suppression and detection systems are provided or deviations justified (see Part VII for the discussion of deviations).

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, which includes primary containment and secondary containment (i.e., annulus), radiant energy shields or automatic detection and suppression are used to obtain separation where fire could potentially damage redundant safe shutdown components. Note that radiant energy shields are not installed on Unit 2 inside primary containment.

The ERFBS for WBN was tested to the guidance provided in GL86-10, Supplement 1 (Ref. 4.1.10) and GL92-08 (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) and General Engineering Specification G-98 (Ref. 4.2.24) document the testing, design, installation, quality control and maintenance requirements of the ERFBS. The design standard also provided the guidelines for evaluating unique ERFBS configurations to ensure that a unique design is within the important parameters that keep it bounded by tested configurations. NRC previously reviewed and approved this program (Ref. 4.3.9 and 4.3.11).

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 texts 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.

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). 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 Evaluation 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 NPG-SPP-18.4.5, Fire Protection Quality Assurance (Q07), (Reference 4.2.28). 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 meets the requirements for adequate separation as stated in Appendix R, Section III.G.2.

12.10.3 Equipment Hatches and Stairwell

Equipment hatches in floor or ceiling fire barriers fall into three categories:

a) Precast concrete plugs which overlap mating surfaces for support--These plugs are usually associated with radiation shielding and provide a fire barrier equivalent to the floor or ceiling in which they are located.

b) Steel covers that overlap mating surfaces for support--These covers are of substantial construction and provide an effective barrier to prevent fire from propagating from one side of the barrier to the other. However, since they are not fire rated, they are either provided with a draft stop and water curtain around them or redundant safe shutdown components on either side have been separated from each other by a cumulative horizontal distance of 20 or more feet. In either case, automatic fire suppression and detection are provided on both sides of the equipment hatch cover, if appropriate, or an engineering evaluation has been performed. See Part VII for justifications for deviations and/or evaluations.

c) Open hatches and stairwells - Redundant safe shutdown components located on each side of the opening have been identified. If separated by less than a cumulative distance of 20 feet horizontally, either the hatch/stairwell has been provided with a water curtain to separate elevations, or a one hour fire barrier has been provided on the cables for one of the redundant paths. In either case, automatic fire suppression and detection has been provided on both sides of the opening, except for the refueling area and the 676 ft elevation of the Auxiliary Building. See Part VII for justifications for deviations and/or evaluations.

12.10.4 Fire Doors

Fire door assemblies (doors, frames, and hardware) are generally provided for door openings in required fire barriers. These assemblies are UL listed as either "A" label (3-hour rated) or "B" label (1-1/2 hour rated). "A" label doors are provided in 3-hour or less rated fire barriers and "B" label doors are provided in some barriers that require a 2-hour or less fire rating.

Sliding fire doors are provided in selected locations. These sliding fire doors are closed by heat melting a fusible link, and in CO_2 protected areas, when a CO_2 system pressure-activated release occurs.

In some cases, such as air lock doors, equipment doors, submarine type doors, etc., the doors cannot be purchased as labeled fire doors. These doors have been evaluated by a Fire Protection Engineer for their ability to prevent the propagation of a fire. These evaluations are either kept on file for review or are documented in Part VII, Deviations.

Repairs on fire door assemblies require the approval of a Fire Protection Engineer except when replacing a like item for a like item as specified on design output.

12.10.5 Fire Dampers

Fire dampers are provided in HVAC ducts that penetrate required fire barriers to prevent the propagation of a fire through the duct. Some duct penetrations do not have fire rated dampers and are shown on the compartmentation drawings as unprotected openings. In some cases, the fire damper is also used to isolate an area prior to CO_2 discharge. Fire dampers are provided with appropriately rated fusible links based on the ambient temperatures in the location. The fire dampers provided with CO_2 suppression system isolation capability are actuated by CO_2 system pressure activated release mechanism and/or by thermal link. Fire dampers in safety-related HVAC systems may have double fusible links installed if required by a single failure analysis.

12.10.6 Penetration Seals

When plant commodities (i.e., pipe, cable trays, conduits, etc.) must pass through required fire barriers, the openings are provided with seals that meet or exceed the fire protection requirements of the barrier. The mechanical and electrical penetration seals used at Watts Bar have been bounded by fire tests conducted at independent testing laboratories that are experienced in fire testing (e.g., Underwriters Laboratories, Omega Point Laboratories, Construction Technologies Laboratories, etc.). The testing labs were required to conduct the test using the standard temperature-time curve as described in ASTM E-119. The critical attributes of an acceptable mechanical and electrical seal are defined below. The most important attribute is that the penetration seal has withstood the fire endurance test without passage of flame or gases hot enough to ignite cable or other fire stop material on the unexposed side for a period equal to the required fire rating. In addition, these seals may be required to meet other plant design bases requirements such as radiation shielding, HVAC pressure differential, and/or flood. Engineering report for Penetration Seal Program Assessment (Ref. 4.2.50) documents the testing acceptance parameters and design standards for fire rated penetration seals at WBN. This document along with General Engineering Specifications G-96 (Ref. 4.2.61) and drawing series 45A883 (Ref. 4.2.62), 45W883 (Ref. 4.2.63) and 47W472 (Ref. 4.2.64) control the penetration seal program at WBN. NRC

performed an "audit type review of mechanical and electrical penetration seals" and stated, "The staff concludes from its audit of the applicant's penetration seal program that this program adequately demonstrates the fire resistive ratings of these typical penetration seal designs and, therefore, they conform to the guidelines of Positions D.1.j and D.3.d of Appendix A to BTP (APCSB) 9.5-1 and are acceptable" (Ref. 4.3.10). In addition the NRC stated in NUREG-1552 (Ref. 4.1.25), Section 5.5.6, "The staff had documented its review and evaluation of the WBN fire penetrations seal program in Section 9.5.1, "Fire Protection Section," of NUREG-0847m "Safety Evaluation Report Related to the operation of Watts Bar Nuclear Plant, Unit 1 and 2." On the basis of its comprehensive safety evaluation of the WBN penetration seal program, the staff had concluded that the program satisfied applicable NRC requirements and guidelines."

(A) <u>Mechanical Pipe Penetrations</u>

A 1-hour, 2-hour, or 3-hour Fire rating in accordance with ASTM E-814-83, section 10.1, and 1-hour, 2-hour, or 3-hour T rating in accordance with ASTM E-814-83, section 10.2 is established for mechanical penetration seals. The T rating acceptance criteria is limited to a temperature rise of 325° F above ambient for cold side seal surface temperatures. Cold side surface temperatures are defined by thermocouples required to be on the fire stop surface (field) per section 10.2 of ASTM E-814-83. A T rating is not required on the penetrant(s). In addition to the above listed criteria of fire rating, differential pressure, etc., the seal must be able to accommodate the service temperature and any thermal or mechanical movement of the pipe.

(B) <u>Electrical Penetrations</u>

A 1-hour, 2-hour, or 3-hour rating in accordance with IEEE 634-1978, section 6.1 was established for electrical penetration seals. Transmission of heat through the penetration seal was limited to 700° F or the lowest auto-ignition temperature of cable in the penetration, whichever is lower.

Conduit penetrations typically require only internal seals since most conduit penetrations were poured-in-place during plant construction. Internal seal materials, design, and locations in walls and floor/ceiling assemblies have been evaluated as equivalent to tested configurations. If a conduit requires an external seal (e.g., the conduit passed through a sleeve larger than the conduit), the external seal will meet the same criteria as stated in the above paragraph. The criteria for internal conduit seals that were reviewed and approved by the NRC are based on the information presented in an RAI response from July 1, 1994 (ML072320559). The following information is from that submittal. The internal conduit seal criteria is documented on drawing series 45W883 and is as follows.

Smoke and gas seals shall have a (min) 3 inch RTV silicone foam and 1 inch ceramic fiber damming at the bottom/back side of the foam. The fiber damming may or may not exist in the front/top side of the foam. The silicone foam shall be installed at the first available opening. Conduits that terminate in junction boxes or other non-combustible enclosures need not additional sealing except for Auxiliary Building secondary containment envelope boundaries. See table below for sealing instructions. A closed electrical cubical similar to a motor control center or switchgear cabinet is not considered a non-combustible enclosure.

CONDUIT	TOTAL LENGTH OF CONDUIT FROM BARRIER					
SIZE	CONTINUOUS THRU AREA	<1'	≥1' - <3'	≥3' - <5'	≥5' - <22'	≥22'
<1"	NSR	F	NSR	NSR	NSR	NSR
1"	NSR	F	S	S	NSR	NSR
>1" - <2"	NSR	F	S	S	NSR	NSR
2"	NSR	F	F	S[5]	NSR	NSR
>2" - ≤4"	NSR	F	F	F[5]	S[5]	NSR
>4"	NSR	F	F	F	S	NSR

Notes:
1. NSR – No Seal Required
2. S – Smoke and Hot Gas Seal Required
3. F – Fire Seal Required
4. A smoke and gas seal is required when a conduit passes through an ABSCE boundary and the junction box or non-combustible enclosure is the first accessible opening.
5. NSR if cable fill exceeds 40%

C. Hose Stream Test for Penetrations

Hose stream test requirements are in accordance with IEEE 634-1978 or ASTM E-814-83. The penetration seal configurations at Watts Bar have withstood a hose stream test without the hose stream causing an opening through the penetration seal that would permit a projection of water beyond the unexposed side.

13.0 FIRE PROTECTION SYSTEM IMPAIRMENTS AND COMPENSATORY ACTIONS

Fire protection impairments are controlled to maximize the availability of the active and passive fire protection systems and features.

Fire protection systems and features are intended to remain fully operational to the maximum extent possible. However, it is expected that outages or impairments will occur to support plant or fire protection-related modifications or maintenance. As a minimum, fire protection systems and features are to remain operable whenever the equipment they protect is required to be operable, or appropriate compensatory actions are established as prescribed in the associated ORs.

WBN "Regulatory Required" (REG) fire protection systems and features, although not classified as safety related, provide fire protection capabilities in those areas where protection of safety-related or FSSD equipment is deemed necessary. In the event a REG fire protection system or feature becomes inoperable, compensatory actions have been developed to minimize the effects of the impaired equipment on safe plant operations and safe shutdown. To ensure the

maximized availability of REG fire protection systems and features, processes are in place, through administrative procedures, to keep fire protection system and feature inoperability as short in duration as possible.

Compensatory actions for impaired REG fire protection systems or features generally consist of fire watches as defined in the applicable sections of this plan. Alternate compensatory actions such as additional/alternative fire protection equipment, temporary/portable detection systems, temporary alternate feeds to suppression systems, or closed circuit television may be utilized on a case by case basis. These alternative actions are considered when they provide equal or better protection and/or when the primary methods are too restrictive, create further hazards, or represent personnel safety concerns.

A summary of each of these primary and alternate actions are as follows:

A. Fire Watch - Continuous (Primary)

The locations that a continuous fire watch is required are based on plant conditions existing at the time the fire watch is in place and modified as needed. Continuous fire watches will be restricted to patrolling one fire area except as noted below.

Continuous fire watches are only required when the affected unit is in Modes 1 (Power Operation) to 4 (Hot Shutdown), inclusive. A "roving" fire watch will cover the designated areas on an hourly basis in areas where only the unit in Modes 5, 6, or core empty would be affected by a fire. If a fire in an area could affect both units, then a Continuous fire watch is required.

Specific patrol locations are selected to accommodate plant features such as locked doors, security card readers, contaminated areas, etc., so that patrol access is not unduly impeded under existing conditions. The patrol routes are specified such that the fire watch can routinely accomplish the route within 15 minutes with a thorough review of the route, with a margin of 5 minutes to accommodate and handle unforeseen circumstances and to report and/or resolve potential fire hazards in a location.

There are locations where one or more rooms are in different fire areas but their proximity and limited size warrant allowing them to be combined for one continuous fire watch to address. Time study information is used to identify the rooms, in different fire areas, that can be covered in 15 minutes without putting undue exertion on the person. As these areas are identified they will be listed below as an exception to the definition of a continuous fire watch. The specific patrol locations will still require approval of the Fire Protection Supervisor or his designee to ensure the conditions that formed a basis for the time study have not changed such as to invalidate the time study. The routes with more than one fire area that are exceptions to a continuous fire watch staying in one fire area are:

1. Diesel Generator Building, Elev. 742

2. Diesel Generator Building, Elev. 760

3. Auxiliary Building Rooms (0-FCV-26-143 and 0-FCV-26-322 out of service):

757.0-A2	757.0-A12
757.0-A9	757.0-A21
757.0-A10	782.0-A1
757.0-A11	782.0-A2

4. Auxiliary Building Rooms (0-FCV-26-143 and 0-FCV-26-322 out of service)

772.0-A1	772.0-A9
772.0-A6	772.0-A12
772.0-A7	772.0-A16
772.0-A8	

5. Auxiliary Building Rooms (0-FCV-26-151 and 0-FCV-26-326 out of service)

757.0-A5	757.0-A17
757.0-A14	757.0-A24
757.0-A15	782.0-A3
757.0-A16	782.0-A4

6. Auxiliary Building Rooms (0-FCV-26-151 and 0-FCV-26-326 out of service)

772.0-A2	772.0-A11
772.0-A5	772.0-A15
772.0-A10	

7. Auxiliary Building Rooms (0-FCV-26-191 out of service)

Covers areas bounded by column lines A1-A8/Q-X

692.0-A1 (partial)	692.0-A10
692.0-A4	692.0-A11
692.0-A6	692.0-A12
692.0-A7	692.0-A13
692.0-A9	692.0-A14

8. Auxiliary Building Rooms (0-FCV-26-191 out of service)

Covers areas bounded by column lines A8-A15/Q-X

692.0-A1 (partial)	692.0-A21
692.0-A17	692.0-A22
692.0-A18	692.0-A23
692.0-A19	692.0-A25
692.0-A20	692.0-A26

9. Auxiliary Building Rooms (0-FCV-26-187 out of service)

Covers areas bounded by column lines

<u>C1-A8/Q-RB Centerline</u>

713.0-A1 (partial)	713.0-A6
713.0-A2	713.0-A7
713.0-A3	713.0-A13
713.0-A4	713.0-A22
713.0-A5	713.0-A27

10. Auxiliary Building Rooms (0-FCV-26-187 out of service)

Covers areas bounded by column lines

<u>A8-A15/Q-RB Centerline</u>

713.0-A1 (partial)	713.0-A20
713.0-A14	713.0-A22
713.0-A19	

11. Auxiliary Building Rooms (0-FCV-26-183 out of service)

<u>Covers rooms on elevation 729.0</u>

729.0-A3	729.0-A8
729.0-A4	729.0-A9
729.0-A5	

12. Auxiliary Building Rooms (0-FCV-26-183 out of service)

<u>Covers rooms on elevation 737.0</u>

737.0-A1	737.0-A12
737.0-A3	737.0-A15
737.0-A5	737.0-A16
737.0-A9	

13. Auxiliary Building Room (0-FCV-26-147)

Covers Auxiliary Control Room and associated

<u>Instrument Rooms</u>

757.0-A1	757.0-A27
757.0-A25	757.0-A28
757.0-A26	

14. Auxiliary Building Rooms (0-FCV-26-143, 322, 151, 326 out of service

Covers areas bounded by column lines A1-A15/Q-U

757.0-A2	757.0-A17
757.0-A5	757.0-A21
757.0-A9	757.0-0A24

15. Auxiliary Building Rooms (0-FCV-26-143, 322, 151, 326 out of service

Covers areas bounded by column lines A1-A15/Q-U

772.0-A1	772.0-A9
772.0-A2	772.0-A10
772.0-A5	772.0-A11
772.0-A6	772.0-A12
772.0-A7	772.0-S15
772.0-A8	772.0-A16

16. Auxiliary Building Rooms (0-FCV-26-143, 322, 151, 326 out of service

Covers areas bounded by column lines A2-A14/U-X

757.0-A10	757.0-A16
757.0-A11	782.0-A1
757.0-A12	782.0-A2
757.0-A14	782.0-A3
757.0-A15	782.0-A4

Situations may arise in which the system or equipment cannot be restored within the time specified by the Fire Protection Systems and Features Operating Requirements (Section 14.0). In such cases, an augmented compensatory action will be taken to ensure that a continuous fire watch does not go to different fire areas. The 15 minute requirements will still apply, but the continuous fire watch must remain within the same fire area. This augmented compensatory action is not required when only the unit in Modes 5, 6, or core empty could be affected by a postulated fire.

B. Fire Watch - Roving (Primary)

A roving fire watch consists of a trained individual in an affected location at 60 minute intervals with a 15 minute margin to accommodate and handle unforeseen circumstances and to report and/or resolve potential fire hazards in a location. Roving fire watches are required as a compensatory action in all modes of plant operation (i.e., Modes 1 through 6 or core empty).

With a unit in Modes 5, 6, or core empty, locations where a continuous fire watch would be required may be combined and patrolled by a roving fire watch when approved by the Fire Protection Supervisor (or designee) if the location only affects the unit in Modes 5, 6, or core empty.

C. Additional/Alternative Fire Protection Equipment (Alternative)

Additional/alternative fire protection equipment consists of first aid firefighting features such as fire hose and wheeled fire extinguishers, or mobile apparatus. Normal compensatory actions for inoperable fire protection features such as hose stations consist of physical routing and/or staging of backup fire hose capable of supplying water from the nearest operable fire hose station to the area left unprotected by the inoperable hose station. Additionally, the use of wheeled fire extinguishers or mobile apparatus may be considered when physical constraints such as fire barrier integrity preclude breaching the barrier to stage compensatory fire protection equipment. In the event an alternative compensatory action is considered, an evaluation will be performed by the plant fire protection staff and documented with the impairment permit or work initiation document to demonstrate technical equivalency to standard compensatory actions identified in Section 14, "Fire Protection Systems and Features Operating Requirements (OR)."

D. Temporary/Portable Detection Systems (Alternative)

A temporary/portable detection system consists of one or more listed or approved detectors, a power supply and monitor unit, connecting cable, and a method of transmitting an alarm to a constantly attended location. Fire detectors may be placed in more than one room or more than one elevation of the plant. The temporary/portable fire detection system is similar to the one used by the Toledo Edison Company's Davis-Besse Nuclear Plant, and other utilities, and approved for use by the NRC. An evaluation will be performed by the plant fire protection staff and documented with the impairment permit or work initiation document for each type of temporary/portable detection system to demonstrate technical equivalency to standard compensatory actions identified in Section 14, "Fire Protection Systems and Features Operating Requirements (OR)." The area with impaired fire protection equipment of Section 14 as well as the associated temporary/portable detection system monitor unit(s) will be observed by an hourly roving fire watch. Portable detection systems are used where plant configuration and conditions would be acceptable for its use.

E. Closed Circuit Television -CCTV (Alternative)

CCTV equipment consists of CCTV cameras and monitors. Cameras may be placed in more than one room or more than one elevation of the plant. CCTV systems are similar to the ones used by other utilities for monitoring of inoperable fire barriers as well as CCTVs previously utilized at Browns Ferry Nuclear Plant in inaccessible tunnels. An evaluation will be performed by the plant fire protection staff and documented with the impairment permit or work initiation document for use of CCTV equipment (cameras and monitors) to demonstrate technical equivalency to standard compensatory actions identified in Section 14, "Fire Protection Systems and Features Operating Requirements (OR)." CCTV monitors are monitored by trained personnel at a frequency consistent with standard compensatory actions identified in Section 14, "Fire Protection Systems and Features Operating Requirements (OR)." CCTV is used in instances where personal safety exceeds OSHA thresholds based on detailed evaluation, operational conditions in high heat areas such as the main steam vault, or ALARA concerns in high radiation areas preclude using a human fire watch in the area.

F. Constantly Manned Location (Alternative)

In plant areas that are continuously manned, credit may be taken for the constant manning in lieu of establishing either continuous or roving compensatory fire watches when the responsible

individual(s) are informed and accept this responsibility. All employees receive training annually on proper reporting of fires. Documentation for the fire watch position is not required provided the manned position is documented (e.g., Main Control Room logs or documented security post).

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.

The fire protection organization performs a periodic walkdown to ensure fire protection and compensatory actions are established for those fire protection system impairments or features that are out-of-service.

SECTION 14.0 TABLE OF CONTENTS

14 FIRE PROTECTION SYSTEMS AND FEATURES OPERATING REQUIREMENTS (OR)

The OR established in this section have been developed to ensure adequate fire protection capability is available and maintained, to detect, control, and extinguish fires occurring in any portion of the plant where safety-related or FSSD equipment are located.

Fire protection systems and features at WBN are not assumed to be operable to mitigate the consequences of a Design Basis Accident (DBA) or plant transient. The bases for this assumption are contained in Section I of Appendix R which states that the need to limit fire damage to systems required to achieve and maintain FSSD conditions is greater than the need to limit fire damage to those systems required to mitigate the consequences of DBAs. As a result, Section I identifies that fire protection features must be capable of limiting fire damage so that:

1. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room, auxiliary control room, or emergency control stations is free of fire damage; and

2. Systems necessary to achieve and maintain cold shutdown from either the control room, auxiliary control room, or emergency control stations can be repaired within 72 hours.

3. Alternate shutdown capability is provided at WBN, when needed, to achieve and maintain cold shutdown within 72 hours.

Operability of the fire protection systems and features are required whenever safety-related equipment and fire safe shutdown systems protected by the fire protection systems and features are required to be Operable.

The Fire Protection Report provides applicable action statements and thus does not have a requirement similar to Technical Specification 3.0.3 except for equipment listed in Section 14.10. When a piece of equipment in section 14.10 is out of service, there are mode reduction requirements similar to Technical Specification 3.0.3. However, equivalent methods (documented in an engineering evaluation in accordance with site procedures) that ensure fire safe shutdown can be achieved per the requirements of 10CFR50, Appendix R may be used to delay or remove the mode reduction requirements. These equivalent methods once documented by engineering evaluation provide alternatives to the applicable actions statements when equipment listed in this part, Section 14.10 must be declared inoperable.

The Fire Protection Report does not have a requirement similar to Technical Specifications 3.0.4 preventing mode changes while in an action statement.

The Testing and Inspection Requirements (TIRs) for the WBN fire protection systems and features have been developed taking into consideration industry practice (e.g., similar methods approved for use by other licensed nuclear power facilities), NFPA consensus standards, and insurance carrier loss prevention recommendations.

Engineering judgment has also been utilized in the development of testing and inspection frequencies and criteria for the WBN FPP. The following factors or influences are considered when developing the testing and inspection frequencies and criteria:

1. Personal safety is of paramount concern when developing and implementing the fire protection testing and inspection requirements at WBN. Therefore, alternative frequencies and/or criteria may be necessary when operational considerations, equipment accessibility, or other conditions warrant such changes.

2. Good ALARA practices in concert with equipment/component failure histories are considered to ensure "value add" is achieved without undue challenge to system components and/or personnel.

3. Nuclear facilities by nature and design are controlled and structured environments. The importance of fire protection systems and features and the established administrative controls at WBN are reinforced to plant personnel through training, sign posting, procedures, and processes.

The performance of the WBN fire protection testing and inspection plan is driven by a trending philosophy which is used to evaluate the success and/or target the testing and inspection activities needing improvement. This philosophy provides an added level of flexibility to increase or decrease as necessary, the testing and inspecting activities based on empirical data.

Refer to the TIR matrix for operational testing requirements. The specified frequency for each TIR is met if the test/inspection is performed within 1.25 times the interval specified in the frequency, as measured from the last scheduled performance date. This extension facilitates TIR scheduling and considers plant operating conditions that may not be suitable for conducting the TIR (e.g., transient conditions or other ongoing TIR or maintenance activities). The provisions for such extensions are not intended to be used repeatedly merely as an operational convenience to extend the TIR testing interval or periodic completion time intervals beyond those specified. The same scheduling policy used for the Technical Specifications will be used for the TIR.

Testing of the fire protection systems involve manually disabling portions of them to prevent unwanted responses. These responses can be in the form of excessive starting of deep draft pumps, discharging water in a radiological controlled area, etc. The equipment, generally in the area of the testing, will still function normally once the temporary, intentional impairment is removed. When test personnel are actively performing the test, the compensatory fire watches will not be required. This allows for the test personnel to serve as the fire watch for the area in question.

14.1 <u>Fire Detection (Early Warning Fire Detection and Notification Only) (OR)</u>

The minimum number of fire detectors are identified on Table 14.1 and shall be Operable when the safety-related or FSSD equipment in that area is required to be Operable.

NOTE 1: The action statements below apply to only the Function A fire detectors as defined in Table 14.l. The action statements of Section 14.3 and 14.4 apply to the Function B fire detectors that are associated with automatic suppression systems.

NOTE 2: Inoperable fire detectors may cause alarms or troubles on the associated local control panels that cause a masking condition addressed in Section 14.5.

NOTE 3: The central processing unit (CPU) for the fire detection system shall be operable when the fire detection system identified in Operating Requirement 14.1 is required to be operable.

NOTE 4: With a unit in Modes 5, 6, or core empty, locations where a continuous fire watch would be required may be combined and patrolled by a roving fire watch when approved by the Fire Protection Supervisor (or designee) it the location only affects the unit in Modes 5, 6, or core empty.

14.1.1 With any of the required Function A fire detectors in a fire detection zone identified on Table 14.1 inoperable in any accessible area, within one hour restore the inoperable equipment

-OR-

establish a roving fire watch once per hour.

14.1.2.a With any of the required Function A fire detectors in a fire detection zone identified on Table 14.1 inoperable inside containment, within eight hours, restore the inoperable equipment

-OR-

either establish a roving fire watch once per 8-hours

-OR-

monitor the air temperature for the area affected once per hour using the following:

AREA	INSTRUMENT(S)
Upper Containment	U-9019 on Unit 1 Plant Computer
Lower Containment	U-9020 on Unit 1 Plant Computer
Upper Containment	U-9019 on Unit 2 Plant Computer
Lower Containment	U-9020 on Unit 2 Plant Computer

14.1.2.b With any of the required Function A fire detectors in a fire detection zone identified on Table 14.1 inoperable in an inaccessible area outside containment, within eight hours, restore the inoperable equipment

-OR-

establish a roving fire watch once per 8-hours.

14.1.3 Restore the inoperable detector(s) to Operable status within 14 days. If not restored within 14 days, continue the compensatory actions AND perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures. Also, determine if any continuous fire watch routes are to be augmented as specified in Section 13.0.A.

14.1.4 With the CPU inoperable, within one hour establish the following compensatory action:

a. Fire detection zones containing Function A detectors in accessible areas shall be continuously monitored at the local fire detection panel. Exempted from this action are zones inside the Main Control Room and zones associated with supervisory functions (i.e., pressure switches, valve position, fire door position, etc.).

b. For fire detection zones containing Function A detectors in inaccessible areas, the air temperature shall be monitored once per hour

-OR-

the local fire detection panel shall be monitored once per hour.

c. For fire detection zones containing function B detectors or for zones providing a supervisory function in accessible or inaccessible areas, the local fire detection panel shall be monitored hourly.

14.1.5 Restore the inoperable CPU to operable status within 14 days. If not restored within 14 days, continue the compensatory actions AND perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures.

14.2 **Water Supply**

The Fire Suppression Water Supply System shall be Operable at all times as follows:

NOTE 1: With a unit in Modes 5, 6, or core empty, locations where a continuous fire watch would be required may be combined and patrolled by a roving fire watch when approved by the Fire Protection Supervisor (or designee) if the location only affects the unit in Modes 5, 6, or core empty.

NOTE 2: Alarms or troubles on the associated local fire detection system control panel (e.g., 0-PNL-13-L631) for the diesel driven pump that may cause a masking condition is addressed in Section 14.5. Section 14.5 is not applicable to the diesel driven pump control panel (e.g., 0-PNL-26-3150A).

a. Three fire suppression pumps consisting of the diesel driven pump (2500 gpm at 125 psig (288 feet of head)) AND two electric driven pumps, each with a minimum capacity of 1590 gpm at 300 feet of head (130 psig), with their discharge aligned to the fire suppression system header,

AND

b. An Operable flow path from the suction supplies, through distribution piping, sectionalizing, control or isolation valves up to but not including the first valve off the headers, leading to the yard hydrant (Section 14.7), the fire hose station/standpipes (Section 14.6), and each water based suppression system (Section 14.3).

14.2.1 With two electric pumps operable and the diesel driven fire pump inoperable:

a. Restore the diesel driven fire pump to operable status within 7 days

-OR-

b. Ensure three electric driven pumps operable AND within one hour a fire watch is established as follows:

1. hourly roving fire watch is established in the Auxiliary Building Elevations 713, 737, 757, 772 and IPS if the fire detection equipment for the area is operable

   -OR-

2. continuous fire watches are established in the Auxiliary Building Elevations 713, 737, 757, 772 and IPS if the fire detection equipment for the area is inoperable.

-OR-

c. *Provide a backup pump with at least the same capacity as an electric fire pump*

- AND-

establish hourly roving fire watch coverage for the areas with common power supplies. Within 7 days after entry from either 14.2.1.a or 14.2.1.b, either enter 14.2.1.b

-OR-

restore the diesel driven fire pump to operable status.

14.2.2 With only one electric driven fire pump operable

- AND-

the diesel driven fire pump operable:

a. Restore an additional electric driven fire pump to operable status within 30 days.

14.2.3 With no electric driven pumps operable

- AND-

the diesel driven fire pump operable:

a. Restore one electric driven pump to operable status within 7 days

- AND-

enter 14.2.2.

14.2.4 With only one electric driven pump operable

- AND-

the diesel driven fire pump inoperable:

a. Restore an additional electric driven pump to operable within 24 hours,

- AND-

enter 14.2.1,

-OR-

b. Restore the diesel driven fire pump to operable within 24 hours

- AND-

enter 14.2.2.

14.2.5 With no water supply system pumps operable:

a. Establish a backup water supply system within 24 hours,

- AND-

restore one electric driven pump to operable within 48 hours

- AND-

a second electric driven pump to operable with 72 hours,

- AND-

restore the diesel fire pump to operable within 7 days,

-OR-

b. Establish a backup water supply system within 24 hours,

- AND-

restore the diesel driven fire pump within 48 hours

- AND-

enter 14.2.3.

c. Perform 10CFR50.72 and/or 10CFR50.73 reviews in accordance with site administrative procedures

14.2.6 With the Fire Suppression Water supply system inoperable for reasons other than loss of a fire pump:

a. Within one (1) hour enter the applicable Operating Requirements of Section 14.3 AND/OR 14.6 AND/OR 14.7 for those devices with no flow path available. No other action is necessary.

b. If the condition involves powering up a normally de-energized valve operator to cycle the valve, then within one (1) hour establish a constant attendant at the breaker.

c. Restore the system to normal alignment within 30 days. If not restored within 30 days, continue the compensatory actions

- AND-

perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures.

14.2.7 With High Pressure Fire Protection (HPFP) or raw service water (RSW) usage's that are not as-designed loads or as-designed loads that have inhibited automatic isolation capability:

a. Provide isolation capability

- AND-

within one (1) hour establish a constant attendant in communication with the 0-M-29 Operator for HPFP/RSW usage's that are not as-designed.

b. Ensure the inhibited automatic isolation is controlled by procedure.

c. Remove the non-as-designed HPFP/RSW usage

-OR-

restore the automatic isolation capability within 30 days. If not restored within 30 days, continue the compensatory actions

- AND-

perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures.

14.2.8 With three of the electric driven pumps capable of manual starting from the Main Control Room (MCR) or their associated 480V shutdown board but the automatic start circuitry inoperable.

a. Ensure the inhibited automatic start circuitry is controlled by procedure.

b. Restore the system to normal alignment within 30 days. If not restored within 30 days perform 10 CFR 50.72 and/or 10 CFR 50.73 reviews per site administrative procedures.

14.3 Water Based Fire Suppression

The water based fire suppression systems in the following areas (See Table 14.3 for specific systems) and their associated fire detectors shall be Operable whenever the protected safety-related or FSSD equipment is required to be Operable:

a. Unit 1 Reactor building - RC pump area, Annulus.

b. Unit 2 Reactor building – RC pump area, Annulus

c. Auxiliary building - Elev. 692, 713, 729, 737, 757, 772, and 782.

d. Auxiliary building - ABGTS filters, EGTS filters, Containment Purge Air Exhaust Filters, 125V battery and battery board rooms.

e. Control building - Elev. 692, cable spreading room, operator living area.

f. Control building - MCR air filters.

g. Diesel building - Corridor area.

h. Intake Pumping Station

i. Turbine Building - Control Building Wall

Note 1: The action statements of this section apply to the Function B fire detectors that are associated with an automatic suppression system. Refer to Table 14.1 for

the specific number of fire detectors associated with the water based fire suppression systems in the areas noted below.

Note 2: Inoperable fire detectors may cause alarm or trouble conditions on the associated local control panels that may cause a masking condition addressed in Section 14.5.

Note 3: With a unit in Modes 5, 6, or core empty, locations where a continuous fire watch would be required may be combined and patrolled by a roving fire watch when approved by the Fire Protection Supervisor (or designee) if the location only affects the unit in Modes 5, 6, or core empty.

14.3.1 . With either suppression and/or associated Function B fire detectors inoperable in any of the locations noted above (a-i) in which redundant safe shutdown systems or components could be damaged by a single fire, within one hour, restore the inoperable equipment:

-OR-

a. For accessible areas, within one hour establish the following:

1. A continuous fire watch AND backup suppression equipment for those areas, if detection or both suppression and detection are inoperable,

-OR-

2. A roving fire watch and backup suppression equipment for those areas, except for 737' elevation of the Auxiliary Building, if only the suppression is inoperable.

-OR-

3. A continuous fire watch and backup suppression equipment for the 737' elevation of the Auxiliary Building if suppression or detection or both are inoperable. This watch shall be limited to the 737' elevation of the Auxiliary Building.

-OR-

b. For inaccessible areas, as noted, within one hour establish the following:

1. For either Reactor Building, Lower Containment, within one hour establish a continuous fire watch

-OR-

monitor the air temperature in the area once per hour using U-9020 on Plant Computer.

2. For other inaccessible areas with detection inoperable OR both suppression and detection inoperable, within one hour establish backup suppression equipment:

-AND-

a. A continuous fire watch,

-OR-

b. Provide alternate compensatory actions.

3. For other inaccessible areas with inoperable suppression only, within one hour establish backup fire suppression equipment:

-AND-

a. An hourly roving fire watch,

-OR-

b. Provide alternate compensatory actions.

14.3.2 With either inoperable suppression or associated Function B fire detectors in any of the locations noted above (a-i) in which redundant safe shutdown systems or components are NOT exposed to the damage of a single fire, within one hour establish a roving fire watch AND backup suppression equipment for those areas.

14.3.3 Restore the inoperable suppression and/or associated detection to Operable status within 14 days. If not restored within 14 days, continue the compensatory actions AND perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures. Also, determine if any continuous fire watch routes are to be augmented as specified in Section 13.0.A.

14.4 **<u>Carbon Dioxide (CO_2) Suppression Systems</u>**

The CO_2 suppression systems in the following areas and their associated fire detectors shall be operable whenever the protected safety-related or FSSD equipment is required to be operable:

NOTE 1: The action statements of this section apply to the Function B fire detectors that are associated with an automatic suppression system. Refer to Table 14.1 for the specific number of fire detectors associated with the CO_2 based fire suppression systems in the locations noted below.

NOTE 2: Inoperable fire detectors may cause alarms or troubles on the associated local control panels that may cause a masking condition addressed in Section 14.5.

NOTE 3: With a unit in Modes 5, 6, or core empty, the locations where a continuous fire watch would be required may be combined and patrolled by a roving fire watch when approved by the Fire Protection Supervisor (or designee) if the location only affects the unit in Modes 5, 6, or core empty.

a. Auxiliary instrument room (Units 1 and 2).

b. Computer room.

c. Diesel generator rooms.

d. Diesel generator fuel oil pump room.

e. Diesel generator electrical board rooms.

f. Diesel generator lube oil storage room.

14.4.1 With either suppression or associated Function B fire detectors inoperable in any of the locations noted above (a-f) in which redundant safe shutdown systems or components could be damaged, within one hour establish a continuous fire watch AND backup suppression equipment for those areas.

14.4.2 With either inoperable suppression or associated Function B fire detectors in any of the locations noted above (a-f) in which redundant safe shutdown systems or components are NOT exposed to the damage of a single fire, within one hour establish a roving fire watch AND backup suppression equipment for those areas.

14.4.3 Restore both the inoperable CO2 suppression and associated detection to operable status within 14 days. If not restored within 14 days, continue the compensatory actions AND perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures. Also determine if any continuous fire watch routes are to be augmented as specified in Section 13.0.A.

14.5 **Fire Detection Supervision**

The supervision capabilities of the local control panels identified on Table 14.5 shall be Operable when the associated fire detectors identified on Table 14.1 are required to be operable.

NOTE: These action statements apply to both Function A and Function B detectors and the actuation circuits for automatic valves in the flow path.

14.5.1 With the supervisory function of a panel listed in Table 14.5 masked by a panel alarm or trouble, within eight hours, restore the inoperable equipment,

-OR-

jumper out the zone(s) providing the masking condition (alarm or trouble)

-AND-

implement the compensatory actions and time limits of Section 14.1, 14.2, 14.3, or 14.4 as appropriate.

14.5.2 If the masking condition cannot be cleared by jumpering out a zone(s), within 8 hours evaluate the condition for affects on the equipment operation and implement the compensatory actions and time limits of Section 14.1, 14.2, 14.3, and 14.4 as appropriate

-AND-

restore the panel to Operable status within 14 days. If not restored within 14 days, continue the established compensatory actions AND perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures.

14.5.3 If conditions exist that would warrant returning a masked circuit to a functional status prior to the circuit's return to normal, with the supervisory function of a panel listed in Table 14.5 masked by a panel alarm or trouble, defeat the alarm or trouble masking condition while maintaining the circuit's functional capability, verify the circuit's functional capability,

-AND-

establish the controls to monitor the circuit's functional capability periodically. Restore the panel to Operable status within 30 days. If not restored within 30 days, continue the established compensatory actions -AND- perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures.

14.6 **Fire Hose Stations/Standpipes**

The fire hose stations listed in Table 14.6 have been provided to support manual firefighting efforts in safety-related or FSSD buildings, areas, and/or rooms at WBN. The fire hose stations also provide backup suppression when the automatic suppression systems are inoperable. The fire hose stations listed in Table 14.6 shall be Operable whenever the safety-related or FSSD equipment in the areas protected by the fire hose stations is required to be Operable.

14.6.1 With one or more of the fire hose stations listed in Table 14.6 inoperable, within eight hours restore the inoperable equipment

-OR-

provide alternate protection for the area served by the inoperable hose stations(s).

14.6.2 Restore the fire hose station(s) to Operable status within 14 days. If not restored within 14 days, continue the compensatory actions AND perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures.

14.7 Fire Hydrants

Two fire hydrants listed in Table 14.7 have been provided to support manual fire fighting efforts in the Diesel Generator Building's Conduit Interface Room. One fire hydrant listed in Table 14.7 is also provided as backup for hose stations in the Intake Pumping Station. The fire hydrants listed in Table 14.7 shall be Operable whenever the safety-related or FSSD equipment in the areas protected by the fire hydrants is required to be operable. An additional fire hydrant is included in Table 14.7 as an alternate for a situation in which one of the other hydrants becomes inoperable. The relevant fire hydrants are specified in the table.

14.7.1 With any of the fire hydrants identified on Table 14.7 inoperable, within eight hours restore the inoperable equipment

-OR-

provide alternate suppression capabilities for the area served by the inoperable fire hydrant(s).

14.7.2 Restore the fire hydrant to Operable status within 28 days. If not restored within 28 days, continue the compensatory actions AND perform 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures.

14.8 Fire-Rated Assemblies

Fire-rated assemblies shall be Operable whenever the safety-related and FSSD equipment on either side of the barrier/assembly is required to be Operable. Fire doors are listed in Table 14.8-1 and fire dampers are listed in Table 14.8-2. Fire barriers are depicted on Fire Compartmentation drawings, Figures II-27A through II-40A.

NOTE: With either a unit in Modes 5, 6, or core empty, locations where a continuous fire watch would be required may be combined and patrolled by a roving fire watch when approved by the Fire Protection Supervisor (or designee) if the location only affects the unit in Modes 5, 6, or core empty.

14.8.1 With one or more of the required fire-rated assemblies/fire barriers, electrical raceway fire barrier systems, or electrical raceway radiant energy shields inoperable within one hour restore the inoperable equipment:

-OR-

a. If no fire detection (as listed in Table 14.1) is designed to protect both sides of the inoperable barrier then, post a continuous fire watch.

-OR-

b. If fire detection (as listed in Table 14.1) is designed to protect only one side of the inoperable barrier, then post a roving fire watch once per hour for the side without detection.

-OR-

c. 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 (not applicable to ERFBS or radiant energy shield raceway protection).

14.8.2 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 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures. Also determine if any continuous fire watch routes are to be augmented as specified in Section 13.0.A.

14.9 Emergency Battery Lighting Units

Emergency battery lighting units provided for FSSD shall be Operable whenever the illuminated associated fire safe shutdown equipment is required.

14.9.1 With any of the emergency battery lighting units provided for FSSD inoperable, restore the inoperable units to Operable status within 24 hours

-OR-

ensure alternate lighting is available.

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 10CFR50.72 and/or 10CFR50.73 reviews per site administrative procedures. Also determine if any continuous fire watch routes are to be augmented as specified in Section 13.0.A.

14.10 Fire Safe Shutdown Equipment

The equipment listed on Table 14.10 is required for Fire Safe Shutdown (FSSD) and shall be Operable (or in its FSSD condition) when it supports FSSD for a unit in modes 1, 2, and 3. The non-System 26 valves noted on the plants mechanical flow diagrams as being administratively locked in the open, closed, or throttled position (with breaker open) for Appendix R shall be maintained in that condition when the applicable unit is in Modes 1, 2 and 3.

14.10.1 With one or more required equipment in Table 14.10 inoperable (or not in its FSSD condition), restore to operable status (or its FSSD condition) within 30 days.

14.10.2 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.

14.10.3 If required action and associated completion time cannot be met,

a. place the equipment in the condition required for FSSD,

-OR-

b. provide a back-up means of instrumentation monitoring for the equipment in Table 14.10,

-OR-

c. perform an evaluation to justify using alternate means to provide FSSD,

-OR-

d. be in Mode 3 within 6-hours and Mode 4 within the following 12-hours.

TESTING AND INSPECTION REQUIREMENTS (TIR)

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
	NOTE: The TIRs specified by Section 14.1 apply to all input devices listed in Table 14.1.			
14.1.a	Fire Detection Instrumentation (refer to Table 14.1)	6 months	Perform a functional test on at least one detector and a minimum of 10% of the detectors on each signal initiating circuit of the restorable heat detectors in any accessible area with all detectors tested within five years.	
14.1.b		6 months	Perform a functional test on each of the required smoke detection instruments in any accessible area.	
14.1.c		18 months	For the unit in a refueling outage, perform a functional test on each of the required smoke detection and restorable heat detection instruments which are in any inaccessible area.	
14.1.d		During each REFUELING OUTAGE	For the unit in a refueling outage, perform a functional test on each of the required smoke detection instruments which provide protection for the Containment Purge Air Filter Units which are required operable only during Mode 6.	

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.2.a	Water Supply	31 days	Operate each electric motor driven pump for a minimum of 15 minutes on recirculation flow.	
14.2.b		92 days	Visually inspect each testable valve in any accessible area in the flow path to ensure it is in its correct position.	
14.2.c		Twice per year	Perform system flush in conjunction with biocide injection.	
14.2.d		12 months	Cycle each testable valve located in any accessible area in the flow path through at least one cycle.	
14.2.e		18 months	Perform a system functional test with simulated automatic actuation, and: a. Verify electric motor driven pump starting logic ability for timing design requirements. b. Verify electric motor driven pumps develop flow ≥ 1590 gpm at a head of ≥ 300 feet (130 psig). c. Verify automatic valves in the flow path actuate to the correct position.	
		Refueling Outage	d. For the unit in a refueling outage, cycle testable valves in any inaccessible area in the flow path through one cycle	

(continued)

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.2.f		3 years	Perform a flow test of the system in accordance with the National Fire Protection Association Handbook, 17^{th} Edition (Reference 4.3.2).	
14.2.g	The Diesel Fire Pump shall be demonstrated operable:	31 days	Operate the diesel engine driven pump for a minimum of 30 minutes on recirculation flow. The fuel storage tank contains at least a two hour supply of fuel.	
14.2.h		92 days	Verify that the diesel fuel has been sampled and is within the acceptable limits specified in Table 1 of ASTM D975-1990, for viscosity, water and sediment.	
14.2.i		18 months	Inspect the diesel engine per Manufacturer's recommendations.	
14.2.j		18 months	Perform a system functional test with simulated automatic actuation, and: a. Verify diesel engine driven pump starts from a drop in system pressure ≤ design specified set point. b. Verify that the diesel engine driven pump develops ≥2500 gpm at 125 psig (288 feet of head).	
			(continued)	

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.2.k	The diesel engine driven fire pump 24 volt battery bank and charger shall be demonstrated operable.	7 days	Verify the following: The electrolyte level of each battery is above the plates. The overall battery voltage is ≥ 24 volts.	
14.2.l		92 days	Verify specific gravity is within tolerance for continued service of the battery.	
14.2.m		18 months	Verify the following: The batteries, cell plates and battery racks show no visible signs of damage or abnormal deterioration. The battery to battery and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material.	

TESTING AND INSPECTION REQUIREMENTS (TIR)

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.3.a	Water Based Fire Suppression (Refer to Table 14.3)	92 days	Verify by visual inspection that each testable manual, power-operated, or automatic valve in any accessible area, in the spray or sprinkler system flow path is in the correct position.	
14.3.b		12 months	Cycle testable valves in any accessible area in the spray or sprinkler system flow path through at least one cycle.	
14.3.c			Perform a system functional test including a simulated automatic actuation of the system and:	
		18 months	a. Verify automatic valves in the spray or sprinkler system flow path actuate on test signal.	
		Refueling Outage	b. For the unit in a refueling outage, cycle testable valves in any inaccessible area in the spray or sprinkler system flow path through at least one cycle.	
14.3.d			Perform a general visual system inspection (floor level type observation only) to identify any abnormal conditions and/or physical damage to the riser, sprinkler piping network, and hangers. This includes assurance that sprinkler heads/spray nozzles are not obstructed from providing protection for the hazards present in the areas as follows:	
		18 months	a. In any accessible area	
		Refueling Outage	b. For the unit in a refueling outage in any inaccessible area	

(continued)

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.3.e	Water Based Fire Suppression (Refer to Table 14.3) (continued)	During each COLD SHUTDOWN planned to exceed 24 hours, unless the TIR was performed in the previous 92 days.	For the unit in shutdown, visually inspect each testable valve in any inaccessible area in the flow path to ensure it is in its correct position.	

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.4.a	CO_2 Systems	7 days	Verify 24 ton CO_2 storage tank level ≥ 38.1 inches and pressure ≥ 270 psig. Verify 6 ton CO_2 storage tank level ≥ 65% and pressure ≥ 270 psig.	
14.4.b		92 days	Verify by visual inspection each system's tank shutoff isolation valve and vapor pilot valve is in the correct position.	
14.4.c		18 months	Verify each system's valves, timers, associated ventilation system actions (e.g., fan shutdown and damper closure), and fire door release mechanisms actuate automatically upon receipt of a simulated actuation signal. Verify flow from each nozzle during a "puff test".	
14.4.d		18 months	Perform a visual inspection to verify discharge nozzles are not physically damaged and orifice openings are not externally obstructed.	

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.5	Fire Detection Supervision		None.	

TESTING AND INSPECTION REQUIREMENTS (TIR)

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.6.a	Fire hose stations and associated preaction control valves (Refer to Table 14.6)	92 days	Perform visual inspection of the fire hose stations in any accessible area to assure all required equipment is at the station and all required stations are not obstructed.	
14.6.b		92 days	Verify by visual inspection each testable manual and power operated dry standpipe control valve in any accessible area in the flow path is in the correct position.	
14.6.c		12 months	Cycle testable valves in any accessible area in the flow path through at least one cycle.	
14.6.d		12 months	For hose stored in unheated areas, ensure the hose has been hydrostatically tested at a pressure of 150 psig or at least 50 psig above maximum fire main operating pressure, whichever is greater.	
14.6.e		 18 months Refueling Outage	Perform a system functional test including a simulated automatic actuation of the system and: a. Verify dry standpipe water flow devices, in the hose station flow path, actuate on test signal. b. For the unit in a refueling outage, cycle testable valves in any inaccessible area in the hose station flow path through at least one cycle.	

(continued)

TESTING AND INSPECTION REQUIREMENTS (TIR)

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.6.f	Fire Hose stations and associated preaction control valves (Refer to Table 14.6) (continued)	Refueling Outages and every 92 days during refueling outages	For the unit in a refueling outage, perform a visual inspection of the fire hose stations in any inaccessible area to assure all required equipment is at the station and all required stations are not obstructed.	
14.6.g		18 months Refueling Outage	Remove each hose for inspections and reracking. Inspect all gaskets and replace any degraded gaskets in couplings in the areas as follows: a. In any accessible area. b. For the unit in a refueling outage, in any inaccessible area.	
14.6.h		3 years	For hose stored in heated areas, ensure the hose has been hydrostatically tested at a pressure 150 psig or at least 50 psig above maximum fire main operating pressure, whichever is greater.	
14.6.i		3 years	*Partially open each hose station valve to verify valve* operability and no flow blockage.	
14.6.j		During each COLD SHUTDOWN planned to exceed 24 hours, unless the TIR was performed within the previous 92 days.	For the shutdown unit, visually inspect each testable valve in any inaccessible area in the flow path to ensure it is in its correct position.	

TESTING AND INSPECTION REQUIREMENTS (TIR)

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.7.a	Fire Hydrants (Refer to Table 14.7)	92 days	Perform a visual inspection of the fire hose equipment dedicated to support the use of fire hydrants to assure all required equipment is available.	
14.7.b		92 days	Verify by visual inspection each testable manual valve in any accessible area in the flow path is in the correct position.	
14.7.c		6 months	Verify by visual inspection that fire hydrants are accessible and there is no physical damage.	
14.7.d		12 months	For hose stored in unheated areas, ensure the hose has been hydrostatically tested at a pressure of 150 psig or at least 50 psig above maximum fire main operating pressure, whichever is greater.	
14.7.e		12 months	Flush hydrants to clear foreign material for more than 1 minute. Confirm automatic drainage.	

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.8.a	Fire-rated Assemblies	31 days	Perform a visual inspection of the fire doors as follows: a. The door is in the correct position b. The door is free of obstructions c. The door is not damaged and the vision panel (if provided) is intact.	
14.8.b		12 months	For each fire door, verify operability of all associated release and closing mechanisms and latches by performing a functional test.	
14.8.c		12 months	Verify operability of the required fire-rated assemblies and penetration sealing devices (including dampers) by performing a visual inspection of approximately 20% of the required fire- rated assembly/fire barriers in accessible areas for cracks, holes, or other evidence of physical damage or degradation. A different approximately 20% is selected each 12 months so all fire-rated assemblies/fire barriers are inspected every 5 years.	
14.8.d		Refueling Outage	For the unit in a refueling outage, verify operability of the required fire-rated assemblies and penetration sealing devices (including dampers) by performing a visual inspection of approximately 33% of the required fire- rated assembly/fire barriers in inaccessible areas for cracks, holes, or other evidence of physical damage or degradation. A different approximately 33% is selected each outage so all fire-rated assemblies/fire barriers are periodically inspected.	

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.9.a	Emergency battery lighting units (EBL)	92 days	Perform a functional test and visual inspection of each accessible EBL to verify proper operation and correct alignment of the lamps of the EBL as a unit by simulating a loss of power.	
14.9.b		Periodic	Replace batteries of accessible EBL as a function of their service life, environmental condition and as a safety factor.	
14.9.c		Refueling Outage	For the unit in the refueling outage, replace the battery and perform a functional test and visual inspection of each inaccessible EBL to verify proper operation and correct alignment of the lamps of the EBL as a unit by simulating a loss of power.	Annulus

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.10.a	250 V Batteries 0-BAT-239-1 0-BAT-239-2	31 days	Verify battery terminal voltage and alignment to its associated DC bus.	
14.10.b	250 V DC Battery Boards 0-BD-239-1 0-BD-239-2 250 V DC Turbine Building Distribution Board 0-DPL-239-1 0-DPL-239-2	31 days	Verify proper breaker alignment for supply of control power to steam load trip circuits and RCP breaker trip circuits.	
14.10.c	Main Steam System Valves (Table 14.10)	18 months	Verify capability to close valves using the associated hand switch in the Main Control Room or manually at the valve.	
14.10.d	Instrumentation	18 months	Perform a channel calibration for each required instrument channel.	
14.10.e	Thermal Barrier Booster Pump 1A Thermal Barrier Booster Pump 1B Thermal Barrier Booster Pump 2A Thermal Barrier Booster Pump 2B	92 days	Verify capability of pumps to provide 40 gpm to each thermal barrier heat exchanger.	
14.10.f	RCS Spray Line Isolation Valves 1-PCV-68-340B 1-PCV-68-340D 2-PCV-68-340B 2-PCV-68-340D	92 days	Verify capability to close valves using the associated hand switch in the Main Control Room.	

(continued)

TESTING AND INSPECTION REQUIREMENTS (TIR)

ITEM NO.	TYPE OF SYSTEM/COMPONENT	FREQUENCY	TESTING/INSPECTION REQUIREMENT (TIR)	NOTES
14.10.g	Control Rod Drive Motor Coolers (Table 14.10)	18 months	Verify capability of dampers to open and motors to run.	
14.10.h	Generator Control System Solenoid (Table 14.10)	18 months	Verify capability to operate the solenoid from the associated hand switch in the Main Control Room.	
14.10.i	RB Lower Compartment Cooler System Valves (Table 14.10)	18 months	Verify capability to operate the valves using the associated hand switch in the Main Control Room.	
14.10.j	Nitrogen Supply to PORVs/LCVs (Table 14.10)	31 days 18 months	a. Verify pressure of Nitrogen in tanks is ≥ 1550 psig for AFW LCVs and ≥1100 psig for S/G PORVs. b. Verify that the SG PORVs and AFW LCVs can be operated properly from backup control stations using the compressed nitrogen.	**Note 1**
14.10.k	Auxiliary Control Air Compressors 0-MTR-32-60 0-MTR-32-86	92 days	Verify Compressor will automatically start on low receiver air pressure and re-establish and maintain ACA system pressure.	
14.10.l	Thermal Overloads for Active Valves	None	Tracking Only TIR.	**Note 2**
14.10.m	Transfer Switch (Table 14.10)	18 months	Verify switch performs intended function by performance of a continuity check.	
14.10.n	1-FCV-3-116A, 1-HS-3-116A/C, 1-XS-3-116A, 1-FCV-3-116B, 1-HS-3-116B/C, 1-XS-3-116B, 1-FCV-3-126A, 1-HS-3-126A/C, 1-XS-3-126A, 1-FCV-2-126B, 1-HS-3-126B/C, 1-XS-3-126B 2-FCV-3-116A, 2-HS-3-116A/C, 2-XS-3-116A, 2-FCV-3-116B, 2-HS-3-116B/C, 2-XS-3-116B, 2-FCV-3-126A, 2-HS-3-126A/C, 2-XS-3-126A, 2-FCV-2-126B, 2-HS-3-126B/C, 2-XS-3-126B	18 months	Verify with the hand switch in P-Auto and the transfer switch placed in the Aux position that the FCV will automatically open on low level in the CST.	

Note 1: Both bottles of each pair are required at or above listed pressure.
Note 2: This item is for tracking only. See the associated bases.

BASES – OPERATING REQUIREMENTS (OR)
FIRE DETECTION

B.14.1 Fire detectors are provided within various locations at WBN to ensure adequate warning of fires, detect and locate fires in their early stages to facilitate suppression efforts, and to meet regulatory requirements. Prompt detection of fires reduces the potential for damage to plant equipment and is an integral element in the overall plant FPP. The specific number of required detectors in each room to ensure adequate spatial coverage and the desired level of detector redundancy are specified on Table 14.1. Instrumentation designed to detect smoke as a part of other systems (e.g., smoke detectors in HVAC ducts for main control room habitability) are excluded from Table 14.1 since they were designed for purposes other than fire protection.

This requirement is provided to ensure, as a minimum, the Fire Detection Instrumentation for each Fire Detection Zone shown in Table 14.1 is Operable. The operability of the Fire Detection Instrumentation ensures that adequate warning capability to a constantly attended location is available for prompt detection of fires and that Fire Suppression Systems that are actuated by fire detectors will discharge extinguishing agents in a timely manner. Prompt detection and suppression of fires will reduce the potential for damage to safety-related equipment and is an integral element in the overall facility fire protection program.

When detectors are inoperable, an acceptable alternative in lieu of fire watches is the use of a portable fire detection system designed specifically for fire protection use. Placement of the detectors for the portable system is to be at the approximate location of the inoperable permanent detector on a one-to-one basis. The cables from the detectors to the portable system panel are not installed in conduits or cable trays but are routed and secured so as not to interfere with routine plant operations. The system would not interface with any existing fire detection systems.

When a unit is in Modes 5 (Cold Shutdown), 6 (Refueling), or core empty, the locations where a continuous fire watch would be required may be combined and patrolled by one or more roving fire watch(es) provided the area only affects the unit in Modes 5, 6, or core empty. While a unit is in cold shutdown or refueling, there are fewer systems needed for maintaining cold shutdown and more people present that could detect and report a fire (General Employee Training includes how to report a fire). Roving fire watches provide an adequate level of coverage for these systems by ensuring that potential fire hazards are detected and corrected in a timely manner to prevent fires from occurring, or if a fire were to occur, ensuring that timely action is taken.

Outputs from the Fire Detection system also provide for the automatic shutdown of selected plant fans/air movers and dampers. This output is beyond the scope of this Fire Detection OR for Function A detectors since this automatic shutdown does not affect the operation of the system as exhibited by the annunciation of the affected Fire Detection equipment. Manual actions can be used to compensate for this automatic shutdown.

The testing of the fire detection system is based on the codes in place when the system was designed and purchased. As such, the testing of internal circuit supervisory functions (e.g., trouble due to an open circuit or ground on a detection circuit) of the equipment on a periodic basis is not required. The confirmation of the

Operability of such supervisory functions is confirmed as applicable upon a component's initial installation.

B.14.1.1 With any Function A Fire Detection Instrumentation shown in Table 14.1 inoperable in an accessible area, the inoperable instrument(s) must be restored within 1 hour. The Completion Time of 1 hour to establish a fire watch is reasonable considering that it is consistent with standard Technical Specifications. If the inoperable instrument(s) cannot be restored within 1 hour, a fire watch patrol must be established to inspect the zone(s) with inoperable instrument(s), and thereafter, inspect the zone(s) once per hour. The establishment of frequent fire watch patrols in the affected areas is required to provide detection capability until the inoperable instrumentation is restored to Operability. The Completion Time of one hour to perform a roving fire watch is reasonable and based upon the typical time necessary to establish a fire watch patrol and perform an inspection.

B.14.1.2a With any Function A Fire Detection Instrumentation shown in Table 14.1 inoperable in any inaccessible area in either containment, the inoperable instrument(s) must be restored within 8 hours. The Completion Time of 8 hours is based on containment access considerations. If the inoperable instrument(s) cannot be restored within 8 hours, the zone(s) with inoperable instrument(s) must be inspected once per 8 hours, or the air temperature must be monitored in the affected area once per hour. The Completion Times of once per 8 hours required for a roving fire watch and once per hour required for monitoring of the air temperature are reasonable.

Furthermore, the 1-hour frequency for air temperature monitoring is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to abnormal containment temperature conditions.

Fire detection instrumentation is not assumed to be operable to mitigate the consequences of a design accident or transient. In designing the accident sequence for theoretical hazard evaluation, fires are not assumed to take place simultaneously with the design basis event (DBE) or transient. Therefore, observing the same instruments that are used by SRs 3.6.5.1 and 3.6.5.2 once per hour along with the other indications available in the Main Control Room, including alarms to alert the operator of abnormal containment temperature conditions, provides an equivalent level of fire safety without exposing personnel to unnecessary radiation exposure. Additionally, this method of compensatory actions for inoperable detection systems in the RB has been approved by NRC for Sequoyah Nuclear Plant in TS 3.3.3.8.a and is consistent with industry standard technical specification requirements. Should the Technical Specification instrumentation not be available when needed to support this monitoring, then other appropriately maintained and tested instrumentation may be used after evaluation.

B.14.1.2.b With any function A Fire Detection Instrumentation shown in Table 14.1 inoperable in any inaccessible area outside of either containment, the inoperable instrument(s) must be restored within 8 hours. The Completion Time of 8 hours is based on access considerations to these hazardous areas to ensure personnel safety. If the inoperable instrument(s) cannot be restored within 8 hours, the zone(s) with inoperable instrument(s) must be inspected once per 8 hours. The completion Times of once per 8 hours required for a roving fire watch is reasonable to ensure protection of personnel and the confined areas (relatively small rooms with heavy concrete wall bounding the areas and limited combustibles) that are involved for areas outside of containment.

B14.1.3 The restoration of equipment to Operable in 14 days is reasonable based on the type of equipment that is out of service. The time frame is consistent with standard Technical Specifications.

B14.1.4.a With the CPU inoperable, for zones containing Function A Fire Detection Instrumentation shown in Table 14.1 in an accessible area, the local detection panel shall be monitored within 1 hour. If the inoperable CPU cannot be restored within 1 hour, a continuous monitor patrol must be established. The establishment of a continuous monitor patrol for the affected panels is required to provide detection capability and notification to a constantly attended location until the inoperable CPU is restored to Operability. The Completion Time of one hour to establish a continuous roving monitor is reasonable and based upon the typical time necessary to establish a monitor patrol and to perform an inspection. These actions are consistent with the standard Technical Specifications requirements should the detectors have been declared inoperable. The Main Control Room (MCR) is exempted from this action since the MCR is the constantly attended location that is normally notified.

B14.1.4.b With the CPU inoperable, for zones containing Function A Fire Detection Instrumentation shown in Table 14.1 in an inaccessible area, the monitoring of the air temperature for the affected area once per hour or the monitoring of the local detection panel once per hour is to be established within one hour. The time frame of one hour to establish one of the compensatory actions is reasonable considering that it is consistent with standard Technical Specifications. The establishment of temperature monitoring or monitor patrols for the affected panels is required to provide detection capability to a constantly attended location until the inoperable CPU is restored to Operability. The time frame and actions are reasonable and based upon the necessary times and actions that would be required if these devices had been declared inoperable.

B14.1.4.c With the CPU inoperable, for zones containing Function B Fire Detection Instrumentation shown in Table 14.1 in an inaccessible or accessible area, the local detection panel shall be monitored hourly within one hour. The establishment of a monitor patrol once per hour for the affected panels is required to provide detection notification to a constantly attended location until the inoperable CPU is restored to Operability. The automatic actuations are still operable so the more restrictive compensatory action of a continuous fire watch is not needed. The completion time of one hour to establish an hourly roving monitor is reasonable and is consistent with the standard Technical Specifications when annunciation to a constantly attended location is inoperable such as in OR-14.1.1.

B.14.1.5 The restoration of equipment to Operable in 14 days is reasonable based on the type of equipment that is out of service. The time frame is consistent with standard Technical Specifications.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIR)

FIRE DETECTION

B.14.1.a TIR 14.1.a is the performance of a functional test (excluding confirmation of setpoint accuracy) on one or more of the required accessible thermal detection instruments in each signal circuit which are accessible during plant operation. At least one detector and a minimum or 10% on each signal initiating circuit shall be tested semi-annually such that all are tested within five years. The frequency of six months is based on NFPA consensus standard 72E (code of record) and has been shown acceptable through industry operating experience.

B.14.1.b TIR 14.1.b requires a functional test be performed on each of the required accessible smoke detection instruments. The associated frequency for this surveillance is 6 months which is based on NFPA consensus standard 72E criteria and is consistent with standard Technical Specification requirements.

B.14.1.c TIR 14.1.c is the performance of a functional test on each of the required smoke detection and restorable heat detection instruments which are in any inaccessible area. This test is performed for the unit in a refueling outage. The expected frequency for this testing is each unit's Refueling Outage and is based on operating experience.

B.14.1.d TIR 14.1.d is the performance of a functional test of the required smoke detection instruments which provide protection for the each unit's Reactor Building Purge Air Cleanup units. These units are only required to be Operable during irradiated fuel movements and core alterations which will be performed in Mode 6 for the unit in an outage. This test may be performed during each unit's Refueling Outage prior to declaring its Reactor Building Purge Air Cleanup Units operable, or periodically on line as determined by Operations. The frequency for this TIR is based on the assumption that the required smoke detection instruments are available for testing only during cold shutdown and that these units are not required to be operable except during irradiated fuel movements and core alterations. The expected frequency for testing is each unit's Refueling Outage which is the time that core alterations and fuel movement will occur and is consistent with standard Technical Specification requirements.

BASES – OPERATING REQUIREMENTS (ORs)
WATER SUPPLY

B.14.2 This requirement is provided to ensure, as a minimum, the water supply is Operable. The water for firefighting is supplied by four vertical turbine, high pressure, motor driven pumps, and one centrifugal diesel driven fire pump. The pumps are required to provide the flow for the most hydraulically demanding area in a safety-related structure.

The water suppression system is a prime element of the overall plant fire suppression capability and is not mode dependent; therefore, its availability should be maximized.

Three fire suppression pumps (the diesel and two electric driven pumps) are required to be Operable. With one of the three required pumps inoperable, 100 percent of the required flow can still be provided by the two remaining Operable pumps. The flow path through the distribution piping and valves to each supply terminal are also required to be Operable. In the section of standard Technical Specifications for water supplies, two 100% pumps are addressed. WBN has taken the option allowed by BTP 9.5-1 to provide three pumps; however in place of being three 50% capacity pumps as addressed in the BTP, WBN has a 100% capacity diesel fire pump and two 50% capacity electric motor driven pumps. Since standard Technical Specifications provide action statements when one pump is inoperable and does not cover the three pump installation, the capacity of operable pumps was taken into account in determining the action statements and associated times for action statement completion in Section 14.2.

The Water Supply consists of a flow path from the water source to the using devices (i.e., water based fire suppression systems, the fire hose station/standpipes, and the fire hydrants). The normal configuration is such that the Water Supply piping is looped, meaning it is fed from two directions. Alternately, the pipe that goes to the using devices is only fed from the point of attachment to the Water Supply piping. WBN identifies piping, valves, fittings, and other appropriate items associated with the Water Supply in Section 14.2 as follows:

1) The piping, valves, fittings, and other appropriate items, starting at the water supply, through the fire pumps and up to the first valve on the pipe going to the using devices are included in Section 14.2. The piping, valves, fittings and other appropriate items downstream of this first valve are included under Section 14.3 and 14.6 as appropriate.

2) The isolation of a single valve on the supply/looped piping, covered by Section 14.2, will not preclude water from getting to the using devices.

3) The isolation of a single valve on the using device piping, covered by Section 14.3 and 14.6, will prevent water from getting to the using devices. Separating the water supply piping/features from the using device piping/features eliminates the confusion presented when comparing WBN's design to the standard Technical Specifications which could lead to entering two action statements.

The electric driven pump start circuitry, including the buffer relays, will be temporarily inhibited during testing to prevent the fire pumps from starting. The excessive starting of the deep draft electric driven pumps is an industry concern; therefore, limiting the starting of the electric driven pumps is good practice. This action does not require entering an OR for the following reasons:

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 pumps 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 pumps.

B.14.2.1 With two electric pumps operable and the diesel driven fire pump inoperable, compensatory actions must be taken. These actions consist of:

(a) Restoring the diesel fire pump within 7 days, (b) ensuring that three of the electric motor driven pumps are operable or (c) ensuring two electric fire pumps are operable and a backup pump, either electric or diesel driven, of at least equal capacity to an electric driven fire pump. For action (b), the three electric motor driven pump option, a fire watch, continuous or hourly roving based on fire detection equipment status in the areas, is to be established in the Auxiliary Building and IPS for areas containing common power supplies. For cases involving a continuous fire watch, one continuous fire watch will be assigned to each building/elevation listed in the table below. The areas are as noted below:

Building/Elevation	Room Number (Analysis Volume)	Column Line
Auxiliary Building Elevation 713	713.0-A1 (AV-026)	Q to U and A8 to A15
Auxiliary Building Elevation 737	737.0-A1 (AV-036, 037, 037C, and 038)	Q to RB Center Line and A1 to A15
Auxiliary Building Elevation 757	757.0-A2 (AV-042)	R to U and A1 to A8
Auxiliary Building Elevation 772	772.0-A11 (AV-068)	S to U and A13 to A15
Intake Pumping Station Elevation 711	Electric Board Room (AV-089)	N/A

For action (c), the two electric fire pumps and a backup fire pump, either a hourly roving or continuous fire watch will be established in areas containing common power supplies. The determination of the fire watch(es) frequency and area of coverage will be based on information provided in action (b) (e.g. Hourly fire watch(es) in areas with operable detection).

Either Action (a) or (b) is to be taken within 7 days so that three pumps are available. This provides 150% pump capacity to safety-related areas. The completion time of 7 days is reasonable considering that 100% of the required pumping capacity to safety-

related areas is still provided, and the time required to identify the problem and to take the corrective actions. This is consistent with the standard Technical Specifications.

Action (c) is anticipated for planned outage activities where normally an entry will be made into (a) or (b) and then enter (c) for 7 days before re-entry into (a) or (b). While in cases of unplanned outages, it is anticipated an entry will be made into (a), (b), or OR 14.2.2, 14.2.3, 14.2.4 or 14.2.5 as appropriate. The backup pump for Action (c) also provides a measure of diversity by the general nature of how the existing electric pumps are installed. The backup pump will tend to be located on another water source, with another energy source and a diverse location to provide a tie-in for supplying the fire protection system. For Action (c), the two electric fire pumps and a backup fire pump, a continuous fire watch will be established in areas containing common power supplies. The determination of the fire watches' area of coverage will be based on information provided in Action (b) and additional areas where the power supplies for the backup pump are not separated by at least a one hour fire barrier from the cables associated with the Operable electric fire pumps. The provision of fire watches in areas of power supply interaction between the available electric fire pumps as well as the backup pump is consistent with other actions of OR-14.2.1.b. The completion time of 7 days to restore the 150% pump capacity (i.e., entering OR-14.2.1.b or restoration of the diesel fire pump) is reasonable and is consistent with other existing actions to ensure there is 150% pump capacity.

The backup pump shall be installed to meet the following criteria which will ensure that the pump is operated within the HPFP design limits.

1. The pump driver will be a diesel engine capable of operation for two hours.

2. The pump will provide a minimum 1590 gpm at 300 ft. head as demonstrated by a flow test.

3. Suction supply for the pump will be from the Tennessee River, a cooling tower basin, the 35 acre pond, the lined pond or other pond with a minimum of two hour supply at 1590 gpm.

4. A maximum pressure capability of 135 psig at elevation 729 feet. This maximum can be controlled manually provided the pump is constantly attended.

5. The pump will be connected to the High Pressure Fire Protection system via a non-OR fire hydrant using 1-5inch and 2 nominal 2½ hoses that are in current hydrostatic test requirements.

6. Manual start and control of the pump is acceptable provided the pump is constantly attended when required to be available.

When a unit is in Modes 5, 6, or core empty, the locations where a continuous fire watch would be required may be combined and patrolled by one or more roving fire watch(es) provided the area only affects the unit in Modes 5, 6, or core empty. While the plant is in cold shutdown or refueling, there are fewer systems needed for maintaining cold shutdown and more people present that could detect and report a fire (General Employee Training includes how to report a fire). Roving fire watches provide an adequate level of coverage for these systems by ensuring that potential fire hazards

are detected and corrected in a timely manner to prevent fires, or if a fire were to occur, ensuring that timely action is taken.

B.14.2.2 With only one electric driven fire pump operable and the diesel driven fire pump operable, compensatory actions must be taken. These actions consist of:

Restore an additional electric motor driven pump (to ensure a total of three operable pumps) within 30 days. The condition with the diesel fire pump and only one electric motor driven pump operable provides 150% pump capacity to safety-related areas. The action of restoring an additional electric motor driven pump in 30 days is reasonable given that 150% of the required fire pump capacity is operable.

B.14.2.3 With no electric driven pumps operable and the diesel driven fire pump operable, compensatory actions must be taken. These actions consist of:

Restoring one electric motor driven pump to operable within 7 days. This provides 150% pump capacity to safety-related areas. The diesel fire pump alone connected to the fire protection system provides 100% pump capacity to safety-related areas. This is consistent with the requirements of 14.2.2 and of standard Technical Specifications.

B.14.2.4 With only one electric driven pump operable and the diesel driven fire pump inoperable, compensatory actions must be taken. These actions consist of:

Restore an additional electric motor driven pump to operable within 24 hours. This will provide a minimum 100% pump capacity to safety-related areas. Restore the third required pump to operable within 7 days. The time frames are consistent with standard Technical Specification time allowance for related equipment out of service conditions.

B.14.2.5 With no water supply pumps operable, compensatory actions must be taken. These actions consist of:

a.
1. Establish a backup water supply within 24 hours, and
2. Restore one electric driven pump within 48 hours, and
3. Restore a second electric driven pump within 72 hours. This provides a 100% pump capacity to safety-related areas. The backup supply can then be secured.
4. Restore the diesel fire pump to operable within 7 days.

b. An alternative to the above is to establish a backup water supply within 24 hours and restore the diesel fire pump within 48 hours. Once the diesel is operable, it provides a 100% capacity to safety-related areas and the backup water supply can be secured. Restore one of the two required electric driven pumps within 7 days, and the second required electric drive pumps within 30 days.

This provides a backup supply within 24 hours as required by standard Technical Specifications. This also returns WBN to 100% pump capacity within 72 hours or less. Either method provides a 100% pump capacity to safety-

related areas within 72 hours and the time (72 hours) is reasonable considering the seriousness of the situation.

B.14.2.6 The closing of multiple sectional valves in the water supply piping of Section 14.2 can isolate the flow path to the using devices of Section 14.3, 14.6 and 14.7.

a. In such a situation, the more restrictive requirements of Section 14.3, 14.6 or 14.7 would apply. The requirements of 14.3, .6 or .7 although more restrictive, address the specifically affected area(s). The entering of compensatory actions for the isolated using devices is reasonable.

b. Specific valve operators that have had power removed due to Appendix R concerns require re-energizing to perform periodic testing such as cycling of valves to meet other regulatory requirements. The establishment of an attendant at the breaker will allow prompt action to be taken if a fire condition would occur during this time period.

c. The restoration time of thirty (30) days is reasonable based on the equipment involved and the limited impairment to the Fire Suppression System.

B14.2.7 Specific usages are supplied by the HPFP/RSW system and are required to be operable during normal plant operation. A calculation determined the limits for the total HPFP/RSW usage and is as follows:

a. Selected as-designed RSW loads to remain unisolated during a fire condition (e.g., chiller packages and plant processes required during plant operation).

b. Manual RSW isolation valves to be locked closed to preclude non-as designed RSW loads being added.

c. Selected as designed RSW loads to automatically isolate during a fire condition.

This provides control of HPFP/RSW usage to ensure an adequate water supply is available for fire protection when needed.

RSW was originally designed to be used for multiple usages (e.g., supply various chiller units and plant processes, cleaning of plant areas and other miscellaneous uses). Therefore when HPFP/RSW is needed outside the bounds of the established calculation, it is acceptable to establish compensatory actions employing isolation capability that will allow for prompt isolation of additional usage without requiring a Temporary Alteration Control Form (TACF).

a. For HPFP/RSW usage that automatically isolates, it is not necessary to have the isolation point constantly attended with the attendant in communication with the Main Control Room (MCR), 0-M-29 Operator. In the case where non-as designed HPFP/RSW loads are needed, a manual isolation capability is required and an attendant established in the area within one (1) hour. The attendant will be in communication (radio, cellular radio, telephone, PA, etc.) with the 0-M-29 Operator in the MCR.

b. For those as designed RSW usage's that are designed to automatically isolate on a fire pump start, there will be times when this automatic isolation capability will need to be inhibited (e.g., during fire pump testing). During hot weather, there are chillers that are needed for plant operations and since the inhibiting of the automatic isolation is procedurally controlled, this will allow the plant to continue to operate normally during testing and still provide adequate compensatory actions to ensure an adequate supply of water for firefighting if needed.

c. Thirty (30) days is reasonable based on the actions required by Operating Requirement (OR) 14.10, which requires restoration of equipment required for 10CFR50, Appendix R within that time limit.

B14.2.8 The electric driven pump start circuitry, including the buffer relays, may be temporarily inhibited during maintenance/testing to prevent the fire pumps from starting automatically. The excessive starting of the deep draft electric motor driven fire pumps is an industry concern, therefore, limiting the starting of the electric driven fire pumps is a good practice. This action does not require additional compensatory measures for the following reasons:

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 pumps from the Main Control Room (MCR) 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 pumps.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIRs)
WATER SUPPLY

B.14.2.a TIR 14.2.a verifies that the electric driven pumps operate as designed. Every 31 days, the pumps are tested by starting each pump and letting it operate for a minimum of 15 minutes on recirculation flow. A test frequency of 31 days is reasonable for pumps which are not normally in operation and is consistent with standard Technical Specification requirements.

B.14.2.b TIR 14.2.b verifies every 92 days that each testable valve in any accessible area is visually inspected to be in its correct position. This applies to testable valves that are manual, power-operated, and automatic valves in the flow path. Verification of valve position is not required for valves that are not part of the main flow path which feed branch headers to form a train separation boundary, or which have capped or blind flanges downstream of the valves, or if inadvertently opened/left open would lead to a visible, noticeable discharge which could be corrected. Valves which are not part of the main flow path which are normally closed and feed to branch headers to closed station drains are included in the verification of position, since if left mispositioned could lead to undetected leakage. Verification of valve position is not required for the pressure control valve which has a designed orifice plate downstream to limit the effect, to within design parameters, of the valve failing. Valves that are locked, sealed or otherwise secured in position need only be verified to be locked, sealed, etc., since these were verified to be in the correct position before locking, sealing, or securing. A frequency of 92 days has been established and is more conservative than the inspection criteria established for primary system valves that are locked, sealed, etc.

B.14.2.c TIR B.14.2.c requires the fire protection water distribution system be flushed twice per year in conjunction with biocide injection. The frequency of twice per year is needed to support chemical treatment requirements for biocide injection and meets the intent of standard Technical Specification requirements.

B.14.2.d TIR 14.2.d requires that valves in any accessible area, which are testable, are cycled every 12 months. This verifies that each valve operates properly. Verification of the position of valves every 12 months is based on industry operating experience, and is consistent with standard Technical Specification requirements and NFPA consensus standard 25 criteria.

B.14.2.e TIR 14.2.e consists of a fire suppression water system functional test every 18 months, which includes the electric motor driven pumps and major valves. The electric motor driven pumps start circuitry uses a time delay to ensure the associated emergency diesel generator is not overloaded and/or a combination of the time delay and pressure demand to start additional pumps if system pressure falls below predetermined setpoints.

Only two of the four pumps are needed to satisfy the requirements of OR 14.2. Normally, the first two pumps start based on time delay and the remaining pumps start on pressure demand and time delay. However, there are possible pump alignments where one of the two pumps needed for the OR requirement will have a start logic based on time and pressure delay. The electric motor driven pumps start logic is verified for proper normal operation by verifying pump time delay starts. TVA does not test the time and pressure delay aspects of the start circuitry because:

1. Testing this circuitry involves extensive plant configuration changes in order to minimize the number of pump starts.

2. The pressure switches are periodically maintained and calibrated in accordance with the WBN preventive maintenance program.

3. Plant instructions for responding to fires include verification measures to ensure that at least two electric motor driven pumps are operating.

4. Minimize the number of starts on deep draft pumps.

There are numerous sets of contacts that are associated with the physical fire pump start circuit. These points do not affect the logic beyond providing a start signal for the logic. When there is a set of contacts that provides an automatic start for the logic, it will be tested with the associated equipment (e.g. preaction sprinkler system).

Devices that are manual in nature such as hose stations, except as noted in 14.6, do not need the automatic start input because plant personnel are trained to report all fires before trying to fight them. Additional administrative controls are in place to ensure that a fire pump(s) is running after a fire is reported. Testable valves in any inaccessible area are cycled during the refueling outage for the applicable unit. Automatic valves are checked for correct position and operation each 18-months. The functional test frequency of 18 months/refueling outage is based on industry operating experience, gives acceptable assurance that the system is Operable at all times, and is consistent with standard Technical Specification requirements.

B.14.2.f 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.

B.14.2.g TIR 14.2.g verifies that the diesel engine driven fire pump operates as designed and has an adequate fuel supply that will provide fuel for the running time (i.e. min. 2 hours). Every 31 days, the pump is tested by starting the pump and letting it operate for a minimum of 30 minutes on recirculation flow. A test frequency of 31 days is reasonable for pumps which are not normally in operation and is consistent with standard Technical Specification requirements.

B.14.2.h TIR 14.2.h verifies that the quality of the diesel fuel is within the acceptable limits of Table 1 of ASTM-D975-1990. This either uses the documentation from the fuel in the main diesel fuel storage tanks, when filled from the source, or testing performed on the fuel in the diesel fire pump storage tank. Testing on the fuel in the diesel fire pump fuel oil tank will be performed on a bottom sample as defined by ASTM-D40507-1990. Additional samples from the midpoint or top of the fuel tank per ASTM-D-40507 are not needed since the main concern is water and sediment in the tank. A bottom sample is sufficient for detecting water and sediment. The test frequency of 92 days is

reasonable based on the limited consumption during the 31 day runs and is consistent with standard Technical Specification requirements.

B.14.2.i TIR 14.2.i subjects the diesel engine driver to an inspection as specified by the manufacturer for the class of service. The extent of the inspection will also be based on performance factors of the engine and pump.

B.14.2.j TIR 14.2.j verifies that the diesel engine driven fire pump performs in accordance with the proper normal operation start logic based on plant design of pump. The pump will be tested to verify that it starts from a drop in system pressure ≤ the design specified set point and that the performance of the pump meets the following criteria:

≥ 150% of rated flow at 65% of rated head,

≥ 100% of rated flow at rated head, and

Shutoff flow ≤ 140% of rated head

The frequency of 18 months is consistent with standard Technical Specifications.

B.14.2.k TIR 14.2.k verifies the electrolyte level of each battery in the 24 volt battery bank and that the charger is operable by measuring the voltage at the battery to ensure that it is ≥ 24 volts. The test frequency of 7 days is consistent with standard Technical Specifications.

B.14.2.l TIR 14.2.l verifies that the specific gravity of each battery is within tolerance to ensure continued service of the battery. The frequency of 92 days is consistent with standard Technical Specifications.

B.14.2.m TIR 14.2.m verifies that there is no visible physical damage to the batteries, cell plates and battery racks and that the battery to battery connections are clean, tight, free of corrosion and coated with anti corrosion material. The frequency of 18 months is consistent with standard Technical Specifications.

BASES – OPERATING REQUIREMENTS (OR)
WATER BASED FIRE SUPPRESSION

B.14.3 Water based fire suppression systems and their associated fire detectors are required to be Operable whenever safety-related or FSSD equipment protected by the suppression/detection system is required to be Operable. This is necessary to minimize the adverse effects of fires on structures, systems, and components important to safety.

This water based suppression equipment and associated fire detection equipment is provided as a means to directly detect and annunciate to a constantly attended location, and automatically actuate systems to suppress or control fires with particular emphasis on preserving the ability to achieve and maintain safe plant shutdown by protecting the fire safe shutdown equipment.

The main emphasis is on early detection to a constantly attended location and automatic actuation of the system for the suppression of a fire while the fire is easily controlled and quickly suppressed before it is capable of damaging fire safe shutdown systems. Two levels of actions are provided in recognition of the varying fire safe shutdown impact depending on the location of the fire. The determination whether a single fire can affect redundant FSSD systems or components will be based on whether both FSSD paths are in the same fire area with less than a 3-hour fire barrier separating them. This is consistent with Appendix R in that when 3-hour separation is provided within the same fire area, then suppression and detection are not required. Backup suppression equipment is normally the installed hose stations as discussed in Part II, Section 12.2.

When a unit is in Modes 5, 6, or core empty, the locations where a continuous fire watch would be required may be combined and patrolled by one or more roving fire watch(es) provided the area only affects the unit in Modes 5, 6, or core empty. While the plant is in cold shutdown or refueling there are fewer systems needed for maintaining cold shutdown and more people present that could detect and report a fire (General Employee Training includes how to report a fire). Roving fire watches provide an adequate level of coverage for these systems by ensuring that potential fire hazards are detected and corrected in a timely manner to prevent fires, or if a fire were to occur, ensuring that timely action is taken.

Outputs from the associated fire detection equipment also provide for the automatic shutdown of selected plant fans/air movers and dampers. This output is beyond the scope of this OR for Function B detectors since this automatic shutdown does not affect the operation of the system as exhibited by the annunciation of the associated fire detection equipment. Manual actions can be used to compensate for this automatic shutdown.

B.14.3.1 More restrictive compensatory actions are appropriate where water based suppression equipment or associated fire detection equipment are provided to protect redundant safe shutdown systems or components that could be damaged if a fire occurred. With any fire suppression shown in Table 14.3 inoperable in any accessible or inaccessible area, the inoperable equipment must be restored within one hour. If both the suppression and associated detection are inoperable in an area containing both trains of safe shutdown equipment, then it is appropriate to provide continuous fire watch

coverage except as modified below. The completion time of one hour is based on the standard Technical Specifications.

a. When detection or both suppression and the associated detection are inoperable in an area, then the more stringent compensatory actions are needed. If only the water based suppression is inoperable, then the early warning detection system will provide more extensive coverage of the area and faster notification than can be provided by a fire watch. Therefore, it is appropriate to provide a lesser degree of fire watch coverage (i.e., Hourly roving fire watch). When the detection is inoperable and the associated suppression is still operable then the more restrictive compensatory action is required. In this situation, not only is the early warning capability lost, but so is the automatic actuation capability of the suppression system.

b. The inoperable suppression is to be restored within one hour. If the area is in the Reactor Buildings' Lower Containment, then special consideration is needed due to the radiological conditions, building construction, and hazards present. In this case the area with inoperable suppression and/or detection must have a continuous fire watch established, or the air temperature must be monitored in the affected area once per hour. The completion time of one hour to establish continuous fire watch or hourly monitoring of the air temperature is reasonable. Either of these compensatory actions and associated time frequency is acceptable based on the air supervision for the Reactor Coolant Pump (RCP) sprinkler systems, the RCP oil collection system and the capability to monitor RCP bearings temperatures in the MCR. Furthermore, the one hour frequency for air temperature monitoring is considered adequate in view of other indications available in the MCR, including alarms to alert the operator to abnormal containment temperature conditions. This is also consistent with the standard Technical Specification on the loss of detection in an inaccessible area such as Lower Containment.

Fire suppression is not assumed to be operable to mitigate the consequences of a design accident or transient. In designing the accident sequence for theoretical hazard evaluation, fires are not assumed to take place simultaneously with the design basis event (DBE) or transient. Therefore, observing the same instruments that are used by SRs 3.6.5.1 and 3.6.5.2 once per hour along with the other indications available in the main Control Room, including alarms to alert the operator of abnormal Containment temperature conditions provides an equivalent level of fire safety without exposing personnel to unnecessary radiation exposure. Additionally, this method of compensatory actions for inoperable suppression systems in Lower Containment was approved by NRC for Sequoyah Nuclear Plant's TS 3.3.3.8 that was current at the time Watts Bar Nuclear Plant's FPR was written. This approval was also contained in Sequoyah Nuclear Plant's FPR when Sequoyah's fire protection was removed from TS and placed in the FPR.

Should this Technical Specification instrumentation not be available when needed to support this monitoring, then other appropriate maintained and tested instrumentation may be used after evaluation.

The 737' elevation of the Auxiliary Building is to have a dedicated continuous fire watch when the water based suppression system equipment or associated fire detection equipment is out of service. In such a situation, the continuous fire watch will be

limited to the 737' elevation due to the FSSD sensitivity of the area. The continuous fire watch will not be allowed to cover areas in other elevations that this sprinkler system protects.

Alternate compensatory actions are generally defined in Section 13.0. In addition to actions in Section 13.0 is the alternate compensatory action for the two Reactor Building Equipment Hatch Rooms (757.0-A11 & A15). The Reactor Building Equipment Hatch Rooms (757.0-A11 & A15) will be inaccessible by the placement of the Reactor Building hatch and the shield blocks during plant operation. Due to the construction and thus inaccessibility, an evaluation (see Part VII, section 6.1) has been performed to determine the applicability of the compensatory actions of OR 14.3.1. The results show that this room has such limited fire hazards that the compensatory actions can be omitted without reducing nuclear safety or the fire safe shutdown capability of the plant.

B.14.3.2 Where redundant FSSD systems or components could not be damaged by a single fire, inoperable water based suppression equipment or associated fire detection equipment would necessitate the least restrictive compensatory actions.

B.14.3.3 The restoration of the equipment to Operable in 14 days is reasonable based on the type of equipment that is out of service. The time frame is consistent with the standard Technical Specifications.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIR)
WATER BASED FIRE SUPPRESSION

B.14.3.a TIR 14.3.a verifies the correct alignment for testable valves that are manual, power-operated, and automatic valves in any accessible area in the spray/sprinkler systems flow paths and provides assurance that the proper flow paths will exist for spray/sprinkler system operation. Valves that are locked, sealed, or otherwise secured in position need only be verified to still be locked, sealed, etc., since these were verified to be in the correct position prior to locking, sealing, or securing. This inspection does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned and preventing or inhibiting fire suppression activities are in the correct position. A frequency of 92 days has been established and is more conservative than the inspection criteria established for primary system valves that are locked, sealed, etc.

B.14.3.b TIR 14.3.b ensures that testable valves in the flow path in any accessible area will travel through at least one cycle. This is necessary to ensure valves are Operable in the event of a fire. A frequency of 12 months has been shown to be acceptable through operating experience and is consistent with NFPA consensus standard 25 criteria.

B.14.3.c TIR 14.3.c ensures that each automatic spray/sprinkler system valve actuates to its correct position. These deluge valves for preaction systems have limited means to ensure a cycle of travel is achieved. Industry practice on cycling these valves by closing the isolation valve all but a few turns until the deluge valve opens and then completing the closing of the isolation valve will be used. This TIR also ensures that each testable valve in any inaccessible area will travel through at least one cycle. Any pushbuttons provided at deluge valves for manual start of the fire pumps are not tested as a part of this TIR. These pushbuttons are provided for when the deluge valve is manually activated. Upon discovery of a fire, plant personnel are trained to report all fires before trying to fight them. Additional administrative controls are in place to ensure that a fire pump(s) is running when a fire is reported. A unit's Refueling Outage frequency was developed considering that many surveillances can only be performed during an outage. Standard Technical Specification requirements and operating experience has shown these components routinely pass the TIR when performed on the 18 months/Refueling Outage frequency. Therefore, the frequency was concluded to be acceptable from a reliability standpoint.

B.14.3.d TIR 14.3.d performs a general, floor level visual inspection of each spray or sprinkler system once every 18 months for accessible areas and for the unit in a Refueling Outage for inaccessible areas. This general inspection identifies any abnormal conditions and/or physical damage to the riser, sprinkler piping network, and hangers. This inspection includes assurance that spray/sprinkler head discharge patterns are not obstructed from providing protection from the hazards present. This inspection is not intended to perform a field verification of the design of the installed spray/sprinkler system. The 18 months/Refueling Outage frequencies have been established and are consistent with standard Technical Specification requirements. Design and modification controls exist to prevent improper fire protection system installation or permanent impairment of operation through improper installation of plant equipment.

B.14.3.e TIR 14.3.e verifies during outages that each testable valve in any inaccessible area is visually inspected to be in its correct position. The test is performed during each cold shutdown exceeding 24 hours unless the TIR was performed in the previous 92 days. The verification is to be performed each 92 days during extended outages. The frequency for the TIR is based on the assumption that the required valves cannot be tested until the plant is in cold shutdown for more than 24 hours. Valves that are locked, sealed, or otherwise secured in position need only be verified to be locked, sealed, etc. since these were verified to be in the correct position before locking, sealing, or securing. A frequency of 92 days during outages has been established and is more conservative than the inspection criteria established for primary system valves that are locked, sealed, etc. The expected frequency for this testing is each unit's Refueling Outage and is based on operating experience.

BASES – OPERATING REQUIREMENTS (OR)
CARBON DIOXIDE (CO_2) SUPPRESSION SYSTEMS

B.14.4 Carbon Dioxide based fire suppression systems and their associated fire detectors are required to be Operable whenever safety related or FSSD equipment is required to be Operable. The low pressure CO_2 equipment and associated fire detection equipment is provided as a means to directly detect and suppress fires with particular emphasis on preserving the ability to achieve and maintain safe plant shutdown by protecting the fire safe shutdown equipment.

The main emphasis is on early detection to a constantly attended location and automatic actuation of the system for the suppression of a fire while the fire is easily controlled and quickly suppressed before it is capable of damaging fire safe shutdown systems. Two levels of actions are provided in recognition of the varying FSSD impact depending on the location of the fire. The determination whether a single fire can affect redundant FSSD systems or components will be based on whether both FSSD paths are in an area with less than a 3-hour fire barrier separating them. This is consistent with Appendix R in that when 3-hour separation is provided, then suppression and detection are not required. Backup suppression equipment is normally the installed hose stations as discussed in Part II, Section 12.2.

The Operability of the total flooding CO_2 systems is dependent on the discharge areas' compartment integrity provided by the enclosing civil structure. This structure may or may not be a fire-rated assembly. A penetration of such a non-fire-rated or fire-rated assembly would invoke compensatory actions for an inoperative CO_2 system only.

Outputs from the associated fire detection equipment also provide for the automatic shutdown of selected plant fans/air movers and dampers. This output is within the scope of this OR for Function B detectors. This automatic shutdown can directly affect the operation of the total flooding CO_2 system since the original testing was performed with this automatic shutdown. Manual actions could be used to compensate for this automatic shutdown but the delay would be unacceptable.

When a unit is in Modes 5, 6, or core empty, the locations where a continuous fire watch would be required may be combined and patrolled by one or more roving fire watch(es) provided the area only affects the unit in Modes 5, 6, or core empty. While the plant is in cold shutdown or refueling there are fewer systems needed for maintaining cold shutdown and more people present that could detect and report a fire (General Employee Training includes how to report a fire). Roving fire watches provide an adequate level of coverage for these systems by ensuring that potential fire hazards are detected and corrected in a timely manner to prevent fires, or if a fire were to occur, ensuring that timely action is taken.

B.14.4.1 More restrictive compensatory actions are appropriate where the total flooding CO_2 system equipment or associated fire detection equipment are provided to protect redundant safe shutdown systems or components that could be damaged if a fire occurred.

B.14.4.2 Where redundant safe shutdown components could not be damaged if a fire occurred, inoperable total flooding CO_2 system equipment or associated fire detection equipment would necessitate the least restrictive compensatory actions

B.14.4.3 The restoration of the equipment to Operable in 14 days is reasonable based on the type of equipment that is out of service. The time frame is consistent with the standard Technical Specifications.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIR) CARBON DIOXIDE (CO_2) SUPPRESSION SYSTEMS

B.14.4.a TIR 14.4.a verifies that each of the carbon dioxide storage tank level is greater than the capacity needed to provide two normal timed discharges to the single largest hazard, and that each tank pressure is greater than 270 psig. This surveillance ensures that the quantity of carbon dioxide and the pressure in the tanks are adequate for fire suppression. The frequency of seven days has been established based on consensus standard NFPA 12, and has been shown to be acceptable through operating experience and is consistent with standard Technical Specification requirements.

B.14.4.b TIR 14.4.b requires that each valve is visually verified to be in its correct position. This applies to each system's tank shutoff valve and vapor pilot valve. Valves that are locked, sealed, or otherwise secured in position need only be verified to be in the correct position prior to locking, sealing, or securing. No further testing to confirm the valve's position is required to be performed due to the associated hazard of a CO_2 discharge. This surveillance does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned are in the correct position. No NFPA consensus standard requires CO_2 valve position verification on a routine basis. A frequency of 92 days has been established and is more conservative than the inspection criteria established for primary system valves that are locked, sealed, etc.

B.14.4.c TIR 14.4.c requires that the system be demonstrated Operable by verifying that the system's valves, timers, associated ventilation system actions (e.g., fans shutdown and damper closure), fire dampers, and fire door release mechanisms actuate automatically upon receipt of a simulated actuation signal. Manual manipulation of this equipment does not need to be tested since the associated actions are demonstrated during the automatic actuation (e.g., opening of an HVAC fan breaker to stop a fan and shut down a damper is accomplished when the fan is shut down by the automatic actuation). A "puff test" will be performed to ensure that flow from each nozzle can be achieved. Pneumatic actions/responses will be demonstrated by the "puff test" as opposed to the automatic actuation discussed above to provide a more representative test. A pneumatic full flow "puff test" will be accomplished using nitrogen or other suitable gas. The 18 month frequency has been shown to be acceptable through operating experience and is consistent with standard Technical Specification requirements.

B.14.4.d TIR 14.4.d requires that a visual inspection be performed to verify that discharge nozzles are not physically damaged and that the nozzle orifice openings are not externally obstructed. No actual discharge of carbon dioxide (pneumatic full-flow) is required unless inspection results indicate its advisability. The 18 month frequency is based upon the need to keep all four diesel generators operable during unit operation, and is consistent with standard Technical Specification requirements.

BASES – OPERATING REQUIREMENTS (OR)
FIRE DETECTION SUPERVISION

B.14.5 The supervisory function of a zone may be masked in one of two ways:

1. An Alarm condition on a local panel will cause any existing Trouble conditions to clear locally and at the central alarm location. It will also prevent any additional Trouble conditions from being annunciated locally and at the constantly attended location.

2. A Trouble condition on a local panel will prevent additional Trouble conditions from being annunciated at the constantly attended location. Additional Trouble conditions on other zones or circuits will, however, be annunciated on the local panel.

With the supervisory function of a zone listed in Table 14.1 masked by a panel Alarm or Trouble, the supervision must be restored within 8 hours. The 8 hours is reasonable considering: 1) The probability of a zone going into Trouble is minimal; 2) If a zone goes into Trouble, the probability of it being the type of problem that will disable the Alarm function of a

Class A circuit is minimal; 3) If a zone did have the type of problem that would disable the Alarm function, the probability of a fire in that zone is minimal.

If the supervisory function is masked by an annunciation and cannot be unmasked within 8 hours, the zone(s) causing the masking will be jumpered out using appropriate plant procedures and compensatory actions and time limits of Section 14.1, 14.2, 14.3, or 14.4, as appropriate, will be established. A zone(s) jumpered out, that is addressed by Section 14.1, 14.2, 14.3, or 14.4 will have time limitations to establish compensatory measures, defined compensatory measures, time limitations to address the cause of the masking condition, and reporting requirements to address failure to meet the final repair of the zone(s)of 14.1, 14.2, 14.3, and 14.4. Thus additional time limitations and reporting requirements are not needed in OR 14.5 when an OR related zone(s) is jumpered out. A zone(s) not addressed by Section 14.1, 14.2, 14.3, or 14.4 has controls addressed by the plant's loss prevention program and are outside the scope of this OR.

Masking conditions can be caused by equipment defects that cannot be cleared/ removed by jumpering out a zone(s). In such a case, an evaluation must be made to determine the affect the masking condition has on the OR related equipment. Based on this evaluation, then compensatory measures and time limits of Section 14.1, 14.2, 14.3, or 14.4 are established as appropriate. If the masking condition could not be cleared by jumpering but did not cause an entry into an OR for Section 14.1, 14.2, 14.3, or 14.4, then it would still be appropriate to ensure a panel listed in Table 14.5 is returned to normal within 14 days.

Normally a circuit that causes an alarm or trouble condition that result in a masking condition is repaired within 8 hours or taken out of service. Due to special situations, it may be desired to clear this masking condition while maintaining the circuit's functional capability to actuate (i.e., alarm) and to detect grounds and to monitor for internal module failures (i.e., trouble) but not the Class A supervision to detect conductor

failure. In such special conditions, the resulting temporary alteration control form (TACF) will provide the advantage of the circuit remaining alarm functional which is preferable to the lifting the field wiring, jumpering the monitoring module out of service, and thus completely removing any capability of the circuit. An example of this situation is a problem such as a cable between two devices on a circuit must be removed for operational purposes and this would cause a trouble but due to the Class A design of the system the devices would remain functional. If the circuit field wiring was to be lifted at the controlling module and the devices taken completely out of service then the resulting compensatory measures could be an hourly or continuous fire watch. There is an advantage of having the equipment functional for normal automatic operation in lieu of the manual actions of a fire watch and the subsequent fire brigade. The module providing the supervision will continue to monitor itself and report trouble conditions of the module and grounds on the circuit. The propose of OR-14.5.3 is to address the masking concern by applying jumpers to the controlling module to clear the trouble and cause the loss of supervision of the field wiring for a break in the conductors but will allow the circuit actuation capability to remain functional to provide actuation as well as the circuits ability to detect grounds and internal failures of the monitoring module. The device(s) on either side of this lifted cable would be functionally tested for actuation capability at the time the TACF is first installed to ensure the functional actuation capability then periodically tested to ensure the continued integrity of the remainder of the circuit. Should the portion of the circuit taken out of service include an initiating device then the appropriate OR-14.1, -14.3, or -14.4 will be entered for the device taken out of service and OR-14.5.3 will be entered for the balance of the circuit that is actuation functional. This periodic testing of the circuit is expected to be every 7 days for detection circuits and every 6 months for suppression system actuation circuits for automatic valves in the flow path. These frequencies are reasonable due to the configuration and work control processes provided at WBN and the problem reporting process (e.g., corrective action program) that would investigate a condition that might have endangered a circuit. In addition, the 6 month testing frequency for the suppression system actuation circuits for automatic valves in the flow path, is reasonable since the associated detection circuits would still be available to alert plant personnel of any fire. The frequency of 6 months is the same frequency SQN tests similar suppression system actuation circuits for automatic valves in the flow path. The 30 days to correct this condition is reasonable since the problem is of such a nature that the desire for the continued function of the circuit is of sufficient importance that a TACF was generated in lieu of using the 14 day limits the other ORs referenced. This desire includes the advantage of maintaining equipment in an automatic mode instead of the reliance on manual actions coupled with the reliability of the administrative controls to prevent damage to the equipment. The need for the extra time could be caused by such factors as inaccessibility due to radiological or personnel safety reasons. The physical action, lifting the field cable in the above example, is a TACF and will be addressed by appropriate site procedures which will be prepared to establish the requirements to address this condition in advance of its implementation.

The temporary, unique configuration addressed in OR-14.5.3 is not applicable to the zones that report the diesel fire pump (DFP) annunciations to the Main Control Room since these DFP zones are Class B and not Class A in accordance with NFPA-72D.

BASES – OPERATING REQUIREMENTS (OR)
FIRE HOSE STATIONS/STANDPIPES

B.14.6 Fire hose stations listed in Table 14.6, as part of the water suppression system, ensure that adequate manual fire suppression capability is available to confine and extinguish fires occurring in any portion of the facility where safety-related or FSSD equipment is located and to provide backup to primary suppression systems.

B.14.6.1 With one or more of the fire hose stations inoperable, the degree of fire protection provided to safety related equipment and fire safe shutdown equipment is degraded. Consequently, a backup source of fire hose protection must be supplied from the nearest operable fire hose station. This can be accomplished by routing additional fire hose from an Operable water source (hydrant, hose station, etc.) to the affected area; by staging fire hose immediately outside the affected area; or by providing alternate fire suppression equipment commensurable with the fire hazards present. Normally the method to do this is by providing a gated wye(s) and additional fire hose at the nearest operable fire hose station. In some instances, the physical routing of fire hoses from the Operable hose station to the inoperable hose station may result in a recognizable hazard to operating technicians, plant equipment (e.g., breaching a fire barrier), or the hose itself. In such cases, the hose will be appropriately stored at the operable hose station. The completion time of eight hours is reasonable since normally the responding fire brigade would bring additional fire hose. In addition, this hose is not for occupant use but restricted for use by trained firefighting personnel.

The hose stations in the Reactor Buildings' Lower Containment require special consideration. To provide protection during outages (during Modes 5, 6, or core empty), appropriate lengths of hose and nozzles are provided at the fire protection Siamese connection located at the entrance to Lower Containment. In Modes 1 through 4 these hoses are not required since occupancy and access is limited, thus personnel are normally not available locally to use this manual means of firefighting. The hose station valves and water supply will be maintained operable. Extra hose and nozzles are available in the Fire Equipment Cages in the plant in case of an emergency.

B.14.6.2 Restoration of the equipment to Operable status within 14 days is reasonable considering the equipment involved. The time frame is consistent with the standard Technical Specifications.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIR) FIRE HOSE STATIONS/STANDPIPES

B.14.6.a TIR 14.6.a requires performance of a visual inspection of the fire hose stations in any accessible area to assure all required equipment is at the station and the station is not blocked or obstructed. The frequency of 92 days is considered reasonable in view of the infrequent problems found with hoses and is based on operating experience.

B.14.6.b TIR 14.6.b verifies the correct alignment for testable valves (except hose valves) in any accessible area in the fire hose station/standpipe system flow paths and provides assurance that the proper flow paths will exist for hose station operation. Valves that are locked, sealed, or otherwise secured in position need only be verified to still be locked, sealed, etc., since these were verified to be in the correct position prior to locking, sealing, or securing. This inspection does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned and preventing or inhibiting fire suppression activities are in the correct position. A frequency of 92 days has been established and is more conservative than the inspection criteria established for primary systems valves that are locked, sealed, etc.

B.14.6.c TIR 14.6.c ensures that each testable valve (except hose valves) in any accessible area will travel through at least one cycle. This TIR is necessary to ensure the valves are Operable in the event of an actuation for fire suppression needs. A frequency of 12 months has been established based on operating experience, and is consistent with standard Technical Specification requirements and NFPA consensus standard 25 criteria.

B.14.6.d TIR 14.6.d requires that fire hose, associated with fire hose stations identified in Table 14.6 and stored in unheated areas, undergo a hydrostatic test once every 12 months. This hydrostatic test ensures that the hose is reliable and can withstand the working fire main pressure. Appropriate manufacturers' markings or initials and date by test personnel are sufficient to document this hydrostatic test. The manufacturers' markings are done in accordance with industry consensus standards. Initials and date by test personnel are sufficient to ensure proper controls are maintained. The frequency of 12 months is based upon regulatory guidelines, has been shown to be acceptable through operating experience, and is consistent with standard Technical Specification requirements.

B.14.6.e TIR 14.6.e ensures that each dry standpipe water flow device actuates to its correct position upon an initiation signal. The dry standpipe control valve is a deluge valve for which there is limited means to ensure a complete cycle of travel is achieved. For cycling these valves, the industry practice of closing the isolation valve all but a few turns until the deluge valve opens and then completing the closing of the isolation valve. Also, each testable valve in any inaccessible area will travel through at least one cycle. The pushbuttons associated with these hose stations in the Reactor Buildings not only provide a means to open the deluge valve that allows water into the normally dry standpipe system as discussed in Section 12.2 but also start the fire pumps. Although these Reactor Building hose stations are manual and plant personnel are trained to report a fire before fighting it, there are no administrative controls to ensure the deluge valve is activated as there are for the start of the electric motor driven fire pump(s). Therefore, these push buttons are tested. Any other

pushbuttons provided at hose stations other than the Reactor Buildings for manual start of the fire pumps are not tested as part of this TIR. The 18 month frequency for accessible areas and each unit's Refueling Outage frequency for inaccessible areas was developed considering the scope and requirements of some tests and inspections can only be performed during a unit outage. Operating experience has shown these components routinely pass the TIR when performed on the 18 month/Refueling Outage frequency. Therefore, the frequency was concluded to be acceptable from a reliability standpoint, and is consistent with standard Technical Specification requirements.

B.14.6.f TIR 14.6.f requires performance of a visual inspection of the fire hose stations that are in any inaccessible area to assure all required equipment is at the station and the station is not blocked or obstructed. The Refueling Outage frequency was developed considering that many tests and inspections can only be performed during a unit outage. Operating experience has shown these components routinely pass the TIR when performed on each unit's Refueling Outage frequency. Therefore, the frequency was concluded to be acceptable from a reliability standpoint, and is consistent with standard Technical Specification requirements.

B.14.6.g TIR 14.6.g requires removal of each fire hose for inspection of the hose condition and gaskets in the hose couplings. Degraded gaskets and/or hoses require replacement. Following inspection and gasket and/or hose replacement, the fire hose must be reracked, preferably at different folds. The 18 month or Refueling Outage frequency was developed considering that some areas can only be accessed during a unit outage, and is consistent with standard Technical Specification requirements.

B.14.6.h TIR 14.6.h requires that fire hose, associated with fire hose stations identified in Table 14.6 and stored in a heated area, undergo a hydrostatic test once every three years. This hydrostatic test ensures that the hose is reliable and can withstand the working fire main pressure. Appropriate manufacturers' markings or initials and date by test personnel are sufficient to document this hydrostatic test. The manufacturers' markings are done in accordance with industry consensus standards. Initials and date by test personnel are sufficient to ensure proper controls are maintained. The frequency of three years is based upon regulatory guidelines, has been shown to be acceptable through operating experience, and is consistent with standard Technical Specification requirements.

B.14.6.i TIR 14.6.i verifies the Operability of each fire hose station valve by partially opening the hose station valve with limited water flow. In the case of selected areas such as the Reactor Building, this flow test can use air in order to address the ALARA concerns. The period of three years between tests is reasonable because the infrequent use of the fire hoses provides for little opportunity for physical degradation or buildup of silt or other obstructions. This surveillance frequency and criteria is consistent with standard Technical Specifications.

B.14.6.j TIR 14.6.j verifies correct alignment during outages for each testable valve (except hose valves) in any inaccessible area in the fire hose station/standpipe system flow path and provides assurance that the proper flow paths will exist for hose station operation. The test is performed during each cold shutdown exceeding 24 hours unless the TIR was performed in the previous 92 days. The verification is to be performed each 92 days during extended outages. The frequency for the TIR is based on the assumption that the required valves cannot be tested until the plant is in cold shutdown for more than 24 hours. Valves that are locked, sealed, or otherwise

secured in position need only be verified to be locked, sealed, etc. since these were verified to be in the correct position before locking, sealing, or securing. A frequency of 92 days during outages has been established and is more conservative than the inspection criteria established for primary system valves that are locked, sealed, etc. The expected frequency for this testing is each refueling outage and is based on operating experience.

BASES – OPERATING REQUIREMENTS (OR)
FIRE HYDRANTS

B.14.7 Fire hydrants listed in Table 14.7, as part of the water suppression system, ensure that adequate fire suppression capability is available to provide coverage for selected portions of safety-related structures.

The Intake Pumping Station uses fire hydrants as a backup water source for fire hoses used in manual firefighting. For the Diesel Generator Building's Conduit Interface Room, the fire hydrants are the primary and backup water source for fire hoses used in manual firefighting.

Although the specific fire hydrants in Table 14.7 are to remain operable while the safety related or FSSD equipment in the areas is required to be operable, one hydrant (specified in the table) may be inoperable as long as the alternate hydrant remains operable in its place. In the case that the specified hydrant becomes inoperable, it is acceptable for this hydrant to remain such for as long as necessary, since adequate fire suppression capability is provided by the alternate hydrant.

B.14.7.1 With one or more of the fire hydrants inoperable, the degree of fire protection provided to safety-related equipment and fire safe shutdown systems is degraded. Consequently, a backup source of water must be supplied from the nearest Operable water supply whether it is another Operable fire hydrant or a hose station. This is done by providing a gated wye(s) at the nearest Operable water source. In some instances, the physical routing of fire hoses from the Operable water source to the inoperable fire hydrant may result in a recognizable hazard to operating personnel, plant equipment (e.g., breaching fire barriers), or the hose itself. In such cases, the hose will be appropriately stored at the Operable water source with the hose dedicated for hydrant use. The completion time of eight hours is reasonable since normally the responding fire brigade would bring additional fire hose. In addition, this hose is not for occupant use, but restricted for use by trained firefighting personnel.

B.14.7.2 Restoration of the equipment to Operable status within 28 days is reasonable considering the restraints to getting to (i.e., digging up) and restoring (i.e., cure time for concrete thrust blocks) the equipment involved.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIR)
FIRE HYDRANTS

B.14.7.a TIR 14.7.a requires performance of a visual inspection of the fire hose equipment dedicated to support the use of fire hydrants for manual fire fighting. This assures all required equipment is at the assigned location and is available for use. The frequency of 92 days is considered reasonable in view of the infrequent use of the hose, and is consistent with operating experience.

B.14.7.b TIR 14.7.b verifies the correct alignment for testable valves in any accessible area in the fire hydrant flow path and provides assurance that the proper flow paths will exist for fire hydrant operation. Valves that are locked, sealed, or otherwise secured in position need only be verified to still be locked, sealed, etc., since these were verified to be in the correct position prior to locking, sealing, or securing. This inspection does not require any testing or valve manipulation. Rather, it involves verification that those valves, capable of being mispositioned and preventing or inhibiting fire suppression activities, are in the correct position. A frequency of 92 days has been established and is more conservative than the inspection criteria in standard Technical Specifications for safety system valves that are locked, sealed, etc.

B.14.7.c TIR 14.7.c this visual inspection ensures accessibility and condition of the fire hydrants. Fire hydrants are more likely subject to mechanical damage due to their normal locations. The six-month frequency is needed to ensure continued Operability. The frequency of six months is based on industry operating experience and is consistent with standard Technical Specification requirements.

B.14.7.d TIR 14.7.d requires that fire hose dedicated to support fire hydrant use undergo a hydrostatic test once every 12 months. This hose is normally located on a motorized apparatus and will be periodically exposed to uncontrolled environmental conditions, mainly atmospheric temperature extremes. This hydrostatic test ensures that the hose is reliable and can withstand the working fire main pressure. Appropriate manufacturers' markings or initials and date by test personnel are sufficient to document this hydrostatic test. The manufacturers' markings are done in accordance with industry consensus standards. Initials and date by test personnel are sufficient to ensure proper controls are maintained. The frequency of 12 months is based upon regulatory guidelines, has been shown to be acceptable through operating experience, and is consistent with standard Technical Specification requirements and NFPA consensus standard 25 criteria.

B.14.7.e TIR 14.7.e requires that fire hydrants be inspected and operated once every 12 months to ensure proper function and to flow water from the hydrant until perceptible foreign material has cleared. The frequency of 12 months is consistent with standard Technical Specification requirements and NFPA consensus standard 25 criteria.

BASES – OPERATING REQUIREMENTS (OR)
FIRE-RATED ASSEMBLIES

B.14.8 Fire-rated assemblies/fire barriers (including walls, floors, ceilings, penetration seals, fire doors, electrical raceway fire barrier systems [ERFBS] and radiant energy shields, and fire dampers that comprise the fire boundaries separating redundant safe shutdown components) or separating systems important to safe shutdown within a fire area ensure that fires will be confined or adequately retarded from spreading to adjacent portions of the facility prior to detection and extinguishment. Fire-rated assemblies/fire barriers are used in conjunction with other fire protection features such as fire detection and fire suppression systems. Thus, the completion times and compensatory action requirements vary based on the Operability of the other fire protection features. With the exception of electrical raceway fire barrier systems and radiant energy shields, fire-rated assemblies/fire barriers are depicted on drawings in Part II of the FPR. Cables that require protection are routed in raceways enclosed with fire barriers or radiant energy shields and are identified in Part VI of the FPR.

When a unit is in Modes 5, 6, or core empty, the locations where a continuous fire watch would be required may be combined and patrolled by one or more roving fire watch(es) provided the area only affects the unit in Modes 5, 6, or core empty. While the plant is in cold shutdown or refueling there are fewer systems needed for maintaining cold shutdown and more people present that could detect and report a fire (General Employee Training includes how to report a fire). Roving fire watches provide an adequate level of coverage for these systems by ensuring that potential fire hazards are detected and corrected in a timely manner to prevent fires, or if a fire were to occur, ensuring that timely action is taken.

Additionally, during Modes 5, 6, or core empty, it will be necessary to breach some fire barriers for longer than 30 days. These breaches will be excluded from the 10CFR50.72 and 10CFR50.73 reviews. These fire barrier components that will be breached are as follows:

Reactor Building Equipment Hatch Shield Blocks for the unit in outage.

Doors: A64, A65, 77, 78, A156, 157, A164, A165, A166 and A167

The exemption of the 10CFR50.72 and 10CFR50.73 reviews for those identified components that are breached to facilitate the outage for longer than 30 days is consistent with other nuclear station practices. Roving fire watches will be used until the breaches are restored.

Other than that specified above, the time requirements for correcting equipment problems of OR 14.8 will remain the same.

In addition, those fire rated assemblies/fire barriers that are not accessible due to being in long-term high radiation areas are evaluated in Part VII.

B.14.8.1 The fire-rated assemblies/fire barriers are provided as a part of the defense-in-depth concept of fire protection. The degradation of an assembly/barrier is to be reviewed in concert with the other fire protection features available. Thus, this review produces the following:

a. When the assembly/barrier is degraded and there is no fire detection designed to protect both sides of the assembly/barrier, the continuous fire watch is reasonable.

b. When the assembly/barrier is degraded and there is fire detection designed to protect one side of the assembly/barrier, then a roving fire watch is reasonable.

c. When the assembly/barrier is degraded and there is suppression and fire detection designed to protect both sides of the assembly/barrier, then no compensatory action is reasonable.

The Operability or inoperability of the suppression or fire detection does not need to be addressed in the cases of degraded assemblies/barriers. This is because of the fact that an inoperable suppression or fire detection system/feature that protects Operable safety-related and FSSD equipment has its own compensatory actions.

B.14.8.2 The completion time of 30 days is reasonable based on the curing time of common fire barrier materials.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIR)
FIRE-RATED ASSEMBLIES

B.14.8.a TIR 14.8.a ensures that fire doors are in the correct position, free to close, and the door is not damaged. NFPA consensus standards do not delineate specific frequencies for visual inspections of fire doors. Plant personnel are provided training in General Employee Training of the importance of maintaining fire doors closed and Operable. Plant fire doors are conspicuously identified as fire doors. Therefore, the 31 day frequency is considered acceptable.

B.14.8.b TIR 14.8.b requires a functional test of all associated release and closing mechanisms and latches on fire door assemblies to ensure fire door Operability. The frequency of 12 months is consistent with the guidance found in NFPA 80.

B.14.8.c TIR 14.8.c requires visual inspections of the surface areas of fire-rated barriers to verify Operability. Approximately twenty percent of the barriers will be inspected every 12 months to ensure that all barriers are inspected at least once every five years. Inspection of bellows, metal plates, ERFBS, or insulation covering a penetration seal, provides verification of the fire-rated assembly/fire barrier integrity, provided there is no apparent change in appearance or abnormal degradation. Inspections validate their functional integrity and ensure that fires will be confined or adequately retarded from spreading to adjacent portions of the facility.

The exposed surfaces of the fire-rated assembly/fire barrier will be visually inspected to ensure the integrity of the assembly. Fire dampers are part of the fire-rated assembly/fire barrier. Damper inspection is addressed in the WBN Preventative Maintenance Program. There will be no disassembly of equipment (e.g., removal of damming material, junction box covers, or conduit fitting covers) to perform this visual inspection. Documentation of these inspections will be based on the acceptability of the barrier or barrier portion (i.e., individual sign-offs for each penetration will not be required). The barrier acceptability is used since a failed assembly leads to the barrier being declared inoperable not just the assembly. The surveillance frequency and criteria are considered to be adequate since they are consistent with current industry practice of ensuring all barriers are inspected within 5 years. Although the Standard Technical Specifications call for the inspection of the exposed surfaces of each fire rated assemblies every 18 months, it only required 10% of the penetration seals to be inspected. This results in a delay of 15 years to review all penetration seals. These penetration seals are more susceptible to damage than concrete walls and thus fire safety is increased with the additional inspections.

B.14.8.d TIR 14.8.d requires each unit's Refueling Outage frequency visual inspection of approximately 33-1/3 percent of the surface area of fire rated assemblies/fire barriers to determine Operability. Inspection of bellows, metal plates, ERFBSs, radiant energy shields, or insulation covering a penetration seal, provides verification of the fire rated assembly/fire barrier integrity, provided there is no apparent change in appearance or abnormal degradation. Inspections validate their functional integrity and ensure that fires will be confined or adequately retarded from spreading to adjacent portions of the facility.

The exposed surfaces of the fire-rated assembly/fire barrier will be visually inspected to ensure the integrity of the assembly. There will be no disassembly of equipment (e.g.,

removal of damming material, junction box covers, or conduit fitting covers) to perform this visual inspection. Documentation of these inspections will be based on the acceptability of the barrier or barrier portion (i.e., individual sign-offs for each penetration will not be required). The barrier acceptability is used since a failed assembly leads to the barrier being declared inoperable not just the assembly. The surveillance frequency and criteria are considered conservative since they exceed current industry practice of ensuring all barriers are inspected within 5 years. The frequency for inaccessible areas follows the criteria set out for inspections in accessible areas but adapted to the special circumstances associated with inaccessible areas.

BASES – OPERATING REQUIREMENTS (OR)
EMERGENCY BATTERY LIGHTING UNITS

B.14.9 Emergency battery lighting units are required to support a unit shutdown in the event of a fire and coincident loss of offsite power.

An ability to access and operate fire safe shutdown systems is required as well as the protection of such systems. This ability must be capable of being performed in conjunction with the loss of offsite power. To achieve this, emergency battery lighting units with 8 hour lighting capacity are provided.

B.14.9.1 Section 14.9.1 uses the term "alternate battery lighting" for a temporary substitute for installed emergency battery lighting units. This "alternate battery lighting" generally refers to portable, hand-held lighting as addressed in Section 12.7, "Emergency Lighting" of this report.

B.14.9.2 The restoration of the equipment to Operable in 14 days is reasonable based on the type of equipment that is out of service.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIR)
EMERGENCY BATTERY LIGHTING UNITS

B.14.9.a TIR 14.9.a verifies proper operation of Emergency Battery Lighting (EBL) units by simulating a loss of power. When manually actuated, normal AC power is interrupted to the EBL at the primary or secondary side of the step-down transformer. Thus, the EBL's ability to go from the float charge mode to the discharge mode is fully exercised. This functional test also demonstrates:

1) The EBL is configured for automatic operation and is not in the standby mode
2) The load transfer circuitry is functional
3) The lamps are functional
4) Continuity exists between the battery and all lamps
5) The battery is functional
6) The charging circuit is functional
7) The status indicators are functional

A visual inspection to assess the general condition of the EBL, to detect obvious signs of degradation, and to detect any damage to the unit that may affect Operability is included. The visual inspection can identify degradation mechanisms at an early stage, and in many cases, can warn personnel of an impending failure. Included is a visual inspection to identify electrolyte leakage, and for vented cells, to determine whether water addition is needed. Early detection of battery leakage allows battery replacement before the leakage results in complete battery failure or in severe damage to other EBL components.

The frequency of 92 days for accessible EBLs is based upon vendor recommendations and industry practice. Over time, the optimal inspection frequency will be driven by trending data.

The turbine building standby lighting is not tested as a part of the TIR.

B.14.9.b TIR 14.9.b requires that a battery is replaced periodically as a function of its service life, the environmental conditions the battery will experience, and a safety factor. The service life and the environmental factors are based on information from the manufacturer. This manufacturer's information plus the safety factor results in the frequencies as shown in chart.

B.14.9.c TIR 14.9.c requires that the EBL in inaccessible areas inside the Unit 1 and 2 Annulus be replaced each refueling outage for that unit and that the tests and inspection described under bases 14.9.a be performed to ensure EBL operability. This is being done due to the ALARA considerations in the Reactor Building and the limited accessibility during plant operation. The surveillance frequency and battery replacement are considered conservative and reasonable based on the fact that these are 15 year service life batteries that are being replaced on a refueling outage frequency.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIR)
EMERGENCY BATTERY LIGHTING UNITS

Type of Battery	Environmental Conditions* (ambient temperature)	Service Life (Years)	Replacement Frequency (Years)
Sealed lead acid and calcium alloy	constantly below 95°F	5	3
		15	8
		20	11
Sealed lead acid and calcium alloy	constantly above 95°F	5	1.5
		15	6
		20	8
Sealed lead acid and calcium alloy	Unit 1 and 2 Annulus	15**	Refueling Outage
Solid gel	constantly below 95°F	4	3
Solid gel	constantly above 95°F	4	2

* Based on site environmental drawings for average temperature during normal operation.

**The 15 year service life is for the existing Exide LEC-36. Replacement battery (Sentry PM 6420) has a service life of 5 years. Replacement EBL (Lightguard F-100 w/LC-361 battery) has a service life of 20 years. Regardless of the battery/EBL combination used, the replacement frequency is every refueling outage for batteries in that unit's Annulus.

The replacement method is preferred for the accessible EBL since a periodic, deep discharge (8 hour) test is not recommended by the manufacturer. The refueling outage replacement for inaccessible EBLs is preferred due to ALARA considerations and very limited access to the Reactor Building during operations which means that inspection and testing would only be practical during outages. The frequency and criteria is based on vendor recommendations. The turbine building standby lighting is not tested as a part of the TIR.

BASES – OPERATING REQUIREMENTS (OR)
FIRE SAFE SHUTDOWN EQUIPMENT

B.14.10 A minimum set of plant systems and components has been identified at WBN to ensure that the plant can achieve and maintain safe shutdown in the event of plant fires (see Part III, Safe Shutdown Capabilities). In the majority of cases the identified plant systems and components are addressed by WBN Technical Specifications and Technical Requirements Manual which list surveillance requirements for verifying the Operability of the systems and components. This OR lists the systems and components which are not included as part of a Technical Specification or Technical Requirement.

Thermal overloads that are by-passed during accident conditions must remain operable during normal plant operation. This will ensure that valves that are required for a Control Building fire are not damaged due to a hot short that could by-pass the torque switch. In addition, the thermal overloads are required for limiting current flow in the event of fire induced multiple high impedance faults and documented in the Multiple High Impedance Fault Analysis. The Technical Requirements Manual, Table 3.8.3-1, "Motor-Operated Valves Thermal Overload Devices Which Are Bypassed Under Accident Conditions" provides the list of thermal overloads this statement addresses.

This OR is provided to ensure that systems and components which are required for safe shutdown are maintained operable and tested to ensure operability. The intent of this OR is to ensure the equipment listed in Table 14.10 is capable of performing its FSSD function for the specific unit or both units. To ensure this, equipment listed in Table 14.10 shall satisfy the FSSD Condition listed by being Operable, capable of achieving its FSSD Condition, or in its FSSD Condition. The equipment listed in Table 14.10 is considered inoperable when it is not in or cannot achieve its listed FSSD Condition. The actions are based on Technical Specifications 3.3.4, Remote Shutdown System.

B.14.10.1 With a safe shutdown component shown in Table 14.10 inoperable, the inoperable component must be restored within 30 days when the unit is in modes 1, 2, or 3.

Table 14.10 defines the Fire Safe Shutdown (FSSD) condition as “OPERABLE” for the Temperature Control Valves (TCVs) supplying for the Lower Compartment Coolers (LCCs) and Control Rod Drive Mechanism (CRDM) coolers. In Modes 1, 2, or 3, these valves are required to modulate to control temperature to their respective cooler. “OPERABLE” for these TCVs is a position to ensure that their respective cooler has sufficient cooling flow to maintain the Reactor Building Lower Compartment temperature. Functional Evaluations (FEs) have been performed on a single TCV, and determined that with the TCV in the open position it meets the requirement for FSSD condition.

B.14.10.2 With a breaker and/or valve specified in design output documents as being administratively controlled for Appendix R out of its required position (as noted on the drawing), the breaker and/or valve must be returned to the required position within 30 days when the unit is in Modes 1, 2, or 3. These breakers and/or valves are administratively controlled to prevent inadvertent operation during an Appendix R fire event. There is no TIR associated with the OR since the valves and/or breaker positions are controlled by the applicable System Operating Instruction and the plant's configuration control program.

B.14.10.3 *If the required action and associated completion time are not met, the plant must be* placed in a condition where the OR does not apply. If possible, the inoperable or misconfigured component can be placed in the condition required for safe shutdown (i.e., close a valve, shutdown a pump, lock open a breaker), or a backup instrument can be provided for monitoring temperature, flow, or pressure. If this cannot be accomplished, an evaluation can be performed to justify using an alternate means to achieve compliance with Appendix R FSSD requirements. The evaluation should be performed using the plant's standard review processes (Fire Protection License Condition Impact Evaluation (LCIE), or Fire Protection Program Change Regulatory Review (FPPCRR). The plant's Temporary Control and Alteration process (TACF) along with a 10CFR50.59 review can also be used to provide the alternate means of FSSD compliance. If none of the above actions can be accomplished, the unit must be brought to at least Mode 3 within 6-hours and to Mode 4 within the following 12-hours.

BASES – TESTING AND INSPECTION REQUIREMENTS (TIR)
FIRE SAFE SHUTDOWN EQUIPMENT

B.14.10.a TIR 14.10.a is performance of a terminal voltage check and on alignment check of the plant's 250 VDC Batteries 1 and 2. This provides assurance that the batteries are operable and aligned to the appropriate DC bus. This check will be performed at least once every 31 days when the plant is in modes 1, 2, or 3.

B.14.10.b TIR 14.10.b is performance of a breaker alignment check for the 250 VDC Battery Boards 1 and 2 and Distribution Panels 1 and 2. This check provides assurance that breakers which supply control power to steam load trip circuits and RCP breaker trip circuits are aligned properly. This check will be performed at least once every 31 days when the plant is in modes 1, 2, or 3.

B.14.10.c TIR 14.10.c verifies every 18 months that main steam system valves are capable of being closed via Main Control Room switch or locally by manual operation of the valve. This verifies that each valve operates properly to ensure the isolation of main steam loads should main steam isolation valves become inoperable in the event of fire damage. The valves are tested every 18 months when the unit is shutdown since operation of the valve via the hand switch during operation can cause a reactor trip.

B.14.10.d TIR 14.10.d is performance of a channel calibration on instruments required for safe shutdown. Many of these instruments are required for local operation of plant systems and components during a fire event. The performance of the calibration ensures the accuracy of these instruments should they be required for use. This calibration is performed once per 18 months.

B.14.10.e TIR 14.10.e is performance of in-service testing for the Thermal Barrier Booster Pumps under the augmented in-service testing program. These pumps are needed to support fire safe shutdown requirements. The augmented in-service testing program requires flow verification at least once per 92 days to ensure that the pump is operable.

B.14.10.f TIR 14.10.f verifies every 92 days that RCS Pressurizer Spray Valves are capable of being closed from the Main Control Room controller. The valves are tested every 92 days (quarterly) in accordance with the augmented in-service testing program.

B.14.10.g TIR 14.10.g verifies every 18 months that the Control Rod Drive Cooler Motors and associated dampers operate properly from MCR controls. The CRDM Coolers and dampers are tested every 18 months when the unit is shutdown since these coolers are normally in operation during unit operation. Also, cycling these coolers on and off during plant operation could have an adverse effect on the Rod Position Indication System.

B.14.10.h TIR 14.10.h verifies every 18 months that the Generator Control System Solenoid can be operated from its associated hand switch in the MCR. This test is performed every 18 months when the unit is shutdown since operation of this solenoid will cause a unit trip. The solenoid is tested every 18 months as part of the Technical Requirements Surveillance Program.

B.14.10.i TIR 14.10.i verifies every 18 months that the Lower Compartment Cooler System Temperature Control Valves (TCVs) operate properly from MCR controls. The TCVs

are tested every 18 months when the unit is shutdown since these coolers are required for Containment cooling during unit operation.

B.14.10.j TIR 14.10.j.a verifies every 31 days that the nitrogen tanks have the quantity and pressure of nitrogen required for operation of the valves. This check will be performed at least once every 31 days when the plant is in modes 1, 2 or 3.

TIR 14.10.j.b verifies every 18 months that the SG PORVs and AFW LCVs can be operated properly from backup control stations using the compressed nitrogen. The PORVs and LCVs are tested every 18 months when the unit is shutdown since these valves are required to be operable per plant Technical Specifications when the plant is in operating modes 1 through 4 and testing these valves utilizing the nitrogen system would make the valves inoperable.

B.14.10.k TIR 14.10.k verifies every 92 days that the Auxiliary Control Air Compressors are capable of starting automatically if the air receiver pressure drops below a pre-established setpoint. Re-establishing and maintaining system pressure ensure adequate capacity to meet the needs of the small set of components credited for remote pneumatic operation during Fire Safe Shutdown.

B.14.10.l TIR-14.10.l is for tracking only. The thermal overload bypass devices are tested by the Technical Requirements Manual and no further testing is needed. The concern for the FPR is for the overloads to be bypassed and thus defeating their protection features as addressed in the bases to OR-14.10. This provides a method for the surveillance program to ensure OR-14.10 is entered should the associated tests not be performed and the overloads are bypassed.

B.14.10.m TIR 14.10.m verifies every 18 months that the CREATCS Appendix R transfer switches (0-XS-31-12-A and 0-XS-31-11-B) function as intended by the performance of a continuity check. This will ensure that CREATCS is available for local control during an Appendix R fire that takes out the normal control circuit. The continuity test is consistent with the surveillance requirements for other safety-related transfer switches (reference Technical Specification Bases SR3.3.4.2).

B.14.10.n TIR 14.10.n verifies every 18 months the remote switches for P-Auto operate correctly when the associated transfer switch is in AUX. This testing is consistent with the surveillance requirements for these switches (reference Technical Specification SR3.3.2, 3.3.3, 3.3.4 and 3.7.5).

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 1 OF 10)

A. Diesel Generator Building		Total Number of Instruments**	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
1	Diesel Gen. Room 2B-B, El. 742	0/5	
2	Diesel Gen. Room 2B-B, El. 742	0/5	
3	Diesel Gen. Room 1B-B, El. 742	0/5	
4	Diesel Gen. Room 1B-B, El. 742	0/5	
5	Diesel Gen. Room 2A-A, El. 742	0/5	
6	Diesel Gen. Room 2A-A, El. 742	0/5	
7	Diesel Gen. Room 1A-A, El. 742	0/5	
8	Diesel Gen. Room 1A-A, El. 742	0/5	
9	Lube Oil Storage Room, El. 742	0/1	
10	Lube Oil Storage Room, El. 742	0/1	
11	Fuel Oil Transfer Room, El. 742	0/1	
12	Fuel Oil Transfer Room, El. 742	0/1	
13	Diesel Gen. Corridor, El. 742		0/6
14	Air Intake & Exhaust Room 2B, El. 760	10/0	
15	Air Intake & Exhaust Room 1B, El. 760	10/0	
16	Air Intake & Exhaust Room 2A, El. 760	10/0	
17	Air Intake & Exhaust Room 1A, El. 760	10/0	
18	Diesel Gen. 2B-B Relay Bd. El. 742		3/0
19	Diesel Gen. 1B-B Relay Bd. El. 742		3/0
20	Diesel Gen. 2A-A Relay Bd. El. 742		3/0
21	Diesel Gen. 1A-A Relay Bd. El. 742		3/0
22	Diesel Gen. Board Room 2B-B, El. 760	0/2	
23	Diesel Gen. Board Room 2B-B, El. 760		0/2
24	Diesel Gen. Board Room 1B-B, El. 760	0/2	
25	Diesel Gen. Board Room 1B-B, El. 760		0/2
26	Diesel Gen. Board Room 2A-A, El. 760	0/2	
27	Diesel Gen. Board Room 2A-A, El. 760		0/2
28	Diesel Gen. Board Room 1A-A, El. 760	0/2	
29	Diesel Gen. Board Room 1A-A, El. 760		0/2
36	DGB Train B Conduit Entry, El. 742		0/1
37	DGB Train A Conduit Entry, El. 742		0/1
432	DGB Conduit Interface Room		9/0

** - See Table Notation, Page 10 of 10

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 2 OF 10)

B. Control Building		Total Number of Instruments**	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
30	Cable Spreading Room C7-C11, El. 729		0/15
31	Cable Spreading Room C7-C11, El. 729		0/15
32	Cable Spreading Room C7-C11, El. 729		0/15
33	Cable Spreading Room C7-C11, El. 729		0/15
34	Cable Spreading Room C3-C7, El. 729		0/15
35	Cable Spreading Room C3-C7, El. 729		0/15
48	Control Bldg. Corridor, El. 692		0/4
49	Control Bldg. Corridor, El. 692		0/4
50	Mech. Equip Room, C1, El. 692		0/2
51	Mech. Equip Room, C1, El. 692		0/2
52	Mech. Equip Room, C2, El. 692		0/2
53	Mech. Equip Room, C2, El. 692		0/2
54	Battery Room, C5 El. 692		0/3
55	Battery Room, C5 El 692		0/3
56	Battery Bd. Room, C4 El. 692		2/0
57	Battery Bd. Room, C4 El. 692		2/0
58	Battery Bd. Room, C5 El. 692		2/0
59	Battery Bd. Room,C5 El. 692		2/0
60	Battery Room, C6 El. 692		0/3
61	Battery Room, C6 El. 692		0/3
62	Battery Room, C7 El. 692		0/3
63	Battery Room, C7 El. 692		0/3
64	Battery Bd. Room, C8 El. 692		2/0
65	Battery Bd. Room, C8 El. 692		2/0
66	Communications Room, C9 El. 692		0/4
67	Communications Room, C9 El. 692		0/4
68	Mech. Equip Room, C10, El. 692		0/2
69	Mech. Equip Room, C10, El. 692		0/2
149	Cable Spreading Room C3-C7, El. 729		0/15
150	Cable Spreading Room C3-C7, El. 729		0/15
214	Mech. Equip Room, C1, El. 755		0/5
215	Mech. Equip Room, C1, El. 755		0/5
216	CR Filter. B, Duct Det., El. 755		0/1
217	CR Filter. B, Duct Det., El. 755		0/1

(continued)

** - See Table Notation, Page 10 of 10

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 3 OF 10)

B. Control Building (continued)		Total Number of Instruments**	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
218	CR Filter. A, Duct Det., El. 755		0/1
219	CR Filter. A, Duct Det., El. 755		0/1
220	Main CR, El. 755		27/0
221	Tech Support Center, C14 El. 755		0/6
222	Tech Support Center, C14 El. 755		0/6
223	PSO Eng. Shop, C20 El. 755		0/1
224	PSO Eng. Shop, C20 El. 755		0/1
225	Relay Bd. Room, C13 El. 755		11/0
226	Electric Cont. Bds., El. 755		12/0
227	Operation Living Area, El. 755	0/4	0/4
228	Operation Living Area, El. 755		0/8
229	Main Control Bds., El. 755		8/0
267	Aux. Instr. Room, Unit 1, El. 708		0/8
268	Aux. Instr. Room, Unit 1, El. 708	0/10	
269	Computer Room, El. 708		0/4
270	Computer Room, El. 708	0/4	
271	Aux. Instr. Room, Unit 2, El. 708		0/8
272	Aux. Instr. Room, Unit 2, El. 708	0/10	
273	Computer Room Corridor, El. 708		3/0
297	Unit 2 Main Control Boards		8/0
298	Common Main Cont. Bds. & M15, El. 755		12/0
387	Control/Turbine Bldg. Wall	0/26	
412	Duplex Relay Bds., El. 755		4/0

** - See Table Notation, Page 10 of 10

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 4 OF 10)

C. Auxiliary Building

ZONE	INSTRUMENT LOCATION	Total Number of Instruments** HEAT (A/B)	SMOKE (A/B)
39	Cont. Spray Pump 1A-A, El. 676		2/0
40	Cont. Spray Pump 1B-B, El. 676		2/0
41	Cont. Spray Pump 2A-A		2/0
42	Cont. Spray Pump 2B-B		2/0
43	RHR Pump 1A-A, El. 676		2/0
44	RHR Pump 1B-B, El. 676		2/0
45	RHR Pump 2A-A		2/0
46	RHR Pump 2B-B		2/0
47	Corridor of Aux. Bldg., El. 676		11/0
70	A5-A11, Col. W-X, El. 692		0/6
71	A5-A11, Col. W-X, El. 692		0/6
72	Aux. FW Pump Turbine 1A-S, El. 692		0/1
73	Aux. FW Pump Turbine 1A-S, El. 692		0/1
74	Aux. FW Pump Turbine 2A-S, El 692		0/1
75	Aux. FW Pump Turbine 2A-S, El 692		0/1
76	U1 S. I. & Charging Pump Rms., El. 692		0/5
77	S. I. Pump Room 1A-A, El. 692		0/1
78	S. I. Pump Room 1B-B, El. 692		0/1
79	Charging Pump Room 1C, El. 692		0/1
80	Charging Pump Room 1B, El. 692		0/1
81	Charging Pump Room 1A, El. 692		0/1
82	U2 SI & Charging Pump Rms. El. 692		0/5
83	SI Pump Room 2A-A, El. 692		0/1
84	SI Pump Room 2B-B, El. 692		0/1
85	Charging Pump Room 2A		0/1
86	Charging Pump Room 2B		0/1
87	Charging Pump Room 2C		0/1
88	Aux. Bldg. Corridor A1-A8, El. 692		0/8
89	Aux. Bldg. Corridor A1-A8, El. 692		0/8
90	Aux. Bldg. Corridor A8-A15, El. 692		0/12
91	Aux. Bldg. Corridor A81-A15, El. 692		0/12
92	Aux. Bldg. Corridor U-W, El. 692		0/4
93	Aux. Bldg. Corridor U-W, El. 692		0/4
94	Unit 1 Pipe Gallery, El. 692		0/2
95	Unit 1 Pipe Gallery, El. 692		0/2
96	Unit 2 Pipe Gallery, El. 692		0/2

(continued)

** - See Table Notation, Page 10 of 10

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 5 OF 10)

C. Auxiliary Building (continued)

ZONE	INSTRUMENT LOCATION	Total Number of Instruments** HEAT (A/B)	SMOKE (A/B)
97	Unit 2 Pipe Gallery, El. 692		0/2
98	Cntmt. Purge Air Filter., A & B, Duct Det., El. 713		0/2
99	Cntmt. Purge Air Filter., A & B, Duct Det., El. 713		0/2
100	Unit 2 Containment Purge Air Filter A & B		0/2
101	Unit 2 Containment Purge Air Filter A & B		0/2
102	Unit 1 Pipe Gallery, El. 713		0/4
103	Unit 1 Pipe Gallery, El. 713		0/4
104	Unit 2 Pipe Gallery, El. 713		0/4
105	Unit 2 Pipe Gallery, El. 713		0/4
106	Aux. Bldg. Corridor A5-11, Col. T-W, El. 713		0/8
107	Aux. Bldg. Corridor A5-11, Col. T-W, El. 713		0/8
108	Radio Chemical Lab. Area, El. 713		0/3
109	Radio Chemical Lab. Area, El. 713		0/3
110	Aux. Bldg. A1-A8, Col. Q-U, El. 713		0/24
111	Aux. Bldg. A1-A8, Col. Q-U, El. 713		0/22
112	Aux. Bldg. A8-A15, Col. Q-U, El. 713		0/15
113	Aux. Bldg. A8-A15, Col. Q-U, El. 713		0/15
114	Waste Packaging Area, El. 729		0/3
115	Waste Packaging Area, El. 729		0/3
116	Cask Loading Area, El. 729	0/2	
117	Cask Loading Area, El. 729	0/2	
118	Nitrogen Storage Area		4/0
120	Aux. Bldg. Gas Trtmt. Filter., U1, El. 737		0/1
121	Aux. Bldg. Gas Trtmt. Filter., U1, El. 737		0/1
123	Vol. Control Tank Room 1A, El 713		0/3
125	Vol. Control Tank Room 1A, El 713		0/3
126	Unit 2 Post Accident Sampling Facility		0/3
127	Unit 2 Post Accident Sampling Facility		0/3
128	Post Accident Samp. Fac. U1, El. 729		0/3
129	Post Accident Samp. Fac. U1, El. 729		0/3
130	Ventilation & Purge Air Room, U2, El. 737		0/5
131	Ventilation & Purge Air Room, U2, El. 737		0/5
132	Ventilation & Purge Air Room, U2, El. 737		0/5
133	Ventilation & Purge Air Room, U2, El. 737		0/5
134	Aux. Bldg. A5-A11, Col. U-W, El. 737		0/7
135	Aux. Bldg. A5-A11, Col. U-W, El. 737		0/7

(continued)

** - See Table Notation, Page 10 of 10

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 6 OF 10)

C. Auxiliary Building (continued)		Total Number of Instruments**	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
136	Heating & Vent Room, U1, El. 737		0/5
137	Heating & Vent Room, U1, El. 737		0/5
138	Heating & Vent Room, U2, El. 737		0/5
139	Heating & Vent Room, U2, El. 737		0/5
140	Hot Instrument Shop, El. 737		0/1
141	Hot Instrument Shop, El. 737		0/1
142	Aux. Bldg. A1-A8, Col. Q-U, El. 737		0/13
143	Aux. Bldg. A1-A8, Col. Q-U, El. 737		0/13
144	Aux. Bldg. A8-A15, Col. Q-U, El. 737		0/10
145	Aux. Bldg. A8-A15, Col. Q-U, El. 737		0/10
146	N2 Storage, El. 729		4/0
147	Aux. Bldg Gas Trtmt. Filter. U2, El. 737		0/1
148	Aux. Bldg Gas Trtmt. Filter, U2, El. 737		0/1
151	Volume Control Tank 2A		0/3
152	Volume Control Tank 2A		0/3
156	Unit 1 Reactor Bldg. Access Room, El. 757		0/2
157	Unit 1 Reactor Bldg. Access Room, El. 757		0/2
158	Unit 2 Reactor Bldg. Access Room, El 757		0/2
159	Unit 2 Reactor Bldg. Access Room, El 757		0/2
160	Spare Room (Reverse Osmosis), El. 757, A4-V		0/4
161	Spare Room (Reverse Osmosis), El. 757, A4-V		0/4
162	EGTS Room, El. 757		0/3
163	EGTS Room, El. 757		0/3
164	EGTS Filter. A, El. 757		0/1
165	EGTS Filter. A, El. 757		0/1
166	EGTS Filter. B, El. 757		0/1
167	EGTS Filter. B, El. 757		0/1
168	Reactor Bldg. Equip. Hatch, El. 757 Unit 1		0/1
169	Reactor Bldg. Equip. Hatch, El. 757 Unit 1		0/1
170	Reactor Bldg. Equip. Hatch, El. 757 Unit 2		0/1
171	Reactor Bldg. Equip. Hatch, El. 757 Unit 2		0/1
172	Unit 1 Mech. Eqpt. Room, El. 757		0/1
173	Unit 1 Mech. Eqpt. Room, El. 757		0/1
174	Unit 2 Mech. Eqpt. Room, El. 757		0/1
175	Unit 2 Mech. Eqpt. Room, El. 757		0/1
176	480V Shtdn Bd. Room 1A1, El. 757		0/2
			(continued)

** - See Table Notation, Page 10 of 10

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 7 OF 10)

C.	Auxiliary Building (continued)	Total Number of Instruments **	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
177	480V Shtdn Bd. Room 1A1, El. 757		0/2
178	480V Shtdn Bd. Room 1A2, El. 757		0/2
179	480V Shtdn Bd. Room 1A2, El. 757		0/2
180	480V Shtdn Bd. Room 1B1, El. 757		0/2
181	480V Shtdn Bd. Room 1B1, El. 757		0/2
182	480V Shtdn Bd. Room 1B2, El. 757		0/3
183	480V Shtdn Bd. Room 1B2, El. 757		0/3
184	6.9 kV Shtdn. Bd. Room A, El. 757		0/7
185	6.9 kV Shtdn. Bd. Room A, El. 757		0/7
186	6.9 kV Shtdn. Bd. Room B, El. 757		0/7
187	6.9 kV Shtdn. Bd. Room B, El. 757		0/7
188	480V Shtdn Bd. Room 2A1, El. 757		0/2
189	480V Shtdn Bd. Room 2A1, El. 757		0/2
190	480V Shtdn Bd. Room 2A2, El. 757		0/3
191	480V Shtdn Bd. Room 2A2, El. 757		0/3
192	480V Shtdn Bd. Room 2B1, El. 757		0/2
193	480V Shtdn Bd. Room 2B1, El. 757		0/2
194	480V Shtdn Bd. Room 2B2, El. 757		0/2
195	480V Shtdn Bd. Room 2B2, El. 757		0/2
196	125V Batt. Bd. Room, I, El. 757		2/0
198	125V Batt. Bd. Room, II, El. 757		2/0
200	125V Batt. Bd. Room, III, El. 757		2/0
202	125V Batt. Bd. Room, IV, El. 757		2/0
204	Aux. CR, El. 757		0/2
205	Aux. CR, El. 757		0/2
206	Aux. Cr Inst. Room 1A, El. 757		0/1
207	Aux. Cr Inst. Room 1A, El. 757		0/1
208	Aux. Cr Inst. Room 1B, El. 757		0/1
209	Aux. Cr Inst. Room 1B, El. 757		0/1
210	Aux. Cr Inst. Room 2A, El. 757		0/1
211	Aux. Cr Inst. Room 2A, El. 757		0/1
212	Aux. Cr Inst. Room 2B, El. 757		0/1
213	Aux. Cr Inst. Room 2B, El. 757		0/1
230	Aux. CR Bds. L-4A, 4C, 11A & 10, El. 757		12/0
			(continued)

** - See Table Notation, Page 10 of 10

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 8 OF 10)

C. Auxiliary Building (continued)		Total Number of Instruments**	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
233	Control Rod Dr Equip. Room, U2, El.782		0/4
234	Control Rod Dr Equip. Room, U2, El.782		0/4
235	Control Rod Dr Equip. Room, U1, El.782		0/4
236	Control Rod Dr Equip. Room, U1, El.782		0/4
237	Unit 1 Mech. Eqpt. Room, El. 772		0/2
238	Unit 1 Mech. Eqpt. Room, El. 772		0/2
239	Unit 2 Mech. Eqpt. Room, El. 772		0/2
240	Unit 2 Mech. Eqpt. Room, El. 772		0/2
241	480V XFMR Room 1A, El. 772		0/3
242	480V XFMR Room 1A, El. 772		0/3
243	480V XFMR Room 1B, El. 772		0/3
244	480V XFMR Room 1B, El. 772		0/3
245	480V XFMR Room 2A, El. 772		0/3
246	480V XFMR Room 2A, El. 772		0/3
247	480V XFMR Room 2B, El. 772		0/3
248	480V XFMR Room 2B, El. 772		0/3
249	125V Batt. Room, I, El. 772		2/0
251	125V Batt. Room, II, El. 772		2/0
253	125V Batt. Room, III, El. 772		2/0
255	125V Batt. Room, IV, El. 772		2/0
257	480V Bd. Room, 1B, El. 772		0/4
258	480V Bd. Room, 1B, El. 772		0/4
259	480V Bd. Room, 1A, El. 772		0/4
260	480V Bd. Room, 1A, El. 772		0/4
261	480V Bd. Room, 2A, El. 772		0/4
262	480V Bd. Room, 2A, El. 772		0/4
263	480V Bd. Room, 2B, El. 772		0/4
264	480V Bd. Room, 2B, El. 772		0/4
296	Aux. CR Bds. L-4B, 4D, & 11B, El. 757		8/0
330	Pipe Chase, U1, El. , 676, 692, 713		20/0
331	Pipe Chase, U2, El. 676, 692, 713		24/0
441	125V Batt. Room, V, El. 772		0/2
442	125V Batt. Room, V, El. 772		0/2
455	Post Accident Samp. Fac., U1, El.737		0/1
456	Post Accident Samp. Fac., U1, El.737		0/1

** - See Table Notation, Page 10 of 10

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 9 OF 10)

D. Additional Equipment Building		Total Number of Instruments**	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
122	Add. Eqpt. Bldg., U1, El. 729		6/0
124	UHI. Bldg., U2, El 729		6/0
153	. Bldg., U2 El 763.5		4/0
154	Add. Eqpt. Bldg U1, El. 763.5		6/0
231	Add. Eqpt. Bldg., El. 786.5		4/0
232	Add. Eqpt. Bldg., El. 775.25		4/0

E. Intake Pumping Station		Total Number of Instruments**	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
250	ERCW Pump Room, El. 741	4/0	
277	Strainer Room, El. 722		18/0
278	ERCW Pump Room, El. 741	4/0	
405	Elect. Bd. Room, El. 711		0/5
406	Elect. Bd. Room, El. 711		0/5

F. Containment Unit 1		Total Number of Instruments **	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
352	Lower Compt. Coolers, El. 716		4/0
354	Upper Compt. Coolers, El. 801		4/0
356	RCP 2, El. 716	0/2	
357	RCP 2, El. 716	0/2	
360	RCP 1, El. 716	0/2	
361	RCP 1, El. 716	0/2	
364	RCP 3, El. 716	0/2	
365	RCP 3, El. 716	0/2	
368	RCP 4, El. 716	0/2	
369	RCP 4, El. 716	0/2	
372	Reactor Bldg. Annulus		0/26
373	Reactor Bldg. Annulus		0/25
457	Reactor Bldg. Annulus		0/9
458	Reactor Bldg. Annulus		0/8

The fire detection instruments located within the containment are not required to be OPERABLE during the performance of Type A containment leakage rate tests

** - See Table Notation, Page 10 of 10

TABLE 14.1 FIRE DETECTION INSTRUMENTATION
(PAGE 10 OF 10)

G. Containment Unit 2		Total Number of Instruments**	
ZONE	INSTRUMENT LOCATION	HEAT (A/B)	SMOKE (A/B)
353	Lower Compt. Coolers, El. 716		4/0
355	Upper Compt. Coolers, El. 801		4/0
358	RCP 2, El. 716	0/2	
359	RCP 2, El. 716	0/2	
362	RCP 1, El. 716	0/2	
363	RCP 1, El. 716	0/2	
366	RCP 3, El. 716	0/2	
367	RCP 3, El. 716	0/2	
370	RCP 4, El. 716	0/2	
371	RCP 4, El. 716	0/2	
374	Reactor Bldg. Annulus		0/26
375	Reactor Bldg. Annulus		0/25
459	Reactor Bldg. Annulus		0/9
460	Reactor Bldg. Annulus		0/8

The fire detection instruments located within the containment are not required to be OPERABLE during the performance of Type A containment leakage rate tests.

TABLE NOTATION

** **A/B**: A is a number of Function A (early warning fire detection and notification only) instruments.

B is a number of Function B (actuation of fire suppression systems and early warning notification) instruments.

TABLE 14.3 WATER BASED FIRE SUPPRESSION
(Page 1 of 1)

OR SECTION	SPECIFIC SYSTEMS
14.3.a	Unit 1 Reactor Building - RC Pump Area, Annulus 1-FCV-026-219 1-FCV-026-223 Unit 2 Reactor Building – RC Pump Area, Annulus 2-FCV-026-219 2-FCV-026-223
14.3.b	Auxiliary Building - El 692, 713, 729, 737, 757, 772, 782 0-FCV-026-191 0-FCV-026-187 0-FCV-026-183 0-FCV-026-143 and 0-FCV-026-322 0-FCV-026-151 and 0-FCV-026-326 0-FCV-026-147
14.3.c	Auxiliary Building - ABGTS Filters, EGTS Filters, Unit 1 and 2 Containment Purge Air Exhaust Filters, 125V Battery and Battery Board Rooms 1-FCV-026-163 2-FCV-026-171 0-FCV-026-175 0-FCV-026-179 1-FCV-026-159 2-FCV-026-155 0-ISV-026-996 0-ISV-026-997 0-ISV-026-998 0-ISV-026-999
14.3.d	Control Building - El 692, Cable Spreading Room, Operator Living Area 0-FCV-026-203 0-FCV-026-207 0-FCV-026-211
14.3.e	Control Building - MCR Air Filters 0-FCV-026-215
14.3.f	Diesel Building - Corridor Area 0-FCV-026-167
14.3.g	Intake Pump Station 0-FCV-026-26
14.3.h	Turbine Building - Control Building Wall 0-FCV-026-199

Table 14.5 FIRE DETECTION PANELS
PAGE 1 OF 1

Panel Number	Building	Elevation
0-PNL-013-L600	Control	741
0-PNL-013-L601	Control	741
0-PNL-013-L602	Control	708
0-PNL-013-L603	Control	692
0-PNL-013-L604	Control	692
0-PNL-013-L605	Auxiliary	772
0-PNL-013-L606	Auxiliary	772
0-PNL-013-L607	Auxiliary	772
0-PNL-013-L608	Auxiliary	713
0-PNL-013-L609	Auxiliary	713
0-PNL-013-L610	Auxiliary	782
0-PNL-013-L611	Auxiliary	782
0-PNL-013-L612	Intake Pump Station	711
0-PNL-013-L613	Auxiliary	757
0-PNL-013-L614	Auxiliary	757
0-PNL-013-L615	Auxiliary	757
0-PNL-013-L616	Auxiliary	757
0-PNL-013-L617	Auxiliary	757
0-PNL-013-L618	Auxiliary	757
0-PNL-013-L619	Diesel Generator	742
0-PNL-013-L620	Diesel Generator	742
0-PNL-013-L621	Diesel Generator	760
0-PNL-013-L622	Diesel Generator	742
0-PNL-013-L623	Auxiliary	737
0-PNL-013-L624	Auxiliary	737
0-PNL-013-L625	Auxiliary	737
0-PNL-013-L626	Auxiliary	692
0-PNL-013-L627	Auxiliary	692
0-PNL-013-L628	Auxiliary	692
0-PNL-013-L629	Auxiliary	676
0-PNL-013-L630	Turbine	729
0-PNL-013-L631	Turbine	729
0-PNL-013-L636	Control	708
0-PNL-013-L637	Control	708
0-PNL-013-L638	Control	708

TABLE 14.6 FIRE HOSE STATIONS
(PAGE 1 OF 4)

LOCATION	ELEVATION	HOSE RACK #
DIESEL GENERATOR BUILDING		
Corridor	742	0-26-1077
Air Exhaust 2B Room	760	0-26-1082
Entrance to 1A Elec. Bd. Room	760	0-26-1080

LOCATION	ELEVATION	HOSE RACK #
UNIT 1 REACTOR BUILDING		
Reactor Coolant Pumps (*)	702	1-26-1220
Reactor Coolant Pumps (*)	702	1-26-1221
Reactor Coolant Pumps (*)	702	1-26-1222
Reactor Coolant Pumps (*)	702	1-26-1223
Reactor Coolant Pumps (*)	702	1-26-1224
Reactor Coolant Pumps (*)	702	1-26-1225
Standpipe R. Bldg. Annulus	Platform 702	1-26-1216
Standpipe R. Bldg. Annulus	Platform 702	1-26-1217
Standpipe R. Bldg. Annulus	Platform 702	1-26-1218
Standpipe R. Bldg. Annulus	Platform 702	1-26-1219
Standpipe R. Bldg. Annulus	Platform 724	1-26-1212
Standpipe R. Bldg. Annulus	Platform 724	1-26-1213
Standpipe R. Bldg. Annulus	Platform 724	1-26-1214
Standpipe R. Bldg. Annulus	Platform 724	1-26-1215
Standpipe R. Bldg. Annulus	Platform 744	1-26-1208
Standpipe R. Bldg. Annulus	Platform 744	1-26-1209
Standpipe R. Bldg. Annulus	Platform 744	1-26-1210
Standpipe R. Bldg. Annulus	Platform 744	1-26-1211
Standpipe R. Bldg. Annulus	Platform 763	1-26-1204
Standpipe R. Bldg. Annulus	Platform 763	1-26-1205
Standpipe R. Bldg. Annulus	Platform 763	1-26-1206
Standpipe R. Bldg. Annulus	Platform 759	1-26-1207
Standpipe R. Bldg. Annulus	Platform 782	1-26-1200
Standpipe R. Bldg. Annulus	Platform 782	1-26-1201
Standpipe R. Bldg. Annulus	Platform 782	1-26-1202
Standpipe R. Bldg. Annulus	Platform 801	1-26-1196
Standpipe R. Bldg. Annulus	Platform 801	1-26-1197
Standpipe R. Bldg. Annulus	Platform 801	1-26-1198
Standpipe R. Bldg. Annulus	Platform 801	1-26-1199

(*) NOTE: Hoses and nozzles are provided at the Siamese connection (1-26-674 and 1-26-675) at the entrance to Unit 1 Reactor Building Lower Containment for outages.

TABLE 14.6 FIRE HOSE STATIONS
(PAGE 2 OF 4)

LOCATION	ELEVATION	HOSE RACK #
UNIT 2 REACTOR BUILDING		
Reactor Coolant Pumps (*)	702	2-26-1220
Reactor Coolant Pumps (*)	702	2-26-1221
Reactor Coolant Pumps (*)	702	2-26-1222
Reactor Coolant Pumps (*)	702	2-26-1223
Reactor Coolant Pumps (*)	702	2-26-1224
Reactor Coolant Pumps (*)	702	2-26-1225
Standpipe R. Bldg. Annulus	Platform 702	2-26-1216
Standpipe R. Bldg. Annulus	Platform 702	2-26-1217
Standpipe R. Bldg. Annulus	Platform 702	2-26-1218
Standpipe R. Bldg. Annulus	Platform 702	2-26-1219
Standpipe R. Bldg. Annulus	Platform 724	2-26-1212
Standpipe R. Bldg. Annulus	Platform 724	2-26-1213
Standpipe R. Bldg. Annulus	Platform 724	2-26-1214
Standpipe R. Bldg. Annulus	Platform 724	2-26-1215
Standpipe R. Bldg. Annulus	Platform 744	2-26-1208
Standpipe R. Bldg. Annulus	Platform 744	2-26-1209
Standpipe R. Bldg. Annulus	Platform 744	2-26-1210
Standpipe R. Bldg. Annulus	Platform 744	2-26-1211
Standpipe R. Bldg. Annulus	Platform 763	2-26-1204
Standpipe R. Bldg. Annulus	Platform 763	2-26-1205
Standpipe R. Bldg. Annulus	Platform 763	2-26-1206
Standpipe R. Bldg. Annulus	Platform 759	2-26-1207
Standpipe R. Bldg. Annulus	Platform 782	2-26-1200
Standpipe R. Bldg. Annulus	Platform 782	2-26-1201
Standpipe R. Bldg. Annulus	Platform 782	2-26-1202
Standpipe R. Bldg. Annulus	Platform 782	2-26-1203
Standpipe R. Bldg. Annulus	Platform 801	2-26-1196
Standpipe R. Bldg. Annulus	Platform 801	2-26-1197
Standpipe R. Bldg. Annulus	Platform 801	2-26-1198
Standpipe R. Bldg. Annulus	Platform 801	2-26-1199

(*) NOTE: Hoses and nozzles are provided at the Siamese connection (2-26-674 and 2-26-675) at the entrance to Unit 2 Reactor Building Lower Containment for outages.

TABLE 14.6 FIRE HOSE STATIONS
(PAGE 3 OF 4)

LOCATION	ELEVATION	HOSE RACK #
AUXILIARY BUILDING		
A9V	676	0-26-691
A8T	676	0-26-663
A3T	692	1-26-668
A13S	692	2-26-668
A7W	692	0-26-680
A8X	692	0-26-681
A8T	692	0-26-662
A3T	713	1-26-667
A13T	713	2-26-667
A8W	713	0-26-690
A8T	713	0-26-661
A1V	716	ABH-5, Valves 1-26-674 and -675
A15W	716	ABH-5, Valves 2-26-674 and -675
A8X	729	0-26-658
A8X	729	0-26-659
A5X	729	1-26-686
A11X	729	2-26-686
A11Y (in the CDWE Building stairwell)	730	0-26-854
A3T	737	1-26-666
A8W	737	0-26-677
A8T	737	0-26-660
A13T	737	2-26-666
A11Y (in the CDWE Building stairwell)	750	0-26-855
A3T	757	1-26-665
A13T	757	2-26-665
A4U	757	1-26-670
A12V	757	2-26-670
A5X	757	0-26-682
A8T	757	0-26-684
A5U	757	ABH-3, Valves 1-26-671 and -672
A11U	757	ABH-3, Valves 2-26-671 and -672
A5X	763	1-26-693
A11X	763.5	2-26-696
A3T	772	1-26-664
A13T	772	2-26-664
A5X	775	1-26-694
A4U	782	1-26-669
A12V	782	2-26-669
A5X	786.5	1-26-695

TABLE 14.6 FIRE HOSE STATIONS
(PAGE 4 OF 4)

LOCATION	ELEVATION	HOSE RACK #
CONTROL BUILDING		
Stairwell C-1	692	0-26-1194
Stairwell C-1	708	0-26-1193
Stairwell C-1	729	0-26-1192
Stairwell C-1	755	0-26-1191
Stairwell C-2	692	0-26-1189
Stairwell C-2	708	0-26-1188
Stairwell C-2	729	0-26-1187
Stairwell C-2	755	0-26-1186

LOCATION	ELEVATION	HOSE RACK #
INTAKE PUMPING STATION		
Electrical Board Room	711	0-26-595
Electrical Board Room	711	0-26-596
A Strainer Room	722	0-26-594
B Strainer Room	722	0-26-597
A Fire Pump Room	741	0-26-1710
B Fire Pump Room	741	0-26-1711

Table 14.7 FIRE HYDRANTS
(Page 1 of 1)

Hydrant Number	Location
0-HYD-026-574	Intake Pumping Station
0-HYD-026-819	Diesel Generator Building (North-West Corner)
0-HYD-026-535 *	Diesel Generator Building (South-East Corner)
0-HYD-026-1661 **	Diesel Generator Building (North-East Corner)

* - This hydrant may be rendered inoperable as long as hydrant 0-HYD-026-1661 is operable as an alternate hydrant.

** - Hydrant 0-HYD-026-1661 is an alternate hydrant that is to remain operable in the event that hydrant 0-HYD-026-535 becomes inoperable.

TABLE 14.8.1 FIRE DOORS
(PAGE 1 OF 4)

DOOR NUMBER	ROOMS CONNECTING ROOM 1	ROOM 2	DIRECTION	RATING (Hours)	LABEL	EQ/AC (Note
A3	676.0-A8	676.0-A1	S-N	3	A	
A4	676.0-A9	676.0-A1	N-S	3	A	
A5	676.0-A10	676.0-A1	W-E	3	A	
A6	676.0-A11	676.0-A1	W-E	3	A	
A8	676.0-A12	676.0-A1	E-W	3	A	
A9	676.0-A13	676.0-A1	E-W	3	A	
A10	676.0-A14	676.0-A1	N-S	3	A	
A11	676.0-A15	676.0-A1	S-N	3	A	
A12	676.0-A17	676.0-A1	N-S	3	A	
A25	692.0-A1	692.0-A6	E-W	3	A	
A26	692.0-A1	692.0-A7	S-N	3	A	
A27	692.0-A7	692.0-A8	N-S	3	A	
A28	692.0-A9	692.0-A1	E-W	3	A	
A29	692.0-A10	692.0-A1	N-S	3	A	
A30	692.0-A11	692.0-A1	W-E	3	A	
A31	692.0-A12	692.0-A1	N-S	3	A	
A32	692.0-A13	692.0-A1	S-N	3	A	
A33	692.0-A14	692.0-A1	N-S	3	A	
A36	692.0-A14	692.0-A1	N-S	3	A	(2)
A39	692.0-A19	692.0-A1	S-N	3	A	
A40	692.0-A20	692.0-A1	N-S	3	A	
A41	692.0-A21	692.0-A1	E-W	3	A	
A42	692.0-A22	692.0-A1	N-S	3	A	
A43	692.0-A23	692.0-A1	W-E	3	A	
A44	692.0-A25	692.0-A1	N-S	3	A	
A45	692.0-A25	692.0-A24	N-S	3	A	
A46	692.0-A26	692.0-A1	E-W	3	A	
A57	713.0-A2	713.0-A1	W-E			AC
A60	713.0-A1	713.0-A30	S-N	3	A	
A62	713.0-A1	713.0-A6	S-N	3	A	
A63	713.0-A6	713.0-A7	S-N	1.5	B	
A64	713.0-A6	713.0-A8	E-W	3		EQ
A65	713.0-A8	RB Unit 1	S-N			EQ
A68	713.0-A1	713.0-A11	E-W	3	A	
A69	713.0-A1	713.0-A12	S-N	3	A	
A71	713.0-A1	713.0-A15	S-N	3	A	
A72	713.0-A1	713.0-A16	W-E	3	A	
A75	713.0-A1	713.0-A19	S-N	3	A	
A76	713.0-A19	713.0-A20	N-S	1.5	B	

(continued)

TABLE 14.8.1 FIRE DOORS
(PAGE 2 OF 4)

DOOR NUMBER	ROOMS ROOM 1	CONNECTING ROOM 2	DIRECTION	RATING (Hours)	LABEL	EQ/AC (Note
A77	713.0-A19	713.0-A21	W-E	3		EQ
A78	713.0-A21	RB Unit 2	E-W			EQ
A91	713.0-A13	713.0-A28	S-N	3	A	
A92	713.0-A14	713.0-A29	S-N	3	A	
A111	729.0-A5	729.0-A4	S-N	3	A	
A122	737.0-A3	737.0-A4	W-E	1.5	B	
A124	737.0-A1A	737.0-A5	S-N	3	A	
A125	737.0-A5	737.0-A6	E-W	3	A	
A126	737.0-A1C	737.0-A5	E-W	1.5	B	
A129	737.0-A1C	737.0-A9	W-E	3	A	
A131	737.0-A1B	737.0-A9	S-N	3	A	
A130	737.0-A9	737.0-A10	W-E	3	A	
A133	737.0-A11	737.0-A12	W-E	3	A	
A138	757.0-A1	757.0-A25	E-W	3	A	
A139	757.0-A1	757.0-A26	E-W	3	A	
A140	757.0-A1	757.0-A2	S-N	3	A	
A141	757.0-A3	757.0-A2	S-N	3	A	
A142	757.0-A4	757.0-A2	S-N	3	A	
A143	757.0-A5	757.0-A2	S-N	3	A	
A145	757.0-A5	757.0-A2	S-N	3	A	
A152	757.0-A9	757.0-A13	W-E			EQ
A154	737.0-A1C	757.0-A13	N-S			EQ
A155	757.0-A10	757.0-A13	W-E			EQ
A156	757.0-A12	757.0-A13	W-E			EQ
A157	757.0-A14	757.0-A13	E-W			EQ
A158	757.0-A16	757.0-A13	E-W			EQ
A159	757.0-A17	757.0-A13	E-W			EQ
A162	757.0-A12	763.5-A1	S-N	3	A	
A163	757.0-A21	757.0-A24	S-N	3	A	
A164	757.0-A12	RB Unit 1	E-W			AC
A165	757.0-A12	RB Unit 1	E-W			AC
A166	757.0-A14	RB Unit 2	E-W			AC
A167	757.0-A14	RB Unit 2	E-W			AC
A168	757.0-A21	757.0-A24	S-N	3	A	
A169	757.0-A22	757.0-A24	S-N	3	A	
A170	757.0-A23	757.0-A24	S-N	3	A	
A171	757.0-A2	757.0-A24	W-E	3	A	
A172	757.0-A1	757.0-A24	S-N	3	A	
A173	STAIR #4	757.0-A13	W-E			EQ
A174	757.0-A1	757.0-A27	W-E	3	A	
A175	757.0-A1	757.0-A28	W-E	3	A	
A180	772.0-A2	772.0-A1	S-N	3	A	
A181	772.0-A2	772.0-A3	E-W	3	A	

TABLE 14.8.1 FIRE DOORS
(PAGE 3 OF 4)

DOOR NUMBER	ROOMS CONNECTING ROOM 1	ROOM 2	DIRECTION	RATING (Hours)	LABEL	EQ/AC (Note
A182	772.0-A2	772.0-A4	W-E	3	A	
A183	737.0-A13	737.0-A5	W-E	3	A	
A184	772.0-A2	757.0-A2	S-N			EQ
A185	772.0-A5	772.0-A6	S-N	3	A	
A186	772.0-A1	772.0-A6	E-W	3	A	
A187	772.0-A1	772.0-A7	S-N	3	A	
A188	772.0-A16	772.0-A10	S-N	3	A	
A189	772.0-A16	772.0-A11	W-E	3	A	
A190	772.0-A11	772.0-A12	N-S	3	A	
A191	772.0-A15	757.0-A24	S-N			EQ
A192	737.0-A9	737.0-A14	W-E	3	A	
A193	772.0-A15	772.0-A16	S-N	3	A	
A194	772.0-A13	772.0-A15	W-E	3	A	
A195	772.0-A14	772.0-A15	E-W	3	A	
A196	772.0-A15	772.0-A2	E-W	3	A	
A197	772.0-A16	772.0-A1	E-W	3	A	
A210	772.0-A1	772.0-A8	S-N	3	A	
A212	772.0-A10	772.0-A9	E-W	3	A	
A213	772.0-A10	772.0-A9	E-W	3	A	
A216	729.0-A8 (room)	729.0-A8 (corridor)	E-W			EQ
C19	Area 63	708.0-C1	N-S	3	A	
C22	708.0-C1	708.0-C2	W-E	3	A	
C23	708.0-C2	708.0-C3	S-N	3	A	
C24	708.0-C2	708.0-C4	W-E	3	A	
C26A	708.0-C2	Turb. Bldg.	N-S	3	A	
C29A	729.0-C1	Turb. Bldg.	N-S	3	A	
C34A	729.0-C1	Turb. Bldg.	N-S	3	A	
C36A	755.0-C3	Turb. Bldg.	N-S	3	A	
C49	755.0-C12	757.0-A5	S-N	3	A	
C50	755.0-C12	757.0-A21	S-N	3	A	
C54A	755.0-C15	Turb. Bldg.	N-S	3	A	
D8A	742.0-D2	742.0-D9	W-E	3	A	
D10	742.0-D9A	742.0-D4	S-N	3	A	
D11	742.0-D9A	742.0-D5	S-N	3	A	
D12	742.0-D9B	742.0-D6	S-N	3	A	
D13	742.0-D9B	742.0-D7	S-N	3	A	
D22	760.5-D1	760.5-D4	W-E	3	A	
D24	760.5-D4	760.5-D7	W-E	3	A	
D27	760.5-D7	760.5-D10	W-E	3	A	
D30	760.5-D10	760.5-D13	W-E	3	A	

(continued)

TABLE 14.8.1 FIRE DOORS
(PAGE 4 OF 4)

DOOR NUMBER	ROOMS ROOM 1	CONNECTING ROOM 2	DIRECTION	RATING (Hours)	LABEL	EQ/AC (Note
D35	742.0-D9B	DGB Cable Chase B	N-S	3	A	
D36	742.0-D9A	DGB Cable Chase A	N-S	3	A	
DE2	729.0-A4	CDWE	W-E	3	A	
W3	Stair	ERCW Pump Room B	N-S	3	A	
W5	ERCW Pump Room A	Screen Wash & HPFP A Pump Room	N-S	3	A	
W6	ERCW Pump Room B	HPFP B Pump Room	N-S	3	A	
W8	Screen Wash & HPFP A Pump Room	HPFP B Pump Room	E-W	3	A	
W9	Roof Deck EL. 728	ERCW Pump Room A	E-W	3	A	**(1)**
W10A	ERCW Strainer Room B	ERCW Strainer Room A	E-W			EQ
W10B	ERCW Strainer Room B	ERCW Strainer Room A	E-W			EQ

(1) **See Part VII, Deviation and Evaluations for deviation of door gap criteria.**

(2) **Door has been permanently closed by DCN D-51255-A as part of the Site Security Plan. Operation of this door is not required as part of the Testing and Inspection Requirements (TIR). Visual inspection requirements still apply.**

TABLE 14.8.1 NOTES:

1. These doors are not UL listed doors, but have been evaluated as being equivalent (EQ) to fire rated doors or are personnel air lock assemblies that are not 3-hour listed door assemblies, but have been evaluated as acceptable (AC).

TABLE 14.8.1 REFERENCES

1. See reference 4.2.7
2. See reference 4.2.49

TABLE 14.8.2 FIRE DAMPERS
(PAGE 1 OF 6)

AUXILIARY BUILDING			
IDENTIFICATION NUMBER	ROOMS CONNECTING		RATING (Hours)
	ROOM 1	ROOM 2	
1-ISD-31-5441	676.0-A1	692.0-A1A	3
2-ISD-31-5441	676.0-A1	692.0-A1B	3
2-ISD-31-5442	676.0-A1	692.0-A1B	3
1-ISD-31-5443	676.0-A5	692.0-A1A	3
2-ISD-31-3853	676.0-A17	676.0-A12	1.5
2-ISD-31-3852	676.0-A17	676.0-A13	1.5
2-ISD-31-3854	676.0-A17	676.0-A14	1.5
2-ISD-31-3855	676.0-A17	676.0-A15	1.5
1-ISD-31-3778	676.0-A16	676.0-A11	1.5
1-ISD-31-3777	676.0-A16	676.0-A10	1.5
1-ISD-31-3776	676.0-A16	676.0-A9	1.5
1-ISD-31-3775	676.0-A16	676.0-A8	1.5
1-ISD-31-5444A	692.0-A1A	713.0-A1A	3
1-ISD-31-5444B	692.0-A1A	713.0-A1A	3
1-ISD-31-5444C	692.0-A1A	713.0-A1A	3
2-ISD-31-5444A	692.0-A1B	713.0-A1B	3
2-ISD-31-5444B	692.0-A1B	713.0-A1B	3
2-ISD-31-5444C	692.0-A1B	713.0-A1B	3
2-ISD-31-3868	692.0-A1B	692.0-A26	3
2-ISD-31-3866	692.0-A1B	692.0-A26	3
2-ISD-31-3865	692.0-A1B	692.0-A26	3
2-ISD-31-3862	692.0-A1B	692.0-A25	3
2-ISD-31-3958	692.0-A1B	692.0-A26	3
1-ISD-31-5446	692.0-A1C	713.0-A1C	3
2-ISD-31-5445	692.0-A1C	713.0-A1C	3
2-ISD-31-3987	676.0-A4a	692.0-A31	3
2-ISD-31-3856	692.0-A19	692.0-A24	1.5
1-ISD-31-3967	692.0-A1A	692.0-A6	3
1-ISD-31-3801	692.0-A7	676.0-A16	3
1-ISD-31-3799	692.0-A10	692.0-A8	1.5
1-ISD-31-3798	692.0-A11	692.0-A8	1.5
1-ISD-31-3800	692.0-A9	692.0-A8	3
1-ISD-31-3797	692.0-A12	692.0-A8	1.5
1-ISD-31-3782	692.0-A6	692.0-A1A	3
1-ISD-31-3780	692.0-A6	692.0-A1A	1.5
1-ISD-31-3774	692.0-A13	692.0-A8	1.5
1-ISD-31-3988	692.0-A8	692.0-A7	3
1-ISD-31-3802	692.0-A1A	692.0-A7	3
1-ISD-31-3783	692.0-A1A	692.0-A6	3
1-ISD-31-3779	692.0-A1A	692.0-A6	3

(continued)

TABLE 14.8.2 FIRE DAMPERS
(PAGE 2 OF 6)

AUXILIARY BUILDING			
IDENTIFICATION NUMBER	ROOMS CONNECTING		RATING (Hours)
	ROOM 1	ROOM 2	
2-ISD-31-3857	692.0-A20	692.0-A24	1.5
2-ISD-31-3858	692.0-A21	692.0-A24	1.5
2-ISD-31-3859	692.0-A22	692.0-A24	1.5
2-ISD-31-3860	692.0-A23	692.0-A24	1.5
2-ISD-31-3861	692.0-A24	692.0-A25	3
2-ISD-31-2930	692.0-A24	692.0-A25	3
2-ISD-31-3929	692.0-A25	713.0-A19	3
2-ISD-31-3927	713.0-A19	713.0-A29	3
2-ISD-31-3871	713.0-A1B	713.0-A19	3
2-ISD-31-5447A	713.0-A1B	737.0-A1B	3
2-ISD-31-5447B	713.0-A1B	737.0-A1B	3
1-ISD-31-3976	713.0-A7	713.0-A6	1.5
1-ISD-31-3864	713.0-A7	713.0-A6	1.5
1-ISD-31-3925	713.0-A6	692.0-A7	3
1-ISD-31-3923	713.0-A6	713.0-A28	3
1-ISD-31-3817	737.0-A5	713.0-A28	3
1-ISD-31-3816	713.0-A12	713.0-A28	3
1-ISD-31-3815	713.0-A11	713.0-A28	3
1-ISD-31-3805	713.0-A7	713.0-A28	3
1-ISD-31-3804	713.0-A1A	713.0-A6	3
2-ISD-31-3988	713.0-A1B	692.0-A1B	3
1-ISD-31-3995	713.0-A1A	692.0-A1A	3
2-ISD-31-3870	713.0-A20	713.0-A29	1.5
2-ISD-31-3970	713.0-A20	713.0-A29	1.5
2-ISD-31-3873	713.0-A29	713.0-A15	1.5
2-ISD-31-3874	713.0-A29	713.0-A16	1.5
2-ISD-31-3875	713.0-A29	737.0-A9	1.5
2-ISD-31-3876	713.0-A29	737.0-A9	1.5
0-ISD-31-3827	729.0-A6	692.0-A14	3
0-ISD-31-3823	729.0-A6	692.0-A14	3
0-ISD-31-3824	729.0-A6	692.0-A14	3
1-ISD-31-3992	729.0-A8	692.0-A14	3
2-ISD-31-3882	737.0-A12	737.0-A1B	3
2-ISD-31-3881	737.0-A1B	737.0-A9	3
2-ISD-31-3880	737.0-A9	737.0-A1B	3
2-ISD-31-3879	737.0-A9	737.0-A1B	3
2-ISD-31-3877	713.0-A29	737.0-A1B	3
2-ISD-31-3869	737.0-A12	713.0-A1B	3
2-ISD-31-3883	737.0-A12	737.0-A1B	3
2-ISD-31-5452	737.0-A12	737.0-A1B	3

(continued)

TABLE 14.8.2 FIRE DAMPERS
(PAGE 3 OF 6)

AUXILIARY BUILDING			
IDENTIFICATION NUMBER	ROOMS CONNECTING		RATING (Hours)
	ROOM 1	ROOM 2	
2-ISD-31-3872	713.0-A29	737.0-A8	1.5
1-ISD-31-5150	737.0-A1A	713.0-A1A	3
0-ISD-31-3833	729.0-A6	737.0-A9	3
0-ISD-31-3834	737.0-A1C	737.0-A9	3
0-ISD-31-3843	737.0-A1A	737.0-A5	3
0-ISD-31-3845	737.0-A1C	737.0-A5	3
0-ISD-31-3846*	737.0-A5	FUEL XFR CANAL	3
0-ISD-31-3847*	729.0-A6	737.0-A5	1.5
0-ISD-31-3848*	729.0-A6	737.0-A5	1.5
0-ISD-31-3849	729.0-A6	737.0-A5	3
2-ISD-31-3984	729.0-A6	729.0-A9	3
1-ISD-31-3819	737.0-A1A	713.0-A28	1.5
1-ISD-31-3818	737.0-A5	713.0-A28	1.5
1-ISD-31-3814	737.0-A7	713.0-A28	1.5
1-ISD-31-3813	737.0-A5	737.0-A1A	3
1-ISD-31-3809	737.0-A5	737.0-A1A	3
1-ISD-31-3808	737.0-A5	737.0-A1A	3
1-ISD-31-3807	737.0-A3	737.0-A1A	3
1-ISD-31-3806	737.0-A3	737.0-A1A	3
1-ISD-31-3803	737.0-A3	713.0-A1A	3
1-ISD-31-3996	737.0-A1A	713.0-A1A	3
2-ISD-31-3884	757.0-A17	757.0-A16	3
2-ISD-31-3885	757.0-A13	757.0-A16	3
2-ISD-31-3957	757.0-A17	757.0-A13	1.5
2-ISD-31-3240	757.0-A13	782.0-A3	1.5
2-ISD-31-3239	757.0-A13	782.0-A3	3
2-ISD-31-2990	757.0-A13	763.5-A2	3
0-ISD-31-2713	757.0-A3	757.0-A2	3
0-ISD-31-2715	757.0-A3	757.0-A2	3
0-ISD-31-2720	757.0-A1	757.0-A2	3
0-ISD-31-2721	757.0-A1	757.0-A2	1.5
0-ISD-31-2723	757.0-A1	757.0-A25	3
0-ISD-31-2725	757.0-A1	757.0-A25	3
0-ISD-31-2726	757.0-A1	757.0-A26	3
0-ISD-31-2728	757.0-A1	757.0-A26	3
0-ISD-31-2733	757.0-A4	757.0-A2	3
0-ISD-31-2771	757.0-A1	757.0-A24	3
0-ISD-31-2772	757.0-A1	757.0-A24	1.5
0-ISD-31-2774	757.0-A1	757.0-A27	3
0-ISD-31-2775	757.0-A1	757.0-A27	3

(continued)

TABLE 14.8.2 FIRE DAMPERS
(PAGE 4 OF 6)

AUXILIARY BUILDING			
IDENTIFICATION NUMBER	ROOMS CONNECTING		RATING (Hours)
	ROOM 1	ROOM 2	
0-ISD-31-2777	757.0-A1	757.0-A28	3
0-ISD-31-2779	757.0-A1	757.0-A28	3
0-ISD-31-2780	757.0-A23	757.0-A24	3
0-ISD-31-2782	757.0-A23	757.0-A24	3
0-ISD-31-2785	757.0-A22	757.0-A24	3
0-ISD-31-3835	757.0-A14	737.0-A9	3
0-ISD-31-3836	757.0-A13	757.0-A14	3
0-ISD-31-3837	757.0-A13	729.0-A4	3
0-ISD-31-3838	757.0-A13	729.0-A3	3
0-ISD-31-3839	757.0-A13	757.0-A12	1.5
0-ISD-31-3840	757.0-A12	737.0-A5	3
0-ISD-31-3841	757.0-A13	757.0-A12	1.5
0-ISD-31-3842	757.0-A12	737.0-A5	3
1-ISD-31-3966	757.0-A9	757.0-A13	3
1-ISD-31-3788	757.0-A10	757.0-A13	3
1-ISD-31-3786	757.0-A9	757.0-A10	1.5
0-ISD-31-4618	757.0-A5	757.0-A4	3
0-ISD-31-4620	757.0-A5	757.0-A2	1.5
0-ISD-31-4621	757.0-A5	757.0-A2	1.5
0-ISD-31-4622	757.0-A22	757.0-A21	3
0-ISD-31-4623	757.0-A24	757.0-A21	1.5
0-ISD-31-4624	757.0-A24	757.0-A21	1.5
0-ISD-31-4625	757.0-A24	757.0-A21	1.5
0-ISD-31-4619	757.0-A5	757.0-A2	1.5
1-ISD-31-2987	757.0-A13	763.5-A1	3
2-ISD-31-2564	772.0-A14	772.0-A13	3
2-ISD-31-2559	772.0-A14	772.0-A15	3
2-ISD-31-2558	772.0-A14	772.0-A13	3
2-ISD-31-2557	772.0-A14	772.0-A15	3
2-ISD-31-2554	772.0-A15	772.0-A16	3
2-ISD-31-2526	772.0-A15	772.0-A16	3
2-ISD-31-2525	772.0-A13	772.0-A15	3
2-ISD-31-2523	772.0-A14	772.0-A15	3
1-ISD-31-3119	757.0-A13	782.0-A1	3
1-ISD-31-3117	757.0-A13	782.0-A1	3
2-ISD-31-2516	772.0-A10	772.0-A16	3
2-ISD-31-2515	772.0-A10	772.0-A16	1.5
2-ISD-31-2500	757.0-A17	772.0-A10	3
1-ISD-31-2526	772.0-A1	772.0-A2	3
1-ISD-31-2500	757.0-A9	772.0-A7	3

(continued)

TABLE 14.8.2 FIRE DAMPERS
(PAGE 5 OF 6)

AUXILIARY BUILDING			
IDENTIFICATION NUMBER	ROOMS CONNECTING		RATING (Hours)
	ROOM 1	ROOM 2	
1-ISD-31-2556	772.0-A3	772.0-A4	3
1-ISD-31-2515	772.0-A1	772.0-A7	1.5
0-ISD-31-5455	772.0-A1	772.0-A8	3
1-ISD-31-2554	772.0-A2	772.0-A1	3
1-ISD-31-2555	772.0-A2	772.0-A3	3
1-ISD-31-2525	772.0-A2	772.0-A4	3
1-ISD-31-2516	772.0-A1	772.0-A7	3
1-ISD-31-2523	772.0-A2	772.0-A3	3
1-ISD-31-2504	772.0-A1	772.0-A7	3
2-ISD-31-2504	772.0-A10	772.0-A16	3
2-ISD-31-2519	786.0-A3	772.0-A15	3
2-ISD-31-2518	786.0-A3	772.0-A15	3
2-ISD-31-2517	786.0-A3	772.0-A15	3
1-ISD-31-2517	786.0-A4	772.0-A2	3
1-ISD-31-2518	786.0-A4	772.0-A2	3
1-ISD-31-2519	786.0-A4	772.0-A2	3

CONTROL BUILDING			
IDENTIFICATION NUMBER	ROOMS CONNECTING		RATING (Hours)
	ROOM 1	ROOM 2	
0-ISD-31-5036	708.0-C2	708.0-C3	3
0-ISD-31-3968	708.0-C3	708.0-C1	1.5
0-ISD-31-3969	708.0-C3	708.0-C1	3
0-ISD-31-3957	708.0-C3	708.0-C1	3
0-ISD-31-3956	708.0-C1	708.0-C3	1.5
0-ISD-31-5035	708.0-C2	708.0-C3	3
0-ISD-31-5034	708.0-C2	708.0-C3	3
0-ISD-31-5033	708.0-C2	708.0-C3	3
2-ISD-31-2058	708.0-C3	708.0-C4	3
2-ISD-31-3955	708.0-C3	708.0-C4	1.5
0-ISD-31-3953	729.0-C1	Area 63, Turbine Bldg	3

TABLE 14.8.2 FIRE DAMPERS
(PAGE 6 OF 6)

DIESEL GENERATOR BUILDING			
IDENTIFICATION NUMBER	ROOMS CONNECTING		RATING (Hours)
	ROOM 1	ROOM 2	
0-ISD-30-619	742.0-D1	742.0-D4	3
0-ISD-30-594	742.0-D2	742.0-D9A	3
0-ISD-30-631	760.5-D1	760.5-D5	3
0-ISD-30-621	760.5-D2	760.5-D3	3
0-ISD-30-620	760.5-D3	742.0-D9A	1.5
0-ISD-30-617	760.5-D3	742.0-D9A	3
0-ISD-30-616	760.5-D12	742.0-D9B	3
0-ISD-30-1090	760.5-D9	742.0-D9N	3

CDWE BUILDING			
IDENTIFICATION NUMBER	ROOMS CONNECTING		RATING (Hours)
	ROOM 1	ROOM 2	
0-ISD-31-2429	Area 62, CDWE BLDG	729.0-A4	1.5
0-ISD-31-2427	Area 62, CDWE BLDG	729.0-A4	1.5

* See FPR Part VII, Section 6.2.

TABLE 14.8.2 References - See references 4.2.51 through 4.2.56.

Table 14.10 (FIRE Safe Shutdown Equipment)
(Page 1 of 7)

COMPONENT		FSSD CONDITION
UNID NUMBER	**DESCRIPTION**	
1-FCV-1-15-A	AFWPT STEAM SUPPLY FROM SG 1 FLOW CONTROL VALVE	Open
1-FCV-1-36	MAIN FW PUMP TURBINE HP STOP VALVE	Closed
1-FCV-1-37	MAIN FW PUMP TURBINE HP CONTROL VALVE	Closed
1-FCV-1-43	MAIN FW PUMP TURBINE HP STOP VALVE	Closed
1-FCV-1-44	MAIN FW PUMP TURBINE HP CONTROL VALVE	Closed
1-FCV-1-75	MOISTURE SEPARATOR REHEATER A2 CONTROL VALVE	Closed
1-FCV-1-77	MOISTURE SEPARATOR REHEATER B2 CONTROL VALVE	Closed
1-FCV-1-79	MOISTURE SEPARATOR REHEATER C2 CONTROL VALVE	Closed
1-FCV-1-84	MOISTURE SEPARATOR REHEATER A1 CONTROL VALVE	Closed
1-FCV-1-91	MOISTURE SEPARATOR REHEATER B1 CONTROL VALVE	Closed
1-FCV-1-98	MOISTURE SEPARATOR REHEATER C1 CONTROL VALVE	Closed
1-FCV-1-103	MAIN STEAM COOL DOWN VALVE	Closed
1-FCV-1-104	MAIN STEAM DUMP VALVE	Closed
1-FCV-1-105	MAIN STEAM DUMP VALVE	Closed
1-FCV-1-106	MAIN STEAM DUMP VALVE	Closed
1-FCV-1-107	MAIN STEAM COOL DOWN VALVE	Closed
1-FCV-1-108	MAIN STEAM DUMP VALVE	Closed
1-FCV-1-109	MAIN STEAM DUMP VALVE	Closed
1-FCV-1-110	MAIN STEAM DUMP VALVE	Closed
1-FCV-1-111	MAIN STEAM COOL DOWN VALVE	Closed
1-FCV-1-112	MAIN STEAM DUMP VALVE	Closed
1-FCV-1-113	MAIN STEAM COOL DOWN VALVE	Closed
1-FCV-1-114	MAIN STEAM DUMP VALVE	Closed
1-FCV-1-147-A	STEAM LINE WARMING VALVE LOOP 1	Closed
1-FCV-1-148-B	STEAM LINE WARMING VALVE LOOP 2	Closed
1-FCV-1-149-A	STEAM LINE WARMING VALVE LOOP 3	Closed
1-FCV-1-150-B	#4SG MSIV BYPASS	Closed

Table 14.10 (FIRE Safe Shutdown Equipment)
(Page 2 of 7)

COMPONENT		FSSD
UNID NUMBER	**DESCRIPTION**	**CONDITION**
1-FCV-1-275	MSR A2 LOW POWER BYPASS CONTROL VALVE	Closed
1-FCV-1-277	MSR B2 LOW POWER BYPASS CONTROL VALVE	Closed
1-FCV-1-279	MSR C2 LOW POWER BYPASS CONTROL VALVE	Closed
1-FCV-1-284	MSR A1 LOW POWER BYPASS CONTROL VALVE	Closed
1-FCV-1-291	MSR B1 LOW POWER BYPASS CONTROL VALVE	Closed
1-FCV-1-298	MSR C1 LOW POWER BYPASS CONTROL VALVE	Closed
1-FCV-3-116A-A	ERCW HDR A ISOLATION VALVE	Open
1-FCV-3-116B-A	ERCW HDR A ISOLATION VALVE	Open
1-FCV-3-126A-B	ERCW HDR B ISOLATION VALVE	Open
1-FCV-3-126B-B	ERCW HDR B ISOLATION VALVE	Open
1-TANK-1-0400A	MAIN STEAM LOOP 2 PORV N2 TANK A	Pressurized*
1-TANK-1-0402A	MAIN STEAM LOOP 4 PORV N2 TANK A	Pressurized*
1-TANK-1-0403A	MAIN STEAM LOOP 3 PORV N2 TANK A	Pressurized*
1-TANK-1-0404A	MAIN STEAM LOOP 1 PORV N2 TANK A	Pressurized*
1-TANK-1-0400B	MAIN STEAM LOOP 2 PORV N2 TANK B	Pressurized*
1-TANK-1-0402B	MAIN STEAM LOOP 4 PORV N2 TANK B	Pressurized*
1-TANK-1-0403B	MAIN STEAM LOOP 3 PORV N2 TANK B	Pressurized*
1-TANK-1-0404B	MAIN STEAM LOOP 1 PORV N2 TANK B	Pressurized*
1-L-256	N2 OPERATING STATION	Operable
1-L-737-A	N2 OPERATING STATION	Operable
1-L-738-B	N2 OPERATING STATION	Operable
1-TANK-3-0400A	N2 SUPPLY TANK A TO 1-LCV-3-173/174	Pressurized*
1-TANK-3-0400B	N2 SUPPLY TANK B TO 1-LCV-3-173/174	Pressurized*
1-TANK-3-0401A	N2 SUPPLY TANK A TO 1-LCV-3-172/175	Pressurized*
1-TANK-3-0401B	N2 SUPPLY TANK B TO 1-LCV-3-172/175	Pressurized*
1-PI-3-117	LOCAL MDAFWP A SUCTION PRES INDICATOR	Operable
1-PI-3-127	LOCAL MDAFWP B SUCTION PRES INDICATOR	Operable
1-PI-3-137	LOCAL TDAFW PUMP SUCTION PRES INDICATOR	Operable
1-MTR-30-80-B	CONTROL ROD DRIVE MOTOR COOLER 1D-B	Operable
1-MTR-30-83-A	CONTROL ROD DRIVE MOTOR COOLER 1A-A	Operable
1-MTR-30-88-A	CONTROL ROD DRIVE MOTOR COOLER 1C-A	Operable
1-MTR-30-92-B	CONTROL ROD DRIVE MOTOR COOLER 1B-B	Operable
1-TCO-30-82-B	CONTROL ROD DRIVE CLING 1D-B RM DIVERSION DAMPER	Operable

*Note: Both bottles of each pair is required at or above listed pressure, Item 14.10.j

Table 14.10 (FIRE Safe Shutdown Equipment)
(Page 3 of 7)

COMPONENT		FSSD
UNID NUMBER	DESCRIPTION	CONDITION
1-TCO-30-85-A	CONTROL ROD DRIVE CLING 1A-A ROOM DIVERSION DAMPER	Operable
1-TCO-30-90-A	CONTROL ROD DRIVE CLING 1C-A ROOM DIVERSION DAMPER	Operable
1-TCO-30-94-B	CONTROL ROD DRIVE CLING 1B-B ROOM DIVERSION DAMPER	Operable
0-COMP-32-60	CONTROL AIR COMPRESSOR A-A	Operable
0-COMP-32-86	CONTROL AIR COMPRESSOR B-B	Operable
1-FSV-47-26A-A	EHC OVERSPEED PROTECTION CONTROL	Operable
1-FSV-47-26B-B	EHC OVERSPEED PROTECTION CONTROL	Operable
1-FSV-47-24	TRAIN A MAIN TURBINE TRIP SOLENOID	Operable
1-FSV-47-27	TRAIN B MAIN TURBINE TRIP SOLENOID	Operable
1-FI-62-1A	RCP-1 SEAL INJECTION FLOW INDICATOR	Operable
1-FI-62-14A	RCP-2 SEAL INJECTION FLOW INDICATOR	Operable
1-FI-62-27A	RCP-3 SEAL INJECTION FLOW INDICATOR	Operable
1-FI-62-40A	RCP-4 SEAL INJECTION FLOW INDICATOR	Operable
1-FI-62-93A	NORMAL CHARGING FLOW INDICATOR	Operable
1-LI-62-129A	VCT LEVEL INDICATOR	Operable
1-FI-67-61	ERCW SUPPLY HEADER 1A FLOW INDICATOR	Operable
1-FI-67-62	ERCW SUPPLY HEADER 1B FLOW INDICATOR	Operable
0-FI-67-226	ERCW FLOW TO CCS HX-C INDICATOR	Operable
2-FI-67-61	ERCW SUPPLY HEADER 2A FLOW INDICATOR	Operable
2-FI-67-62	ERCW SUPPLY HEADER 2B FLOW INDICATOR	Operable
2-FI-67-222	ERCW SUPPLY HEADER 2A FLOW INDICATOR	Operable
1-TCV-67-84-A	LOWER CNTMT VENT CLR A SUPPLY CONTROL VLV	Operable
1-TCV-67-85-A	CONTROL ROD DRIVE VENT CLR A SUPPLY CONTROL VLV	Operable
1-TCV-67-92-A	LOWER CNTMT VENT CLR C SUPPLY CONTROL VLV	Operable
1-TCV-67-93-A	CONTROL ROD DRIVE VENT CLR C SUPPLY CONTROL VLV	Operable
1-TCV-67-100-B	LOWER CNTMT VENT CLR B SUPPLY CONTROL VLV	Operable

Table 14.10 (FIRE Safe Shutdown Equipment)
(Page 4 of 7)

COMPONENT		FSSD CONDITION
UNID NUMBER	DESCRIPTION	
1-TCV-67-101-B	CONTROL ROD DRIVE VENT CLR B SUPPLY CONTROL VLV	Operable
1-TCV-67-108-B	LOWER CNTMT VENT CLR D SUPPLY CONTROL VLV	Operable
1-TCV-67-109-B	CONTROL ROD DRIVE VENT CLR D SUPPLY CONTROL VLV	Operable
1-PCV-68-340B	PRESSURIZER SPRAY VALVE	Closed
1-PCV-68-340D	PRESSURIZER SPRAY VALVE	Closed
1-PMP-70-130-B	THERMAL BARRIER BOOSTER PUMP 1B-B	Operable
1-PMP-70-131-A	THERMAL BARRIER BOOSTER PUMP 1A-A	Operable
1-TI-70-154	RHR HX-B OUTLET TEMP (CCS)	Operable
1-TI-70-157	RHR HX-A OUTLET TEMP (CCS)	Operable
1-TI-70-161	ERCW/CCS HX-A OUTLET TEMP (CCS)	Operable
0-TI-70-162	ERCW/CCS HX-C OUTLET TEMP (CCS)	Operable
1-TI-74-15	RHR HX-A OUTLET TEMPERATURE	Operable
1-TI-74-27	RHR HX-B OUTLET TEMPERATURE	Operable
1-TR-74-14P002	RHR HX-A TEMPERATURE RECORDER	Operable
1-TR-74-25P002	RHR HX-B TEMPERATURE RECORDER	Operable
0-BAT-239-1	250V BATTERY 1	Operable
0-BAT-239-2	250V BATTERY 2	Operable
0-BD-239-1	250V BATTERY BD1	Operable
0-BD-239-2	250V BATTERY BD2	Operable
0-DPL-239-1	250VDC TURBINE BLDG DISTRIBUTION BOARD 1	Operable
0-DPL-239-2	250VDC TURBINE BLDG DISTRIBUTION BOARD 2	Operable
GENERAL (1)	THERMAL OVERLOADS FOR ACTIVE VALVES	Operable
0-XS-31-12-A	TRANSFER CONTROL DURING APP R FIRE	Operable
0-XS-31-11-B	TRANSFER CONTROL DURING APP R FIRE	Operable

(1) See the Technical Requirements Manual, Table 3.8.3-1

Table 14.10 (FIRE Safe Shutdown Equipment)
(Page 5 of 7)

COMPONENT		FSSD
UNID NUMBER	**DESCRIPTION**	**CONDITION**
2-FCV-1-15-A	AFWPT STEAM SUPPLY FROM SG 1 FLOW CONTROL VALVE	Open
2-FCV-1-36	MAIN FW PUMP TURBINE HP STOP VALVE	Closed
2-FCV-1-37	MAIN FW PUMP TURBINE HP CONTROL VALVE	Closed
2-FCV-1-43	MAIN FW PUMP TURBINE HP STOP VALVE	Closed
2-FCV-1-44	MAIN FW PUMP TURBINE HP CONTROL VALVE	Closed
2-FCV-1-75	MOISTURE SEPARATOR REHEATER A2 CONTROL VALVE	Closed
2-FCV-1-77	MOISTURE SEPARATOR REHEATER B2 CONTROL VALVE	Closed
2-FCV-1-79	MOISTURE SEPARATOR REHEATER C2 CONTROL VALVE	Closed
2-FCV-1-84	MOISTURE SEPARATOR REHEATER A1 CONTROL VALVE	Closed
2-FCV-1-91	MOISTURE SEPARATOR REHEATER B1 CONTROL VALVE	Closed
2-FCV-1-98	MOISTURE SEPARATOR REHEATER C1 CONTROL VALVE	Closed
2-FCV-1-103	MAIN STEAM COOL DOWN VALVE	Closed
2-FCV-1-104	MAIN STEAM DUMP VALVE	Closed
2-FCV-1-105	MAIN STEAM DUMP VALVE	Closed
2-FCV-1-106	MAIN STEAM DUMP VALVE	Closed
2-FCV-1-107	MAIN STEAM COOL DOWN VALVE	Closed
2-FCV-1-108	MAIN STEAM DUMP VALVE	Closed
2-FCV-1-109	MAIN STEAM DUMP VALVE	Closed
2-FCV-1-110	MAIN STEAM DUMP VALVE	Closed
2-FCV-1-111	MAIN STEAM COOL DOWN VALVE	Closed
2-FCV-1-112	MAIN STEAM DUMP VALVE	Closed
2-FCV-1-113	MAIN STEAM COOL DOWN VALVE	Closed
2-FCV-1-114	MAIN STEAM DUMP VALVE	Closed
2-FCV-1-147-A	STEAM LINE WARMING VALVE LOOP 1	Closed
2-FCV-1-148-B	STEAM LINE WARMING VALVE LOOP 2	Closed
2-FCV-1-149-A	STEAM LINE WARMING VALVE LOOP 3	Closed
2-FCV-1-150-B	STEAM LINE WARMING VALVE LOOP 4	Closed
2-FCV-1-275	MSR A2 LOW POWER BYPASS CONTROL VALVE	Closed
2-FCV-1-277	MSR B2 LOW POWER BYPASS CONTROL VALVE	Closed
2-FCV-1-279	MSR C2 LOW POWER BYPASS CONTROL VALVE	Closed
2-FCV-1-284	MSR A1 LOW POWER BYPASS CONTROL VALVE	Closed
2-FCV-1-291	MSR B1 LOW POWER BYPASS CONTROL VALVE	Closed
2-FCV-1-298	MSR C1 LOW POWER BYPASS CONTROL VALVE	Closed
2-FCV-3-116A-A	ERCW HDR A ISOLATION VALVE	Open
2-FCV-3-116B-A	ERCW HDR A ISOLATION VALVE	Open

Table 14.10 (FIRE Safe Shutdown Equipment)
(Page 6 of 7)

COMPONENT		FSSD
UNID NUMBER	**DESCRIPTION**	**CONDITION**
2-FCV-3-126A-B	ERCW HDR B ISOLATION VALVE	Open
2-FCV-3-126B-B	ERCW HDR B ISOLATION VALVE	Open
2-TANK-1-0400A	MAIN STEAM LOOP 2 PORV N2 TANK A	Pressurized*
2-TANK-1-0402A	MAIN STEAM LOOP 4 PORV N2 TANK A	Pressurized*
2-TANK-1-0403A	MAIN STEAM LOOP 3 PORV N2 TANK A	Pressurized*
2-TANK-1-0404A	MAIN STEAM LOOP 1 PORV N2 TANK A	Pressurized*
2-TANK-1-0400B	MAIN STEAM LOOP 2 PORV N2 TANK B	Pressurized*
2-TANK-1-0402B	MAIN STEAM LOOP 4 PORV N2 TANK B	Pressurized*
2-TANK-1-0403B	MAIN STEAM LOOP 3 PORV N2 TANK B	Pressurized*
2-TANK-1-0404B	MAIN STEAM LOOP 1 PORV N2 TANK B	Pressurized*
2-L-256	N2 OPERATING STATION FOR 2-PCV-1-23, -30	Operable
2-L-737-A	N2 OPERATING STATION FOR 2-PCV-1-5	Operable
2-L-738-B	N2 OPERATING STATION FOR 2-PCV-1-12	Operable
2-TANK-3-0400A	N2 SUPPLY TANK A TO 2-LCV-3-173/174	Pressurized*
2-TANK-3-0400B	N2 SUPPLY TANK B TO 2-LCV-3-173/174	Pressurized*
2-TANK-3-0401A	N2 SUPPLY TANK A TO 2-LCV-3-172/175	Pressurized*
2-TANK-3-0401B	N2 SUPPLY TANK B TO 2-LCV-3-172/175	Pressurized*
2-PI-3-117	LOCAL MDAFWP A SUCTION PRES INDICATOR	Operable
2-PI-3-127	LOCAL MDAFWP B SUCTION PRES INDICATOR	Operable
2-PI-3-137	LOCAL TDAFW PUMP SUCTION PRES INDICATOR	Operable
2-MTR-30-80-B	CONTROL ROD DRIVE MOTOR COOLER 2D-B	Operable
2-MTR-30-83-A	CONTROL ROD DRIVE MOTOR COOLER 2A-A	Operable
2-MTR-30-88-A	CONTROL ROD DRIVE MOTOR COOLER 2C-A	Operable
2-MTR-30-92-B	CONTROL ROD DRIVE MOTOR COOLER 2B-B	Operable
2-TCO-30-82-B	CONTROL ROD DRIVE CLING 2D-B ROOM DIVERSION DAMPER	Operable
2-TCO-30-85-A	CRD COOLING UNIT 2A-A ROOM DIVERSION DAMPER	Operable
2-TCO-30-90-A	CONTROL ROD DRIVE CLING 2C-A ROOM DIVERSION DAMPER	Operable
2-TCO-30-94-B	CONTROL ROD DRIVE CLING 2B-B DIVERSION DAMPER	Operable
2-FSV-47-26A-A	EHC OVERSPEED PROTECTION CONTROL	Operable
2-FSV-47-26B-B	EHC OVERSPEED PROTECTION CONTROL	Operable

* Both bottles of each pair is required at or above listed pressure, Item 15.10.j

Table 14.10 (FIRE Safe Shutdown Equipment)
(Page 7 of 7)

COMPONENT		FSSD
UNID NUMBER	**DESCRIPTION**	**CONDITION**
2-FSV-47-24	TRAIN A MAIN TURBINE TRIP SOLENOID	Operable
2-FSV-47-27	TRAIN B MAIN TURBINE TRIP SOLENOID	Operable
2-FI-62-1A	RCP-1 SEAL INJECTION FLOW INDICATOR	Operable
2-FI-62-14A	RCP-2 SEAL INJECTION FLOW INDICATOR	Operable
2-FI-62-27A	RCP-3 SEAL INJECTION FLOW INDICATOR	Operable
2-FI-62-40A	RCP-4 SEAL INJECTION FLOW INDICATOR	Operable
2-FI-62-93A	NORMAL CHARGING FLOW INDICATOR	Operable
2-LI-62-129A	VCT LEVEL INDICATOR	Operable
2-TCV-67-84-A	LOWER CNTMT VENT CLR A SUPPLY VLV	Operable
2-TCV-67-85-A	CONTROL ROD DRIVE VENT CLR A SUPPLY VLV	Operable
2-TCV-67-92-A	LOWER CNTMT VENT CLR C SUPPLY VLV	Operable
2-TCV-67-93-A	CONTROL ROD DRIVE VENT CLR C SUPPLY VLV	Operable
2-TCV-67-100-B	LOWER CNTMT VENT CLR B SUPPLY VLV	Operable
2-TCV-67-101-B	CONTROL ROD DRIVE VENT CLR B SUPPLY VLV	Operable
2-TCV-67-108-B	LOWER CNTMT VENT CLR D SUPPLY VLV	Operable
2-TCV-67-109-B	CONTROL ROD DRIVE VENT COOLER D SUPPLY VLV	Operable
2-PCV-68-340B	PRESSURIZER SPRAY VALVE	Closed
2-PCV-68-340D	PRESSURIZER SPRAY VALVE	Closed
2-PMP-70-130-B	THERMAL BARRIER BOOSTER PUMP 2B-B	Operable
2-PMP-70-131-A	THERMAL BARRIER BOOSTER PUMP 2A-A	Operable
2-TI-70-154	RHR HX-B OUTLET TEMP (CCS)	Operable
2-TI-70-157	RHR HX-A OUTLET TEMP (CCS)	Operable
2-TI-70-161	ERCW/CCS HX-B OUTLET TEMP (CCS)	Operable
2-TI-74-15	RHR HX-A OUTLET TEMPERATURE	Operable
2-TI-74-27	RHR HX-B OUTLET TEMPERATURE	Operable
2-TR-74-14P002	RHR HX-A TEMPERATURE RECORDER	Operable
2-TR-74-25P002	RHR HX-B TEMPERATURE RECORDER	Operable

Enclosure 3

Part III of the Fire Protection Report (FPR)

PART III – SAFE SHUTDOWN CAPABILITIES

1.0 INTRODUCTION

Part III describes the methodology used to identify, select, and analyze the systems, components, and cables needed to demonstrate compliance with Appendix R to 10CFR50, and the applicable Nuclear Regulatory Commission (NRC) generic letters. The safe shutdown analysis methodology as applied at Watts Bar Nuclear Plant (WBN) is also described.

Paragraph 50.48 of 10CFR50 became effective on February 17, 1981 and requires all nuclear plants licensed to operate prior to January 1, 1979 to comply with the requirements of 10CFR50 Appendix R Sections III.G, III.J, and III.O regardless of any previous approvals by the NRC of other design features. Section III.G.1 requires that fire protection features be provided for those systems, structures, and components important to safe shutdown. These features shall be capable of limiting fire damage so that:

(1) One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or the emergency control station(s) is free of fire damage; and

(2) Systems necessary to achieve and maintain cold shutdown from either the control room or the emergency control station(s) can be repaired within 72 hours.

Where alternative shutdown capability is required (i.e., for control building fires that require shutdown from outside of the Main Control Room), cold shutdown must be achieved within 72 hours. Alternate shutdown capability is evaluated per Appendix R Sections III.G.3 and III.L. Plant locations that do not require alternative shutdown capability are evaluated per Section III.G.2 of Appendix R. Generic Letter 81-12 (February 20, 1981) Enclosure 1 "Staff Position", provides additional guidance on the NRC's requirements for safe shutdown capability.

1.1 Design Basis Evaluation

The purpose of this evaluation is to demonstrate fire safe shutdown capability for postulated fires involving in situ and/or transient combustibles that could impact systems, structures, or components located in or adjacent to that area. For purposes of this evaluation, it is assumed that these fires may adversely affect those systems, structures or components essential to safe shutdown. The availability of offsite power for specific systems and/or fire scenarios has been evaluated for non-alternative shutdown locations. Loss of offsite power has been assumed for control building fires, for which alternative shutdown is provided. No concurrent or sequential design basis accidents or transients are assumed to occur. Failures that are a consequence of the fire are evaluated.

1.2 Limiting Safety Consequences

The limiting safety consequences used in the evaluation of fire safe shutdown are: (1) no fuel failure due to calculated cladding temperature increases; (2) no rupture of any primary coolant boundary; (3) no rupture of the containment boundary; (4) following the event, the reactor coolant system process variables shall be within those predicted for a loss of normal AC power; and (5) shutdown capability shall be able to achieve and maintain subcritical conditions in the reactor, maintain reactor coolant inventory, achieve and maintain hot standby conditions for an extended period of time, achieve cold shutdown conditions within 72 hours with equipment

powered by onsite power sources if using alternative shutdown methods, and maintain cold shutdown conditions thereafter.

Generic Letter 81-12, Enclosure 1, specifies the performance goals and associated safe shutdown functions necessary to ensure the limiting safety consequences of the fire safe shutdown analysis. Other sub-functions may exist under each of these broad headings. Examples of such sub-functions are steam generator level control and steam generator pressure control which exists as part of reactor heat removal. Steam generator level and pressure control are required during hot standby. However, during certain portions of hot shutdown and all of cold shutdown, the residual heat removal system is operable and these sub-functions are not required. Other sub-functions such as emergency power, process cooling, etc., are included as support functions.

In addition to the performance goals and safe shutdown functions identified in Generic Letter 81-12, the reactor coolant pressure control function has been included. Although this function could be placed within the reactor coolant makeup function and reactor heat removal function, the specific goals achieved by the performance of this function are unique enough to warrant a separate safe shutdown function classification. Multiple spurious operation of components due to fire damage on cables has also been considered.

The performance goals and safe shutdown functions identified in the generic letter adequately ensure that the containment pressure boundary will not be threatened. Uncontrolled mass and energy releases to the containment from the primary systems are limited by the achievement of these safe shutdown functions and will ensure that no rupture of the reactor coolant or containment pressure boundaries will occur.

Figures III-1 through III-4 present the Appendix R safe shutdown/interaction analysis flow chart. The figures include:

(1) Identification of performance goals and functions

(2) Identification of safe shutdown systems

(3) Identification of safe shutdown equipment

(4) Identification of safe shutdown cables

(5) Performance of separation/interaction analysis

(6) Documentation of compliance strategies

These topics are described below.

2.0 SAFE SHUTDOWN FUNCTIONS

This section provides a brief overview of the WBN safe shutdown functions. The specific safe shutdown functions necessary to satisfy the performance goals and safe shutdown functions of Appendix R as identified in Enclosure 1 to Generic Letter 81-12 are:

(1) the reactivity control function

(2) the reactor coolant makeup function

(3) the reactor coolant pressure control function

(4) the reactor/residual heat removal function

(5) the process monitoring function

(6) the support function

2.1 Reactivity Control

After a reactor trip, the reactivity control systems must be capable of achieving and maintaining adequate reactivity shutdown margin from zero power hot standby to cold shutdown. The function must be capable of compensating for any reactivity changes associated with xenon decay and reactor coolant temperature decrease which occur during cooldown to cold shutdown conditions.

2.2 Reactor Coolant Makeup

The reactor coolant makeup systems shall be capable of assuring that sufficient make-up inventory is provided to compensate for reactor coolant system (RCS) fluid losses due to identified leakage from the reactor coolant pressure boundary and shrinkage of the RCS water volume during cooldown from hot standby to cold shutdown conditions. Adequate performance of this function is demonstrated by the maintenance of reactor coolant level within the pressurizer.

2.3 Reactor Coolant Pressure Control

Reactor coolant pressure control is required to assure that the RCS is operated:

(1) Within the Technical Specifications for RCS pressure-temperature requirements;

(2) To prevent peak RCS pressure from exceeding 110% of system design pressure; and

(3) With a sufficient sub-cooling margin to minimize void formation within the reactor vessel.

2.4 Residual Heat Removal

The residual heat removal (RHR) systems shall be capable of transferring fission product decay heat from the reactor core at a rate such that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. The function shall be capable of achieving (for alternative shutdown) cold shutdown within a 72-hour period and maintaining cold shutdown conditions thereafter.

2.5 Process Monitoring

When information on process variables is required by operators to modify safe shutdown system alignments or control safe shutdown equipment, such monitoring information must be

available. The process monitoring function shall be capable of providing, if possible, direct readings of those plant process variables necessary for plant operators to perform and/or control the previously identified functions.

2.6 Support

The systems and equipment used to perform the Fire Safe Shutdown (FSSD) functions may require miscellaneous support functions such as process cooling, lubrication and AC/DC power. These supporting functions shall be available and capable of providing the support necessary to assure acceptable performance of the FSSD functions.

3.0 ANALYSIS OF SAFE SHUTDOWN SYSTEMS

3.1 Introduction

Various analytical approaches ensure that sufficient plant systems are available to perform the FSSD functions. Numerous plant systems are available, alone and in combination with other systems, to provide these required functions. A minimum set of plant systems and components are identified to demonstrate that the plant can achieve and maintain safe shutdown per TVA's commitments to Appendix R at WBN. In addition, for control building fires that require shutdown from outside of the Main Control Room (MCR), the concurrent loss of off-site power is also assumed. Providing adequate protection of this minimum system, component, and cable set from the effects of postulated fires constitutes an adequate and conservative demonstration of the ability to achieve and maintain safe shutdown for the purpose of fire protection.

The safe shutdown systems selected for WBN are capable of:

(1) achieving and maintaining subcritical conditions in the reactor,

(2) maintaining reactor coolant inventory,

(3) achieving and maintaining hot shutdown conditions for an extended period of time,

(4) within 72 hours, performing cold shutdown repairs needed to achieve and maintain cold shutdown (or, for control building fires that require shutdown from outside of the MCR, achieving cold shutdown conditions within 72 hours), and

(5) maintaining cold shutdown conditions thereafter.

Common Unit 1 and Unit 2 support systems and process monitoring equipment (such as Component Cooling System (CCS), Essential Raw Cooling Water (ERCW), electrical power distribution, and common area HVAC) are required for the safe shutdown analysis. In the electrical power distribution discussions, reference is made to "per unit" equipment. "Per unit", as used in the discussions, designates the Unit 1 and Unit 2 common support equipment that are required for safe shutdown of the plant.

3.2 Initial Assumptions

(1) Each unit is operating at 100% power upon the occurrence of a fire.

(2) For alternative shutdown locations (control building fires that require shutdown from

outside of the MCR), a loss of off-site power is assumed.

(3) The affected reactor(s) is/are tripped either manually or automatically.

(4) No failures are considered other than those directly attributable to the fire.

(5) Equipment required for safe shutdown is assumed to be operable (i.e., not out of service).

3.3 Definitions

Hot Standby (Mode 3)	The initial safe shutdown state with the reactor at zero power, K_{eff} less than 0.99 and average RCS temperature T_{avg} greater than or equal to 350^0 F.
Hot Shutdown (Mode 4)	Reactor at zero power, K_{eff} less than 0.99 and average RCS temperature T_{avg} between 350^0F and 200^0F.
Cold Shutdown (Mode 5)	Reactor at zero power, K_{eff} less than 0.99 and average RCS temperature T_{avg} below or equal to 200^0F.
Sub-cooling Margin	The difference between the saturation temperature at the RCS pressure, and the maximum temperature in the hot legs or Reactor Pressure Vessel (RPV).

3.4 Safe Shutdown Functions

The following is a comparison of the Generic Letter 81-12 safe shutdown functions and the corresponding safety functions used in the Appendix R FSSD analysis for WBN:

GL 81-12 Safe Shutdown Function	WBN Safety Functions
Reactivity Control	Initial Reactivity Control
Reactor Coolant Makeup Control	RCS Inventory Control RCP Seal Integrity RCS Pressure Boundary Control RCS Makeup and Letdown RCS Seal Injection
Reactor Coolant Pressure Control	RCS Pressure Control
Decay Heat Removal	SG Inventory Control Secondary Side Pressure Control Secondary Side Isolation Long -Term Heat Removal
Process Monitoring Instrumentation	(no specific correlation, in logics by system)

GL 81-12 Safe Shutdown Function	WBN Safety Functions
Support	Electrical Supply Containment Integrity Environmental Control Process Cooling

Each plant system or subsystem function relied on to accomplish the above safe shutdown functions is identified. A separate designator is assigned to each plant system or subsystem function to ensure consistency between analysis documents and calculations. Each designator is identified as a safe shutdown "Key". Figure III-5 depicts the safe shutdown system and/or system function, associated Key number, and logical relationships between systems and Keys used to demonstrate compliance with Appendix R criteria. Table 3-1 identifies the plant systems and subsystems sorted by Key. The correlation between Keys and safe shutdown systems is provided in Section 4. The following sections provide a general description of the methods and systems used to satisfy the safe shutdown performance goals and functions as delineated in Generic Letter 81-12.

3.4.1 Reactivity Control

Initial reactivity control will result from an automatic reactor protection system (RPS) trip or from operator initiation of a manual trip upon notification of a major fire. This action will de-energize the normally energized control rod drive mechanism (CRDM) to actuate a reactor trip. The RPS has a diversity of inputs, each of which "fails safe" and will actuate on an open circuit or a loss of power. As such, fire damage to the RPS will not preclude the initiation of an automatic trip or control rod insertion.

Following rod insertion, hot standby (subcritical, Mode 3) conditions may be maintained for over eight hours with no addition of boron, assuming all rods are inserted into the core (even if the highest worth rod is not inserted) and the reactor trip occurs at end of fuel life and at 100% power, with xenon at steady-state level. (Note that for the Appendix R analysis, the stuck-rod assumption is not required.) As xenon decays it adds positive reactivity, requiring the addition of borated water from the refueling water storage tank (RWST) to maintain the required shutdown reactivity margin. The cooldown transition from hot standby to hot shutdown, and ultimately to cold shutdown, requires additional boration to compensate for the moderator's negative temperature coefficient. The chemical and volume control system (CVCS) draws minimum 2000 ppm boron water from the RWST and injects it into the RCS to achieve and maintain the required shutdown reactivity level.

3.4.2 Reactor Coolant Make-up Control

For the assumed fire scenario, reactor coolant makeup control can be achieved by isolating normal make-up and boron injection tank (BIT) injection path, isolation of the normal and excess letdown CVCS paths, and operation of the charging portion of the CVCS through the reactor coolant pump (RCP) seal injection path. Reactor coolant makeup is available post-reactor trip.

Successful maintenance of RCS integrity is also necessary to achieve adequate inventory control. Inadvertent opening of boundary isolation valves such as the reactor head vent valves and RHR suction isolation valves has been precluded. Adequate reactor coolant pump seal integrity is maintained to assure safe shutdown.

Control of pressurizer water level is achieved manually by controlling CVCS charging flow based on charging flow or pressurizer level information. The total quantity of water from the RWST which must be injected into the RCS to achieve the required cold shutdown margin is less than the quantity of borated water required to maintain a constant pressurizer level during cooldown (RCS volume shrinkage compensation).

3.4.3 Reactor Coolant Pressure Control

Establishing and maintaining a sufficient sub-cooling margin within the RCS is required to minimize void formation in the core and to ensure the ability to maintain natural circulation (if the RCPs are not operable) through the steam generators (SGs). This is essential to achieving and maintaining safe shutdown.

Overpressure protection of the RCS prior to a controlled cooldown and depressurization is provided by the pressurizer safety valves. During cooldown from Mode 3 hot standby (above 350 °F) to Mode 4 hot shutdown (below 350 °F), pressure control may be by pressurizer heaters or by varying pressurizer level in combination with control of SG pressure and RCS temperature using SG power operated relief valves (PORVs). Pressure is reduced by discharging to the pressurizer relief tank (PRT) using either the reactor coolant (pressurizer) PORVs or reactor head vent valves. To ensure adequate RCS pressure and adequate sub-cooling margin, the operator will isolate pressurizer spray valves, or trip the RCPs to limit depressurization, and isolate the pressurizer auxiliary spray. Entering Mode 4 will permit aligning the RHR system to the RCS for decay heat removal. While on RHR, the maximum pressures in both the RHR and RCS systems are limited by the RHR system safety valves.

The specific combinations of systems used are identified in Part VI under the safe shutdown analysis discussion for each plant location.

3.4.4 Reactor Heat Removal

Following a reactor trip with loss of off-site power (either assumed or caused by the fire), decay heat is initially removed by natural circulation within the RCS, heat transfer to the main steam system via the steam generators, and operation of the steam generator PORVs or lift of the main steam system code safety valves.

For decay heat removal via natural circulation a minimum of two steam generators will be available. Decay heat removal requires the ability to supply sufficient auxiliary feedwater to the steam generators to make up for the inventory discharged as steam by the safety valves or steam generator PORVs. For maintenance of initial hot standby conditions, the required feedwater flow to the steam generators is supplied by the auxiliary feedwater (AFW) system. AFW sources are available from the condensate storage tanks, and alternatively, from the ERCW system. AFW may be supplied to the steam generators by the motor-driven AFW pumps or by the turbine-driven AFW pump. Continued heat removal is achieved by the controlled operation of the PORVs and continued operation of the AFW system. After reduction of RCS temperature to 350^{0}F, the RHR system is used to establish long-term core cooling by the removal of decay heat from the RCS to the environment via the RHR, CCS, and ERCW systems.

3.4.5 Process Monitoring Instrumentation

The operator requires knowledge of various plant parameters to perform required system transitions and essential operator actions. A discussion by safe shutdown function of the necessary instrumentation is provided below.

For the fire scenarios assumed in this analysis, inventory make-up to the RCS will be from the RWST through the RCP seal injection lines. As previously discussed, sufficient negative reactivity exists in the RCS (after rod insertion) for over eight hours without the need for additional boron. Furthermore, the negative reactivity inserted by the control rods and borated water injected by the CVCS (to compensate for the RCS volume decrease) will maintain the core subcritical while cooling down from hot full power to a cold shutdown condition, even assuming no letdown is available. Sufficient boron is added to the primary system in a timely manner via charging of borated water through the seals to achieve the necessary cold shutdown reactivity margin. With boron concentration in the Volume Control Tank (VCT) and RWST under procedural control, no operator actions are required based on direct-reading neutron monitoring to ensure an adequate safe shutdown negative reactivity margin. However, core source range detectors will be available for core reactivity monitoring in the MCR or local station. An additional source range channel indicator is available in the Auxiliary Control Room (ACR) to provide this information for fires in control building areas requiring alternative shutdown.

Various process monitoring functions must be available to adequately achieve and maintain the reactor coolant makeup, pressure control and decay heat removal functions. For the assumed fire scenario, maintenance of hot standby requires that pressurizer level and RCS pressure instrumentation are available. RCS temperature is maintained during hot standby by proper decay heat removal via steam generators using the steam generator PORVs. When the reactor coolant pumps are tripped and cooling is required in the natural circulation mode of operation, the difference between the hot-leg and cold-leg wide range temperatures (T_h-T_c) provide indication of the existence of a natural circulation condition.

RCS hot and cold leg temperature instrumentation is available for use given a fire that does not require MCR abandonment. For alternative shutdown, SG pressure instrumentation is required in order to provide a means of determining RCS cold-leg temperature from the ACR. (Refer to Part VII for the deviation request associated with T_{sat} in lieu of direct indication of T_c in the ACR.) During RCS cooldown, SG pressure will be controlled to maintain desired RCS temperature by manual control of the SG PORV if control from the MCR is unavailable.

Operating personnel will maintain RCS pressure to assure that appropriate sub-cooling margin is achieved by monitoring of RCS pressure and hot leg temperature (T_h) instrumentation. Manual control of the pressurizer heaters may be used if available, but is not required for safe shutdown. Pressurizer level control is maintained by monitoring pressurizer level instrumentation and manual control of CVCS charging flow through the RCP seals.

The above methods of controlling primary system parameters by means of the secondary system require monitoring secondary system parameters. Steam generator level and pressure indicators are available to assure adequate and controlled decay heat removal. Steam generator level is controlled by operator manipulation (either from the MCR or locally) of AFW system flow based on steam generator wide range level indication or AFW system flow and steam generator narrow range level indications. Use of AFW flow indication and narrow range

level indication for monitoring SG inventory is consistent with analyses for FSAR Chapter 15 design basis events. Secondary system pressure will be monitored by steam generator pressure indication.

The plant operators will utilize the instrumentation discussed above for monitoring natural circulation conditions, sub-cooling margin, heat removal and compliance with the RCS low temperature pressure/temperature limits (minimum cold leg temperature for a given RCS pressure).

3.5 Support Functions

The support functions for various safe shutdown equipment or systems are provided by the following systems:

(1) Emergency Power Distribution System

(2) Offsite Power System

(3) Essential Raw Cooling Water System

(4) Component Cooling Water System

(5) Ventilation to areas containing essential fire safe shutdown equipment

(6) Main Control Room chillers and ventilation

The following sections discuss the required safe shutdown systems and support systems.

4.0 SAFE SHUTDOWN SYSTEMS

4.1 Chemical and Volume Control System (CVCS) - Keys 1A, 2, 4, 5, 9

The charging portion of the CVCS accomplishes the following safe shutdown functions:

(1) Reactivity control by injection of boron into the RCS

(2) Reactor coolant makeup control by maintaining seal water injection to the RCS

(3) Maintenance of reactor coolant pump seal integrity

Reactivity control for safe shutdown is provided by the control rods, with boron injection used to compensate for the xenon decay and positive reactivity insertion due to cooldown. Insertion of the control and shutdown rod groups make the reactor adequately subcritical following trip from any credible operation condition to the hot zero power condition, even assuming the most reactive rod remains in the fully withdrawn position.

For the assumed post-fire scenario, makeup water to the RCS will be provided by the CVCS from the RWST. When the unit is at power, the concentration of boron in the RWST exceeds that quantity required to bring the reactor from an initial hot standby condition to hot shutdown and then to cold shutdown, assuming that the only volume injected is that required to make up for reactor water volume decrease due to cooling. Letdown, which would permit adding more

borated water, is not necessary to achieve adequate boron concentration for cold shutdown reactivity margin.

Numerous CVCS paths are normally available for charging to the RCS. The flow path that will be used to provide reactor coolant makeup and boration is the charging line to the reactor coolant pump seals. This path will be available by ensuring that at least one of the charging pumps is operable and charging flow control valve remains open.

For the assumed event, charging and boration will be accomplished by operating a minimum of one centrifugal charging pump taking suction from the RWST and injecting borated water through the RCP seal injection line to the RCS. Suction to the charging pump can be delivered from the RWST by opening either one of two normally closed motor-operated valves.

Controlled leakage (letdown) from the RCS normally occurs via the seal leak-off return path and the normal and excess letdown paths. For the post-fire operational scenario, the normal and excess letdown paths will be isolated. Isolation of the normal and excess letdown lines may occur as a result of loss of instrument air or will be achieved by operator action to assure adequate inventory control. Procedural controls for isolation of all potentially spurious RCS letdown paths, including pressurizer PORVs and reactor head vents, provide assurance that isolation of normal and excess letdown paths will be achieved.

The injection path from the charging pumps to the reactor coolant pump seals contains the charging flow control valve (normally open) which is provided with a minimum-flow pneumatic stop. Thus, operation of one charging pump will ensure availability of minimum RCS charging flow. In the event of failure of the pneumatic stop and complete cutoff of injection path flow, thermal barrier cooling (Key 9) is credited to assure seal integrity until charging is reestablished. Thermal barrier cooling ensures that the RCP seal integrity is maintained. No boron injection is required during this period.

Isolation of the VCT by closure of either one of two motor-operated valves during emergency makeup from the RWST can be performed either remotely or by local manual operation. The VCT is isolated to prevent introduction of H_2 cover gas into the centrifugal charging pump (CCP) suction in the event of VCT drainage.

Pressurizer water level is maintained by operation of one centrifugal charging pump using pressurizer level instrumentation information.

4.1.1 Centrifugal Charging Pumps - Key 1A

The two high-head centrifugal charging pumps (per unit) are normally aligned for the CVCS charging function. During design basis accidents, they are part of the Emergency Core Cooling System (ECCS). The centrifugal charging pumps are of the horizontal multistage type with a design flow rate of 150 gpm at 5800 feet total dynamic head. Each pump is designed to provide rated flow against a pressure equal to the sum of the RCS normal maximum pressure (existing when the pressurizer PORV is operating) and the piping, valve and equipment pressure losses at the design charging flows. Each of the centrifugal charging pumps has a motor-operated minimum re-circulation flow valve to prevent damage to the pump when it is operating at shut-off pressure. The pumps require cooling water from the CCS to their mechanical-seal heat exchangers, gear oil coolers, bearing oil coolers and seal housings.

4.1.2 Refueling Water Storage Tank - Key 5

In addition to its normal duty to supply borated water to the refueling cavity for refueling operations, the RWST provides borated water to ECCS pumps for cooling and to provide shutdown margin.

The capacity of the refueling water storage tank (one per unit) is based on the requirement for filling the refueling cavity. This quantity is in excess of that required for safe shutdown. The Technical Specification requirement for the volume of the RWST is 370,000 gallons of borated water at a minimum concentration of 2000 ppm boron.

4.2 Reactor Coolant System - Keys 7, 8, 28, 48

The RCS consists of four similar heat transfer loops (per unit) connected in parallel to the reactor vessel. Each loop contains a reactor coolant pump and a steam generator. In addition, the system includes a pressurizer with associated code safety and power-operated relief valves (PORVs). RCS instrumentation includes cold-leg and hot-leg temperatures (wide range), pressure (wide range), and pressurizer water level.

The natural circulation capability of the plant provides a means of decay heat removal when the reactor coolant pumps are unavailable. Natural circulation flow rates are governed by the amount of decay heat, relative component elevations, primary to secondary heat transfer, loop flow resistance, steam generator and RCS inventories, and any RCS voiding. These conditions determine whether adequate primary to secondary heat transfer and sub-cooling during natural circulation can be maintained.

For this analysis of safe shutdown capability, two of the four RCS loops (for which steam generator level and pressure are controlled) will be available to ensure that natural circulation is established and maintained.

While in natural circulation, adequate heat transfer and coolant flow are dependent on adequate inventory in both the primary and secondary systems. Maintaining water level above the "U" tubes on the secondary side of the steam generators and adequate level within the pressurizer are required for natural circulation. RCS loop temperatures confirm flow and heat transfer while in natural circulation. Cold-leg temperature (T_c) should drop to a few degrees higher than the saturation temperature of the secondary inventory. Hot-leg temperature (T_h) should reach a value which is less than at full power but higher than T_c.

RCS inventory control is based on the operation of CVCS charging paths. High pressure seal water from the CVCS system is injected into the reactor coolant pumps lower radial bearing chamber to prevent leakage of high temperature reactor coolant along the pump shaft. The injection flow splits in the bearing chamber with a portion flowing up through the radial bearing and into the shaft seal chamber. The remaining portion flows down the shaft, through the RCP thermal barrier and into the RCS. For added operational flexibility in certain post-fire scenarios, RCP thermal barrier cooling provided by CCS is available for safe shutdown. Maintenance of either seal injection or thermal barrier cooling provides adequate protection of the RCP seals.

4.2.1 Pressurizer Heaters

The pressurizer heaters are not required to operate for safe shutdown. Alternate means of controlling RCS pressure are credited in the WBN Appendix R analysis. (Refer to Calculation WBN-OSG4-031 and EEB-EDQ00099920090012 for details.) However, should the pressurizer heaters be available, sub-cooling within the RCS can be maintained by controlled operation of the pressurizer heaters. The availability of pressurizer heaters has been analyzed to enhance the capability of controlling RCS pressure and sub-cooling margin. The locations where pressurizer heaters are available are documented in Part VI of the FPR. The heat from one pressurizer heater will conservatively cover heat losses from the pressurizer at or below normal operating temperature and pressure.

4.3 Main Steam Systems - Keys 20, 21, 22, 24, 25, 26

For the post-fire scenario, maintenance of the steam generator inventory and control of steam generator pressure are required for both hot standby and subsequent primary system cooldown to support the decay and sensible heat removal function, within the applicable operational limits, until initiation of RHR to bring the affected unit to cold shutdown.

The main steam (MS) system for each unit consists of four parallel flow paths, one from each steam generator to the main turbine of the unit. The MS system will be isolated either by operation of the turbine stop and control, dump, reheat, feed turbine stop and control, and gland steam valves; or by the main steam isolation valves.

In accordance with supporting analyses, inventory control of two steam generators provides the reactor heat removal function during natural circulation conditions. Maintenance of the steam generator water level during the period of AFW operation (hot standby) involves either MCR operator or local manual positioning of the AFW level control valves and operation of the motor-driven or turbine-driven AFW pumps based on steam generator level information. Steam generator water level and pressure indication are available in the MCR and in the ACR.

The MS system also delivers motive steam to the turbine-driven AFW pump. Steam to the turbine is supplied by branch connections upstream of the main steam isolation valves on two steam lines (corresponding to steam generators No. 1 and 4). Either line is sufficient to supply steam for the AFW pump turbine, however, credit is only taken for steam supply from steam generator No. 1.

4.3.1 Steam Generator Power - Operated Relief Valves

A power-operated relief valve (PORV) provided on each steam line is capable of releasing the sensible and decay heat to the atmosphere. The PORVs are used for plant cooldown by steam discharge to the atmosphere since the steam dump system is assumed to be unavailable. The PORVs have a total combined capacity of approximately 10% of the maximum steam flow. For the assumed fire scenario, a minimum of two PORVs will be available to support controlled cooldown of the RCS.

Controls for the steam generator PORVs are provided in the MCR and locally at the shutdown stations. During hot standby conditions, the steam generator PORVs are used in MCR modular mode or manual steam pressure control mode. In this mode, the RCS temperature is controlled by maintaining the steam generator at the corresponding saturation pressure.

4.4 Auxiliary Feedwater System - Keys 11, 12, 14, 16, 17, 19

The AFW system is required during hot standby to support RCS decay heat removal. For hot standby, secondary system (steam generator) inventory control is provided by the AFW system. Two motor-driven pumps and one turbine-driven pump are provided to each unit. Each motor-driven pump is rated at 450 gpm at a nominal 3270 feet total dynamic head. The turbine-driven pump is rated at 790 gpm at 3350 feet total dynamic head. The pumps have the design capability to provide the rated flow, less bypass, against the lowest steam generator safety valve setpoint plus 3% accumulation and 3% set error.
The AFW system is designed to deliver enough water to maintain sufficient heat transfer in the steam generators in order to prevent loss of primary water through the RCS pressurizer safety or relief valves.

4.4.1 Turbine-Driven Auxiliary Feedwater Pump

The turbine-driven AFW pump (one per unit) is designed to deliver a sufficient flow to all four steam generators and maintain steam generator water levels at the lower limit of the wide range level indicator. The pump is a horizontal, six-stage, centrifugal pump driven by a single-stage atmospheric exhaust turbine. During automatic operation the turbine speed, and therefore capacity, are governed by pump flow. The turbine is provided with automatic speed control that ensures a minimum of 720 gpm. Manual speed control is also provided to enable the operator to control speed from 2076 rpm to 3950 rpm. Use of the speed control in combination with manual operation of the level control valves (LCVs) allows the operator to control the flow from 0 to 720 gpm. Two overspeed trip devices are provided. The electrical overspeed trip resets automatically. The higher mechanical overspeed trip device must be reset manually.

The AFW pump turbine lube oil system uses a pump driven from the turbine shaft. Water for the turbine oil cooler and pump bearing cooler is supplied from the AFW pump discharge line. Lube and control oil and lube oil cooling are therefore available whenever the AFW pump turbine is operating.

Steam generators No. 1 and/or 4 provide motive steam to the turbine-driven AFW pump. However, only the steam supply from steam generator No. 1 is credited for safe shutdown. The turbine-driven AFW pump is capable of operating down to a steam pressure of 115 psia, which is below the pressure at which the RHR system must be placed in service.

4.4.2 Motor-Driven Auxiliary Feedwater Pumps

WBN is supplied with two motor-driven AFW pumps per unit with only one per unit required for safe shutdown. Pump A supplies SGs 1 and 2 and Pump B supplies SGs 3 and 4. Each pump is a horizontal, nine-stage centrifugal pump. Bearings are cooled by water from the first stage. A separate motor-driven oil pump is provided for motor bearings. Pump bearings use ring oilers. The pumps require no external lube oil cooling or other support services other than AC power.

4.4.3 Condensate Storage Tank

Each unit is provided a Condensate Storage Tank (CST). At hot standby, the minimum volume of water required by the WBN Technical Specification for each CST is 200,000 gallons. The CST is normally aligned to the supply for the AFW pumps. As a backup, cross-ties to the AFW

supply from the ERCW system are provided. Ample time is available post-fire for a local manual realignment of the supply to the AFW pumps from CST to ERCW.

4.5 Residual Heat Removal System - Keys 30, 31

The RHR system is designed to remove residual and sensible heat from the core by reducing the temperature of the RCS during the hot and cold shutdown phases of safe shutdown. The following discussion is applicable for each unit.

The RHR system for each unit consists of two RHR heat exchangers, two RHR pumps and associated piping, valving and instrumentation necessary for operational control. The design residual heat load is based on the residual heat fraction of the full core MW (thermal) power level that exists 20 hours following reactor shutdown from an extended power run near full power.

During cold shutdown operations, reactor coolant flows from the RCS to the RHR pumps through the tube side of the RHR heat exchangers and back to the RCS. The heat load is transferred to CCS on the shell side.

Four motor-operated valves isolate the inlet line to the RHR system from the RCS. The four valves are arranged in an "H" Configuration, with pairs of parallel valves in series. To avoid potential RCS boundary leakage at this high/low pressure interface, all four of the motor-operated valves in the RHR suction line will be kept closed (pre-fire condition) with the corresponding motor control center breaker in the open position. The return lines are isolated by two series check valves in each line and a common motor-operated valve.

A minimum-flow return line from the downstream side of each RHR heat exchanger to the corresponding pump's suction line is provided to assure that the RHR pumps do not overheat under low flow conditions. A motor-operated valve located in each minimum flow line will be opened if RHR pump flow falls below 250 gpm and will be closed when the flow increases above 1100 gpm.

The cooldown rate of the reactor coolant is controlled by regulating the flow through the tube side of the RHR heat exchangers. A bypass line, which serves both residual heat exchangers, is used to regulate the temperature of the return flow to the RCS as well as to maintain a constant flow through the RHR system.

The RHR system can be placed in operation when the pressure and temperature of the RCS are about 400 psig and 350^{0}F, respectively. If one of the pumps and/or one of the heat exchangers is not operable, safe operation of the plant is not affected; however, the time for cooldown is extended.

4.5.1 Residual Heat Removal Pumps

Two identical pumps per unit are installed in the RHR system. Each pump is sized to deliver sufficient reactor coolant flow through the residual heat exchangers to meet the unit's cooldown requirements. A seal heat exchanger for each pump is supported by operation of the CCS.

4.5.2 RHR Safety Valves

The RHR system safety valves provide RCS cold overpressure protection whenever the RHR system is in operation. The valves are located inside containment, one each on the RHR system suction and discharge path, and discharge to the pressurizer relief tank. The valves are set at 450 psig and 600 psig, respectively.

4.6 Safety Injection System Accumulators - Key 36

During normal plant operating conditions, the safety injection system accumulators are pressurized by nitrogen gas in order to inject borated water in the RCS when RCS pressure falls below 600 psi unintentionally. During a controlled depressurization, the accumulators are isolated to prevent injection of safety injection system accumulator borated water. However, if the isolation valves remain open, the borated water will be injected and nitrogen pressure will decrease due to the increased empty volume of the accumulators. Injection of nitrogen into the RCS occurs when RCS pressure is less than 150 psi.

The manual isolation of the accumulators is assumed as a post-fire activity. The isolation valve at each accumulator is closed only when the RCS is intentionally depressurized below 1000 psig. If the cables associated with these valves were damaged by fire, isolation is performed locally per appropriate plant procedures (post-fire). In the event the valves are inaccessible, RCS pressure will be maintained greater than 150 psi to preclude nitrogen injection into the RCS via the accumulators.

4.7 Component Cooling System (CCS) - Key 1B

CCS is a supporting system to other safe shutdown systems. Two redundant trains per unit are available. For each unit, Train A consists of two available pumps (pumps 1A-A and 1B-B for Unit 1 and pumps 2A-A and 2B-B for Unit 2) and the associated valves, piping, instrumentation and heat exchanger (Heat Exchanger A for Unit 1 and Heat Exchanger B for Unit 2). Train B is common for both units and consists of one pump (pump C-S) and the associated valves, piping, instrumentation and heat exchanger (Heat Exchanger C). Each unit has a Train A pump (1A-A for Unit 1 and 2A-A for Unit 2) which receives electrical power from Train A. Each unit also has a Train A pump (1B-B for Unit 1 and 2B-B for Unit 2) which receives electrical power from Train B. These pumps are normally aligned to the Train A piping system for that unit but can be aligned to the common Train B piping system. The C-S pump, which normally receives Train B electrical power while serving as the common Train B CCS pump, is capable of being powered from a Train A power source.

The CCS system serves as an intermediate heat transfer loop between the various safe shutdown components and the ERCW system (ultimate heat sink).

The CCS system provides cooling for the following safe shutdown equipment per unit:

(1) Residual heat removal exchangers
(2) Centrifugal charging pumps
  (a) Mechanical-seal heat exchangers
  (b) Gear oil coolers
  (c) Bearing oil coolers
  (d) Seal housing

(3) Residual heat removal pumps mechanical-seal heat exchangers
(4) Reactor coolant pump thermal barrier heat exchanger (Train A only)
(5) Spent fuel pool cooling system heat exchanger (Train A only)
(6) Chemical volume control system seal water heat exchanger (Train A only)

One CCS pump and its associated CCS heat exchanger fulfill the heat removal function of a unit during normal full-load operation for various components located in the auxiliary and reactor buildings. During normal unit cooldown in RHR mode, two CCS trains (i.e., that unit's Train A and the common Train B) are utilized to remove the residual heat. If only one train is used, cooldown is at a lower rate. Both units are not typically cooled from hot standby to cold shutdown at the same time.

Other than the RHR heat exchangers, the essential loads are normally valved open to the supply header and discharge to the suction of the CCS pump with which they are normally associated, so that component cooling water is circulated continuously through the essential loads during normal operation.

The CCS outlet lines from each unit's Train A RHR heat exchangers (one per unit) have a normally closed motor-operated valve which must be opened during RHR cooldown. The CCS outlet lines (one per unit) from the Train B RHR heat exchanger have throttleable motor-operated valves. The valve for the unit undergoing cooldown must be open during RHR cooldown and the other unit's valve must be closed. The motor-operated valves that isolate the RCP thermal barrier coolers (Train A only) are included as safe shutdown components for operational flexibility in a post-fire scenario, since the thermal barriers may be required to perform a redundant function to RCP seal injection cooling.

4.8 <u>Essential Raw Cooling Water System - Key 1C</u>

The ERCW system provides cooling for the following safe shutdown heat transfer equipment:

(1) Component cooling heat exchangers

(2) Emergency diesel generator heat exchangers

(3) Essential ventilation coolers and water chillers

(4) Auxiliary control air compressors

The system also provides a back-up supply of water to the AFW system in the event that the condensate storage tank is depleted.

This system consists of four traveling water screens and their wash pumps, eight pumps, four discharge strainers, and four main headers (1A, 1B, 2A, and 2B). These components, together with the associated heat exchangers, valves, piping and local instrumentation, complete the ERCW system.

The ERCW system can remove the heat transferred to CCS, plus the heat loads of the emergency diesel generator engine (EDG) coolers (i.e.. the air aftercoolers, lubricating oil cooler, and jacket water cooler), auxiliary control air compressors and essential ventilation coolers and water chillers, and provide makeup flow to the turbine and motor-driven AFW pumps.

The four Train A ERCW pumps are installed in a portion of the intake pumping station separate from the Train B pumps. The Train A pumps supply ERCW to two Train A ERCW headers (i.e., 1A and 2A). Interlocks exist to preclude starting more than one ERCW pump on a single diesel generator. One ERCW pump is sufficient to carry the heat load of one unit during normal operation or hot standby conditions. Normal ERCW alignment is for Train A ERCW header 2A to provide cooling to both unit's Train A CCS heat exchangers which will utilize two Train A ERCW pumps. Three pumps (two Train A and one Train B) will normally be used to carry the dual unit heat removal duties of the system during RHR cooldown of a unit. Local manual operation of motor-operated valves and strainers is credited post-fire. Train B pumps and headers are arranged similar to the Train A configuration.

4.9 Essential HVAC - Keys 37A, 37C, 37J, 37K, and 37O

Essential HVAC is provided for the control, auxiliary, diesel generator, and reactor buildings. Portions of the systems in each building that service safe shutdown equipment required for compliance with Appendix R have been analyzed to ensure that at least one path of the required systems will be available for an Appendix R fire. The systems consist of filters, fans, ductwork, dampers, heating/cooling coils, instrumentation, and controls for general building ventilation, along with separate systems for individual rooms. The required systems, components, and cables for those subsystems relied on to protect equipment for safe shutdown have been incorporated into the Appendix R analysis as required equipment and cables. The location of equipment and routing of cables has been identified and evaluated as described in Sections 5 and 6 of this Part. These systems are discussed below.

The primary safety-related portions of the control building are cooled by two independent trains of HVAC. The two trains are separated by fire barriers and/or separation distance in accordance with Appendix R requirements to ensure that the control building HVAC system will remain functional during a fire. The entire control building HVAC system is separate from the HVAC system servicing the ACR.

The auxiliary building HVAC system is required to achieve and maintain hot standby. Specifically, HVAC is required for the 480V transformer rooms and for the general floor area on the 713' elevation to support the use of the motor-driven auxiliary feedwater (MDAFW) and CCS pumps. Individual room coolers are also required for the CCP and RHR pumps and are addressed in the equipment logics for their respective systems (Keys 1A and 31).

The turbine-driven auxiliary feedwater (TDAFW) pump room is provided with a DC operated exhaust fan sized (1200 CFM +/-10%) to provide required air flow in the room for the volume method of cooling. The fan is a roof ventilator type with intake and venting to the general area of the auxiliary building. The fan will automatically start upon the start the TDAFW pump. The fan is addressed in the TDAFW pump equipment logic (Key 14).

The diesel generator HVAC systems serve each combination of diesel generator and associated batteries and electrical boards. The diesel generator building HVAC system consists of various subsystems. The subsystems for each combination include diesel generator room HVAC subsystems, generator and electrical panel subsystems, battery hood exhaust subsystems, electric board room exhaust and heating subsystems, and muffler room exhaust systems. A fire in any combination of diesel generator and associated batteries and electrical boards, which are separate fire areas, will not affect the HVAC systems servicing the adjacent combinations of diesel generator and associated batteries and electrical boards.

The containment air cooling systems are designed to maintain acceptable temperatures within the upper and lower compartments, CRDM shroud, and instrument room for the protection of controls. Each unit's lower compartment cooling (LCC) system consists of (4) 33-1/3% fan coil assemblies. Each unit's CRDM cooling system consists of (4) 50% fan coil assemblies combined into two subsystems, with one fan coil assembly in each subsystem normally operating. Each unit's containment air cooling is evaluated to ensure either 3 out of 4 LCC fan coil assemblies, or 2 out of 4 LCC/CRDM pairs of fan coil assemblies, are available for Appendix R fire scenarios.

All other areas of the plant which contain equipment required for safe shutdown per Appendix R have been evaluated and determined that acceptable temperatures will be maintained for the required equipment to perform its intended function if HVAC is lost.

4.10 Onsite Power System - Key 38

The plant Emergency Power System (EPS) includes on-site, independent, automatically-starting emergency power sources that supply power to essential safe shutdown equipment if the normal off-site power sources are unavailable.

The emergency power sources consist of four 6.9kV diesel generators. Each consists of a single generator driven by two engines on a common shaft. Each diesel engine is equipped with its own auxiliaries. These include starting air, fuel oil, lube oil, cooling water, intake and exhaust system, speed regulator (governor) and controls. Cooling water is provided from the ERCW system while electric power for each engine's auxiliaries is provided by its own generator. The governors for each pair of engines are electrically linked.

4.10.1 6.9KV Shutdown Power System

Each of the four 6.9kV shutdown boards is normally fed from 161kV/6.9kV Common Station Service Transformers (CSSTs) that receive power from offsite sources. In addition, upon loss of the normal CSST, the 6.9kV boards will transfer the power source to another CSST.

Each of four 6.9kV shutdown boards can also be fed from the corresponding 6.9kV diesel generator. Loss of offsite power to the 6.9kV boards is sensed by undervoltage relays. Upon sensing an undervoltage, the master relay(s) automatically start the emergency diesel generators, trip the normal feed switchgear breakers and trip all motor feeder breakers on the boards. The emergency diesel generators can also be manually started locally, from the MCR, or from the ACR. For shutdown scenarios that do not require MCR abandonment, a switchgear breaker on each board is automatically closed when its diesel generator is at rated speed and rated voltage and re-energizes the bus. The essential loads are sequentially connected to the bus. For shutdown scenarios from the ACR, breaker closure and diesel generator loading is done manually. The emergency diesel generators will then supply all equipment which must operate under emergency conditions for the respective safeguard train.

4.10.2 480V AC Shutdown Power System

The 480V power system distributes power for low voltage station service demands. The normal source of power is the 6.9kV shutdown boards via the 6.9kV/480V transformers.

The 480V power system consists of eight boards, two per unit per train. Each 480V board is fed from the associated unit/train 6.9kV board through the normal or spare 6.9kV/480V transformers. There are a total of eight normal and four spare transformers, with each spare transformer able to feed either of the two boards of the same train/unit. The 480V shutdown boards feed 480V loads and various motor control centers (MCCs). The MCCs in turn feed various motor operated valves and other loads required for safe shutdown. Each MCC has a normal and alternate power source that can be utilized when needed for equipment maintenance.

4.10.3 120V AC Vital Instrument Power System

The 120V AC Vital Instrument Power System consists of four separate vital boards per unit. Each 120V AC Vital Bus is supplied by an independent inverter. Each station battery supplies two inverters (one per unit) of the same channel. Each channel also includes a normally de-energized spare inverter that can be energized and manually aligned to be an alternate supply to either Unit 1 or Unit 2 associated 120V AC vital bus. Each inverter is normally supplied by the 480V AC power system of the associated train (A for D or F and B for E or G) and can be supplied from the opposite trains via a manual transfer switch. In addition, the uninterrupted supply to each inverter is its respective 125V DC battery board via a static transfer switch scheme.

The output of each inverter is connected to its 120V AC vital instrument power board through a normally closed circuit breaker. The vital instrument power boards supply all of the required normal safe shutdown instrumentation per channel.

4.10.4 125V DC Power System

The 125V DC power system consists of four batteries, four normal chargers, two spare chargers, and four main DC battery boards. The 125V dc power system supplies power for control of 6.9kV/480V shutdown boards, operation of vital inverters, pneumatic-operated, solenoid controlled valves, and MCR emergency lights. The battery system consists of four separately located sets of batteries powering four channels of DC boards. Each normal vital battery has its own normal charger. Each vital battery board can also be supplied from one of two spare chargers. The battery chargers are energized from normal or alternate MCCs via a manual transfer switch. A fifth vital battery may be used as an installed spare and can be placed into service in place of any of the four normal vital batteries. The fifth vital battery is maintained by its own charger until connected to one of the normal vital battery boards.

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 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.

All direct current loads associated with engineered safeguards equipment are fully redundant. These loads are arranged so that each battery supplies its associated redundant channel.

4.10.5 250V DC Power System

The 250V DC power system consists of two batteries, two normal chargers, two spare chargers, and two 250V DC battery boards. Control power for start board power circuit breakers and associated protective relays is distributed from the 250V DC supply via circuit breakers on the turbine building DC distribution boards. The 250V DC power system provides power for non-safety-related loads and, for Appendix R fire scenarios, is used to operate steam load trip circuits and to provide capabilities to trip the RCPs.

4.11 Offsite Power System - Key 38A

The offsite power system evaluated for safe shutdown consists of CSSTs and common station service boards that provide power from the 161kV offsite power sources to the 6.9kV shutdown boards. Two CSSTs provide normal and alternate power to four 6.9kV shutdown boards. One CSST is the normal source for Train A shutdown boards and also supplies the alternate power to the Train B shutdown boards. The other CSST is the normal source for Train B shutdown boards and the alternate source to the Train A shutdown boards.

4.12 Containment Isolation - Key 10

In order to maintain the integrity of the containment boundary, it is necessary to ensure the capability to isolate all containment penetrations. The normal containment isolation requirements have been relaxed to be consistent with fire safe shutdown requirements and assumptions. Only one isolation boundary is necessary for each penetration and can consist of a check valve or a closed system on either side of the boundary regardless of the piping class. When penetrations are isolated only by electrically isolated valves, the valves were included as required FSSD components.

4.13 Reactor Trip - Key 29

A fire inside or outside of the control building may require the reactor trip to bring the plant to hot standby. Manual trip circuits for manual shutdown from the MCR are available for any fire except one that damages the reactor trip breakers. The RPS is not specifically protected from fire damage given the fail safe design of the RPS. Diversity of input signals could initiate a reactor trip, if required, before the trip is manually initiated. The reactor trip provides sufficient initial reactivity control. Long term reactivity control is accomplished by preventing boron dilution and assuring that injected makeup water is at least the boron concentration of the RWST.

4.14 Auxiliary Control Air System (ACAS) - Key 13

The ACAS provides essential air to the following fire safe shutdown equipment if the normal air supply system cannot maintain minimum system pressure:

(1) Turbine/Motor-driven auxiliary feedwater level control valves (LCVs)

(2) Motor-driven auxiliary feedwater pressure control valves (PCVs)

(3) Steam generator power operated relief valves (SG PORVs)

The ACAS is separated into two independent trains, one supplied from Train A power and the other supplied from Train B power. Each train consists of a compressor, receiver, dryer and filter. The system is supplied from two motor-driven, non-lubricated, compressors that are integral skid mounted assemblies. Relief valves are in place on the compressors and air receivers for overpressure protection. The ACAS automatically isolates from the non-essential control air system (CAS) on low pressure.

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 dual air dryer towers are alternately regenerated (purged) and fully pressurized for service via cam-operated cycling valves controlled by adjustable timers. The dryer is designed such that in the event of electrical failure to the equipment, it will continue to dry air for 4 to 8 hours. 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.

The ERCW system provides the source of cooling to the ACAS compressors, inter-coolers and after coolers.

5.0 IDENTIFICATION OF SAFE SHUTDOWN SYSTEM COMPONENTS

Section 4 described the specific systems which will be used to achieve safe shutdown. This subsection discusses the WBN method of selection of safe shutdown components.

For each system, plant flow diagrams (P&IDs), system descriptions and one-line diagrams were used to identify the precise primary flow paths and operational characteristics that must be established to accomplish the desired safe shutdown function. From this information, a list was compiled of the components which participate in the system's performance of its safe shutdown function. These components are:

(1) Active components that need to be powered to establish, or assist in establishing, the primary flow path and/or the system's operation;

(2) Active components in the primary flow path that normally are in the proper position whose power loss will not result in a change of position, but may be affected by open, short, or ground faults in control or power cabling;

(3) Power-operated components that need to change position to establish or assist in establishing the primary flow path, whose loss of electrical or air supplies result in the component adopting the required safe shutdown position but which may be affected by open, short or ground faults in control or power cabling; and

(4) Major mechanical components that support safe shutdown.

From the analysis of the safe shutdown system flow paths, those components whose spurious operation would threaten safe shutdown system operability were also identified. This identification included those branch flow paths that must be isolated and remain isolated to assure that flow will not be substantially diverted from the primary flow path. See Section 7 for the detailed discussion of spurious operations.

A list was generated for safe shutdown devices including device identification and operating requirements for the various shutdown Keys. The shutdown Keys were previously identified in Section 4 and Table 3-1.

The safe shutdown equipment list (SSEL) for WBN is the equipment necessary to safely shut down the affected unit or units. For reasons of operational flexibility, equipment such as pressurizer heater availability for RCS pressure control was identified in Sections 3 and 4. Optional components are not required for safe shutdown; however, they are included in the safe shutdown equipment list and in the safe shutdown interaction calculation.

The safe shutdown equipment list developed for WBN includes the components required to protect the safe shutdown capability from the exposure fire damage postulated in Appendix R. The safe shutdown equipment list is provided as Table 3-2.

6.0 IDENTIFICATION OF SAFE SHUTDOWN CIRCUITS AND CABLES

The equipment list developed during the WBN safe shutdown system analysis was the basic input for the identification of electrical circuits essential to ensure adequate equipment performance. Essential safe shutdown electrical circuits were identified for all the electrically-dependent devices in Table 3-2. 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. The circuits identified included power, control, and instrumentation. Type II associated circuits as addressed in Section 7 were also treated as required circuits.

The identification and analysis of these essential electrical circuits was based on one-line diagrams, schematics, and wiring diagrams from which the necessary circuit cables were selected for the subsequent cable routing and separation analysis. Circuit evaluation and identification considers equipment operability requirements. Circuits are identified for active and passive equipment. Circuit identification for high/low pressure boundary components considered the possibility of more conservative cable faults (e.g., 3 phase to 3 phase faults.)

For each electrical component, circuits and cables were identified (1) which are required for safe shutdown to ensure operability or (2) failure of which would be detrimental. The circuits not included per the above criteria included annunciator, computer, motor stator heaters and external monitoring circuits. Those circuits which are electrically isolated from the electrical circuits of concern, or whose failure would not affect operability, were not included in the separation analysis.

For each safe shutdown Key, cable block diagrams were developed for each safe shutdown component to identify cables required to ensure that the component can perform its safe shutdown function.

7.0 ASSOCIATED CIRCUITS OF CONCERN

7.1 Introduction

The separation and protection requirements of 10 CFR 50, Appendix R apply not only to safe shutdown circuits but also to "associated" circuits which could prevent operation or cause maloperation of shutdown systems and equipment. The identification of these associated circuits of concern was performed for WBN in accordance with NRC Generic Letter 81-12, the

Staff's clarification to Generic Letter 81-12, and Generic Letter 86-10. The generic letters defined associated circuits of concern as those which have a physical separation less than that required by Section III.G of Appendix R, and have one of the following:

Type I — A common power source with the shutdown equipment and the power source is not electrically protected from the circuit of concern by coordinated breakers, fuses, or similar devices;

Type II — A connection to circuits of equipment whose spurious operation would adversely affect the shutdown capability;

Type III — A common enclosure with the shutdown cables, and,

(1) are not electrically protected by circuit breakers, fuses or similar devices, or

(2) will allow propagation of the fire into the common enclosure

7.2 Associated Circuits by Common Power Supply and Common Enclosures

The electrical distribution system was reviewed to assure that Type I associated circuits by common power supply are addressed by providing selective protective trip coordination for all FSSD power supplies. Type III associated circuits by common enclosures were addressed by ensuring that all existing circuits in Category 1 buildings are electrically protected with a fuse or breaker that will actuate prior to the jacket of existing faulted cables reaching their auto-ignition temperature. For new circuits, Type III associated circuit electrical fault protection is provided to ensure that the fuse or breaker will operate prior to the temperature of the insulation reaching its insulation damage temperature.

Electrical circuit fault protection was originally designed to provide protection for plant electric circuits via protective relaying, circuit breakers and fuses. Protective equipment was designed and applied to ensure adequate protection of electrical distribution equipment, including cables, from electric faults and overload conditions in the circuits. The selection and application of these devices was in accordance with TVA design practices and is documented in engineering calculations. The protective equipment ensures that electrical fault and overloads will not result in any more cable degradation than would be expected when operating conditions are below the set point of the protective equipment. This will also limit cable damage and prevent cable faults from resulting in internal cable temperatures which could cause ignition of cable insulation.

An integral part of the original electric system protection was the proper coordination of these electrical protective devices. Such coordination assures that the protective device nearest (in an electrical sense) to the fault operates prior to the operation of any "upstream" protective devices, and provides interruption of electrical service to a minimum amount of equipment. The original electrical protection design at WBN required coordination of such electrical protective devices and is documented in engineering calculations. Electrical design practices ensures that no associated circuits of concern by common power supply (Type I) or by common enclosure (Type III) exist

7.3 Associated Circuits by Spurious Operation

Cables that are not part of safe shutdown circuits may be damaged by the effects of postulated fires. This cable damage may consequently prevent the correct operation of safe shutdown components, or result in the maloperation of equipment which would directly prevent the proper

performance of the safe shutdown systems. The effects of spurious operations may be conceptually divided into two subclasses as follows:

(1) Maloperation of safe shutdown equipment due to control circuit electrical interlocks between safe shutdown circuits and other circuits; for example, the numerous safe shutdown equipment automatic operation interlocks from process control and instrument circuits.

(2) Maloperation of equipment that is not defined as part of the safe shutdown systems, but that could prevent the accomplishment of a safe shutdown function; for example, inadvertent depressurization of the RCS or the MS system by spurious opening of boundary valves.

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. The analysis also considers that the normally ungrounded 125V DC power distribution system is grounded due to fire damage.

In order for cable faults that generate spurious operation to occur, the following conditions must exist synergistically at the cable fault location:

(1) Sufficient energy must exist due to the fire to create failure of the cable jacket and insulating material;

(2) The failure of the jacket and insulating material must occur in a way that directly exposes the cable conductors;

(3) For each short circuit, two or more specific conductors must come into direct contact causing low impedance conductor-to-conductor connections;

(4) For certain types of spurious operation, multiple electrically independent shorts must occur;

(5) No additional conductors that would cause circuit fault currents and operation of circuit protective devices may participate in the short condition; and

(6) No ground faults that would cause operation of circuit protective devices must occur.

The spurious operation analysis performed for WBN recognized the extremely low probability of certain types of these faulted conditions. The following cable short conditions causing spurious operation were considered of sufficiently low likelihood that they were assumed not to require additional analysis or modification (unless it involves high-low pressure boundary interfaces):

CASE:

(1) Three phase-AC power circuit cable-to-cable faults (6.9kV and 480V)

(2) Two wire ungrounded-DC power circuit cable-to-cable faults (125V)

(3) Two wire ungrounded-AC control circuit cable-to-cable faults (120V

With respect to Cases (1), (2), and (3), no conductor-to-conductor faults within the same power cable can cause spurious powering of the associated device. Only power cable-to-cable connections between one de-energized and one energized power circuit could permit operation. For the case of the three-phase-AC circuit, three electrically independent cable-to-cable shorts must occur without grounds in order to power the associated device. Similarly, for the two-wire ungrounded DC power circuit, two electrically independent cable-to-cable shorts without grounds must occur. The likelihood of such occurrences has been acknowledged by the NRC Staff to be sufficiently low to permit excluding such faulted conditions from consideration except for high/low pressure boundary components. Therefore, for the above identified spurious operations caused by cable faults, only 3-phase hot-shorts for high/low pressure boundary interface valves have been incorporated into the analysis.

The fundamental basis of excluding the remaining shorts from consideration is based on the need for multiple cable-to-cable electrically independent faults in order for spurious operation to occur.

Concerning Case (2), all DC control circuits at WBN are ungrounded. In order for spurious operation to occur due to circuit-to-circuit faults between DC circuits supplied from different sources, at a minimum, two electrically independent cable-to-cable shorts without grounds must occur.

For the ungrounded AC control circuits in Case (3), the identical consideration exists. Most MCC transformer secondary 120V AC control circuits are ungrounded. Therefore, at a minimum, two cable-to-cable shorts must simultaneously occur in order for spurious operation to result for circuits supplied from different sources.

7.4 Multiple High Impedance Faults

Multiple High Impedance Faults (MHIFs) are considered in accordance with Appendix B.1 to NEI-00-01 (FPR Part II, Reference 4.3.12) as endorsed by RG 1.189 revision 2 (FPR Part II, Reference 4.1.26) which establishes a base case analysis demonstrating that the probability of MHIFs is sufficiently low such that they do not pose a credible risk to post-fire safe shutdown when certain criteria are met. WBN meets the NEI 00-01, Appendix B.1 base case criteria which establish applicability of the base case to individual plant designs. The Watts Bar electrical power distribution system compliance with those requirements is described in the following table:

MHIF Base Case Applicability and Compliance	
Base Case Condition	**WBN Compliance**
The power supply in question must operate at a nominal AC or DC voltage greater than 110 V. Specifically, this analysis does not apply to AC and DC control power systems operating at 12 V, 24 V, or 48 V. Nor is the analysis applicable to instrument loops regardless of operating voltage.	The applicable WBN FSSD power supplies operate at greater than 110V (120 VAC, 125V DC, 480 VAC, and 6900 VAC).
For the power supply in question, electrical coordination must exist between the supply-side overcurrent protective device(s) and load-side overcurrent protective devices of concern. Achievement of proper selective tripping shall be based on the guidance of IEEE 242, or other acceptable criteria.	WBN ensures coordination between load-side and supply-side protective devices exist for safety related circuits impacting FSSD equipment. This coordination ensures the electrical boards, cables and end devices are adequately protected since the load-side device will trip before the supply-side device. Coordination is based on the guidance of IEEE 242 and is demonstrated in calculations. WBN does not credit non-safety related power supplies for FSSD. WBN ensures that non-FSSD power supplies do not affect FSSD power supplies.
For 120 V AC and 125 V DC power supplies, in addition to adequate electrical coordination, a minimum size ratio of 2:1 shall exist between the supply-side protective device(s) and load-side devices of concern (for example, a distribution panel with a 50 A main circuit breaker cannot have any load-side breakers larger than 25 A). This stipulation adds additional margin to account for slower protective device clearing times of low-energy circuits.	WBN design meets the minimum size ratio of 2:1 for 120 VAC and 125VDC systems. This has been validated by review of the coordination calculations.
The electrical system must be capable of supplying the necessary fault current for sufficient time to ensure predictable operation of the overcurrent protective devices in accordance with their time-current characteristics.	Electrical coordination and protection calculations demonstrate adequate fault current capability. WBN has reviewed the available fault current to ensure there is sufficient energy available for a sufficient time period to trip the protective device.
Each overcurrent protective device credited for interrupting fault current shall: • Be applied within its ratings, including voltage, continuous current, and interrupting capacity • Be *Listed* or *Approved* by a nationally recognized test laboratory (e.g., UL, ETL, CSA, etc.) to the applicable product safety standard (fuses, molded case circuit breakers, circuit protectors, GFI devices) or be designed and constructed in accordance with applicable ANSI and NEMA standards (protective relays, low and medium voltage switchgear)	The WBN electrical system design criteria, design documents, and calculations demonstrate compliance. All credited overcurrent protective devices (circuit breakers, fuses, protective relays, low and medium voltage switchgear) are Class 1E and are listed or approved by a nationally recognized test laboratory or are designed and constructed in accordance with applicable ANSI and NEMA standards.

MHIF Base Case Applicability and Compliance	
Base Case Condition	**WBN Compliance**
Proper operation of the overcurrent devices shall be ensured by appropriate testing, inspection, maintenance, and configuration control.	FSSD credits only Class 1E power supplies that are used for accident mitigation. Class 1E testing, inspection, maintenance, and configuration control are applicable. WBN does not credit non-safety related supplies for FSSD.
The electrical system associated with the power supply in question shall conform to a recognized grounding scheme. Recognized schemes include solidly grounded, high impedance or resistance grounded, or ungrounded.	WBN power systems all conform to recognized grounding schemes. The 480 V and DC systems are ungrounded. The 120 VAC systems are grounded. The 6900 V system is high impedance grounded.

7.5 Current Transformer Secondaries

When a secondary circuit of a current transformer (CT) opens due to a fire at a remote location, ionized gases and/or additional fires in other locations could be generated, resulting in fire propagation to additional fire areas. Fire hazards due to a fire-induced open circuit in the secondary of CTs installed in high energy panels (i.e., 6.9kV switchgear) of the required and non-required power systems have been evaluated. Three types of CT circuits used in the auxiliary power system have been evaluated: ground fault, differential relaying, and protective relaying.

For Appendix R required and non-required 480V switchgear panels, the CT circuits are contained in the panels. For the CT secondary circuit to be opened by the fire, the fire would have to be localized inside the switchgear assembly. The same is true for the 6.9kV switchgear panel ground fault circuit. Since it is contained within the 6.9kV panels, the fire would have to be localized in the switchgear assembly for the CT secondary circuit to be opened by a fire. Ground fault circuits would not, therefore, result in fire propagation to other fire areas.

The 6.9kV CT circuit that is connected to protective relaying and a current transducer is also contained within the switchgear panel. The output of the current transducer is connected to a remote indicator, and the current transducer is an electrical isolator. Additionally, the output-to-input of the current transducer has been tested for 1500V AC differential. Electrical isolation also exists for the Watt & VAR transducers used on the 6.9kV switchgear at WBN.

With three exceptions, the board differential relaying circuits are totally internal to the switchgear panels. The three exceptions are: (1) between the 6.9kV switchgear emergency supply feeders and the diesel generators which are included in the interaction analysis as required circuits; (2) between the 6.9kV Start and Unit Boards which are not required circuits; and (3) the CSST differential relaying circuits which are required offsite power circuits. Current imbalance created by an open CT circuit causes the protective differential relay to open the supply circuit breaker. This removes primary power to the CT within the time required for protective relay and breaker operation. Since the EDG or CSST differential relay circuit can cause loss of the power train, it is evaluated as a required circuit. Likewise, current imbalance in the protective differential relay of the non-required circuits would also open the supply circuit breaker.

8.0 HIGH/LOW PRESSURE BOUNDARY INTERFACES

Special considerations for high/low pressure interfaces to meet the requirements of 10CFR50 Appendix R are described in Generic Letters 81-12 and 86-10 and Information Notice 87-50. Per Generic Letter 81-12, the following information is required for high/low pressure boundary interfaces in order to ensure that they are adequately protected for the effects of a single fire:

(1) Identify each high/low pressure interface that uses redundant electrically controlled devices (such as two series motor operated valves) to isolate or preclude rupture of any primary coolant boundary.

(2) Identify the essential cabling for each device.

(3) Identify each location where the identified cables are separated by a barrier having less than a 3-hour fire rating.

(4) For the areas identified in (3) above (if any), provide the bases and justification.

Per Generic Letter 86-10, the possibility of getting a hot short on all three phases of three phase AC circuits in the proper sequence to cause spurious operation of a motor is only required to be evaluated for cases involving high/low pressure interfaces. The same applies to ungrounded DC circuits regarding two hot shorts of proper polarity without grounding resulting in spurious operation of high/low pressure interfaces.

Per Information Notice 87-50, for those low pressure systems that connect to the reactor coolant system (a high pressure system) at least one isolation valve must remain closed despite any damage that may be caused by fire, because the high pressure from the reactor coolant system could result in failure of the low pressure piping.

Based on the above, a review of the systems credited for safe shutdown at WBN was conducted to identify potential high/low pressure interfaces. These interfaces were evaluated to identify valves that, if spuriously opened, would expose low pressure piping to high pressure resulting in failure of the low pressure system.

The control system for RHR valves has been designed to prohibit opening unless the reactor coolant pressure is low enough to prevent RHR piping failure. However, if these valves opened spuriously, exposure of RHR piping to high pressure may cause failure of the RHR system piping and render the system inoperable. Therefore, the RHR/RCS isolation valves (1/2-FCV-74-1, 2, 8, and 9) are considered high/low pressure interface valves.

Excess letdown is not required for safe shutdown. However, spurious opening of these valves could expose downstream piping to excess pressure that may cause failure resulting in the rupture of the primary coolant boundary. Therefore, the excess letdown isolation valves (1/2-FCV-62-55, and 56) are considered high/low pressure interface valves.

Normal letdown is not required for safe shutdown. However, spurious opening of these valves may cause failure to maintain RCS inventory control. Therefore, the normal letdown isolation valves (1/2-FCV-62-69 and 70) are considered high/low pressure interface valves.

The safety injection system (SIS)/RHR interface valve with the RCS is located in piping that connects the SIS with the RHR system at a point between the RCS/RHR isolation valves. SIS is not required for safe shutdown. However, spurious opening of valve 1/2-FCV-63-186 along with either 1/2-FCV-74-1-A or -9-B could expose SIS piping to damaging pressure. Therefore, this valve is considered a high/low pressure interface.

The pressurizer PORV and reactor head vent isolation valves are designed to function at high RCS operating pressure. They provide two safe shutdown functions: 1) to initially remain closed for RCS inventory control purposes, and; 2) to provide a means of depressurizing the RCS to the point that the RHR system can be initiated to bring the plant to a cold shutdown condition. Discharge from the RCS through these valves is directed to the inlet of the pressurizer relief tank (PRT). The inlet lines are sized to accommodate vent/relief discharge flow without piping or component failure. Continuous letdown to the PRT may eventually cause spillage of excess coolant to containment through the PRT rupture disks. Therefore, the pressurizer PORVs and block valve combinations, and reactor head vent isolation valves, are required for RCS inventory control (and RCS letdown) and are considered high/low interface valves.

9.0 LOCATION OF SAFE SHUTDOWN EQUIPMENT, CABLES AND RACEWAYS

The safe shutdown equipment list (Table 3-2) identifies the equipment, components, and sub-components relied on for fire safe shutdown.

The routing (conduits and tray nodes) of each safe shutdown cable was obtained from the Integrated Cable and Raceway Design System (ICRDS). This information was entered into a database concurrently with the corresponding room location of each conduit and cable tray node. The route of each safe shutdown cable by room and by fire area has been identified and later used as part of the separation analysis. For large rooms containing redundant paths of safe shutdown equipment and cables, equipment locations and cable routes were further refined by subdividing the room based on column lines. Walkdowns were conducted to verify the locations of the equipment and conduits.

10.0 SAFE SHUTDOWN SYSTEM SEPARATION EVALUATION METHODOLOGY

10.1 Overview of Evaluation Methodology

The safe shutdown analysis first established the systems, components, and cables required for fire safe shutdown purposes. The locations of equipment and routing of cables were determined as described in previous sections. The separation criteria of Appendix R were evaluated on a fire area basis to meet the safe shutdown performance goals as identified in NRC generic letters and guidance documents.

The Appendix R analysis evaluated fire areas that contain systems, components, and cables required for fire safe shutdown. The turbine building, condensate demineralized waste evaporator (CDWE) building, and Yard specific plant locations that directly abut fire areas containing FSSD capabilities, were also included in the separation analysis. Plant structures that do not contain systems, components, or cables associated with FSSD capabilities, or which do not directly abut fire areas containing FSSD capabilities (e.g., service building, temporary storage office building (TSOB), etc.) were not included in the separation analysis. The adequacy of barriers separating safe shutdown-related and non-safe shutdown-related buildings (such as between the control and turbine buildings) was evaluated.

The fire safe shutdown analysis was based on the evaluation of separation in the auxiliary, control, diesel generator, and reactor building, along with the intake pumping station. The auxiliary and diesel generator buildings, and the intake pumping station, were evaluated against the requirements of Appendix R Sections III.G.1, III.G.2a, III.G.2b, and III.G.2c. Detailed procedures have been developed to ensure fire safe shutdown capability in case of an Appendix R fire in the identified locations where applicable.

For purposes of this analysis, the entire control building was evaluated as a single alternative shutdown location under the criteria of Appendix R Section III.G.3 and III.L. Fire safe shutdown activities take place outside of the control building at the ACR and other manual action locations. Detailed procedures have been developed to ensure fire safe shutdown capability in case of an Appendix R fire in the control building.

The reactor buildings were analyzed in accordance with the criteria of Appendix R Sections III.G.2d, III.G.2e, and III.G.2f. Interactions were identified where less than 20 feet, free of intervening combustibles, exist between redundant safe shutdown paths or trains of components. Such interactions are resolved by some combination of protecting one redundant path or train of safe shutdown components with noncombustible radiant energy shields or by fire detectors and automatic suppression in the area. Detailed procedures have been developed to ensure fire safe shutdown capability in case of an Appendix R fire in either reactor building.

Interactions between redundant safe shutdown paths were identified based on the location of the components and cables of redundant safe shutdown trains. Interactions are defined as locations where components of redundant shutdown paths do not meet Appendix R separation criteria. Interactions which require resolution were identified when redundant capabilities did not meet the above criteria. These interactions were evaluated for their impact on the safe shutdown capability of the plant and their resolutions have been documented. 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.

10.2 Fire Area Evaluation Methodology

Separation analyses were initially evaluated for viability on a fire area basis. The fire area separation analysis was effective where only a single room constituted a fire area, and where redundant capability existed outside of the fire area. Large rooms and specific fire areas containing redundant trains of safe shutdown systems, components, or cables have been further subdivided for purposes of the analysis. Where multiple rooms exist in the fire area, regulatory barriers (walls and floor/ceiling assemblies) with a 2-hour fire rating have been credited under Appendix R Section III.G.2c criteria. The 2-hour fire rating exceeds the requirements of Section III.G.2c. The 2-hour rating (as opposed to a minimum 1-hour rating) has been chosen because of the positive effect on fire protection IPEEE and PRA analyses. Where the 2-hour fire rated barriers have been credited, they are identified as regulatory fire barriers, and automatic detection and suppression capabilities on both sides of the barriers have been evaluated per Section III.G.2c criteria. The fire rated non-regulatory fire barriers (maintained for property protection, but not required for Appendix R separation) have not been credited in the analysis.

Credit has been taken for a minimum of 20 feet of separation under Appendix R Section III.G.2b criteria in those fire areas that contain multiple rooms not separated by regulatory fire barriers. Section III.G.2b criteria have also been utilized in large rooms that contain redundant trains of

safe shutdown capability. Section III.G.2c criteria have been applied where 20 feet of separation was not available. Section III.G.2b criteria have been used in the large open areas of the auxiliary building and adjacent rooms which are not enclosed by regulatory fire barriers. It also applies to the B train 480V reactor MOV board rooms on 772' elevation, above the part-height 1-hour barrier separating redundant CCS pumps and cables, and in the electrical equipment room in the intake pumping station (IPS).

10.3 Analysis Volume Evaluation Methodology

An analysis volume (AV) is a defined area subjected to a detailed Appendix R safe shutdown analysis to ensure that one train of FSSD capability is always available. The analysis volume can consist of an entire fire area or a portion of a larger fire area. When the analysis volume is a portion of the fire area, it can consist of multiple rooms, a single room, portions of a room (normally defined by column line locations), or any combination of the above. Each analysis volume that involves only a portion of a room includes a 20 foot wide (minimum) "buffer zone" between it and the adjacent analysis volume. The buffer zones are analyzed as part of the larger analysis volume and as a separate analysis volume.

In performing safe shutdown analyses, safe shutdown components and cables are assigned to the analysis volume containing the component. Additionally, components located in the buffer zones are assigned to an analysis volume for the buffer zone.

The safe shutdown analysis is performed assuming that all components and cables in the analysis volume are damaged. A set of safe shutdown equipment is then selected and corrective actions designated to ensure safe shutdown functions can be maintained with the selected equipment. Corrective actions consist of cable relocation, cable protection by electrical raceway fire barrier system (ERFBS), manual operator actions, application of Appendix R, Section III.G.2 separation criteria as described in Sections 10.1, 10.2 and 10.3.

10.3.1 Analysis Volume Types and Appendix R Compliance

The following types of analysis volumes were identified and used for evaluating Appendix R compliance.

a. *Fire Area* - The fire area is separated from other adjacent areas by rated fire barriers (walls, floors, & ceilings) that are sufficient to withstand the hazards associated with the area and, as necessary, to protect equipment in the area from a fire outside the area. The fire area may be a single room or several individual rooms. If redundant safe shutdown cables are located in the analysis volume, they are protected by an ERFBS throughout the analysis volume (i.e., from rated fire barrier to rated fire barrier). For example an analysis volume consisting of an entire fire area (FA-19) is shown in Figure 1.

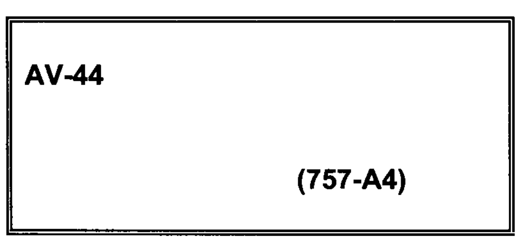


Figure 1

This analysis volume is bounded on all sides by 3-hour rated fire barriers. The 3-hour fire barriers provide for protection of safe shutdown components in accordance with Appendix R Section III.G. Redundant safe shutdown cables in the analysis volume are protected by an ERFBS throughout the analysis volume (i.e., from 3-hour rated fire barrier to 3-hour rated fire barrier).

b. *Single Room within a Fire Area* - The room is separated from other adjacent rooms in a fire area by regulatory fire barriers (walls, floors, & ceilings) that have a 1-hour or greater fire rating. The fire barriers are provided in accordance with Appendix R Section III.G.2.a or III.G.2.c. If redundant safe shutdown cables are located in the analysis volume, they are protected by an ERFBS throughout the analysis volume (i.e., from regulatory fire barrier to regulatory fire barrier). An example of an analysis volume consisting of a single room within a fire area (FA-1) is shown in figure 2.

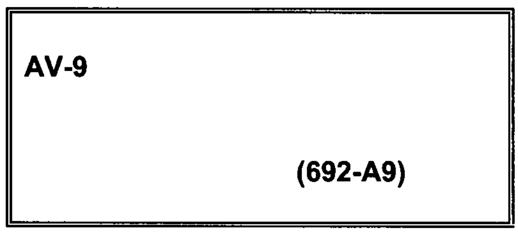


Figure 2

This analysis volume is bounded on all sides by rated fire barriers. Fire propagation will not occur beyond the physical barriers of the room. This type of analysis volume configuration provides for protection of safe shutdown equipment in accordance with Appendix R Section III.G.2.c. Redundant cables requiring protection are protected with an ERFBS from the rated fire barrier to rated fire barrier.

c. *Combination of Rooms within a Fire Area* - The combination of rooms in the analysis volume are separated from other analysis volumes within the same fire area by regulatory fire barriers that are rated for at least 1-hour. The regulatory fire barriers that separate the analysis volume from other analysis volumes in the fire area provide for protection of safe shutdown equipment in accordance with Appendix R Section III.G.2. Except as discussed in Section 10.2 above and in Part VII, Section 2.5, "Partial Fire Wall Between CCS Pumps," if redundant safe shutdown cables are located in the analysis volume, they are protected by an ERFBS throughout the analysis volume (i.e., from regulatory fire barrier to regulatory fire barrier that establishes the analysis volume boundary). An example of this type analysis volume configuration is shown in Figure 3.

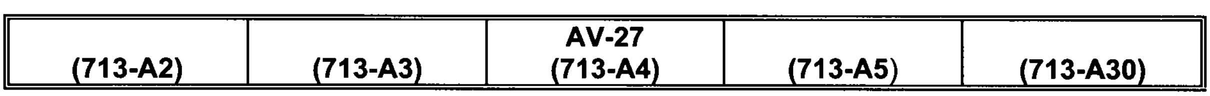


Figure 3
Combination of rooms within a Fire Area
(single lines denote non-regulatory barrier room divisions)

In this example, rooms 713-A2 through A5 and 713-A30 were combined and evaluated as a single analysis volume (AV-27). Fire is unlikely to spread from one room to the next but, in any event, will not propagate beyond the regulatory barriers establishing the boundary of the analysis volume. ERFBS installed to protect redundant cables are

applied from regulatory barrier to regulatory barrier and do not stop at the intermediate walls.

d. *Sections of Large General Areas* - Analysis volumes consisting of sections of large general areas are separated from each other by "buffer zones." The buffer zones are greater than 20 feet in width. In large general areas where buffer zones are used that include intervening combustibles, enhanced automatic suppression and detection systems are installed in the large general area. Refer to FPR Part VII, Section 2.4, "Intervening Combustibles," for additional information. If redundant safe shutdown cables are located in the analysis volume, one train is selected for protection by an ERFBS. The ERFBS is applied throughout the analysis volume (i.e., from analysis boundary to analysis volume boundary); exceptions are noted and justified for the applicable analysis volumes in FPR Part VI. An example of this type of analysis volume is shown in Figures 4.1 and 4.2.

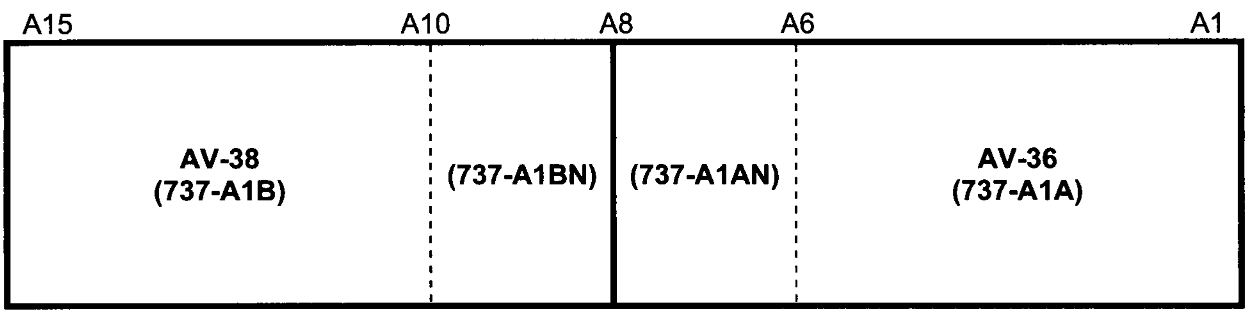


Figure 4.1

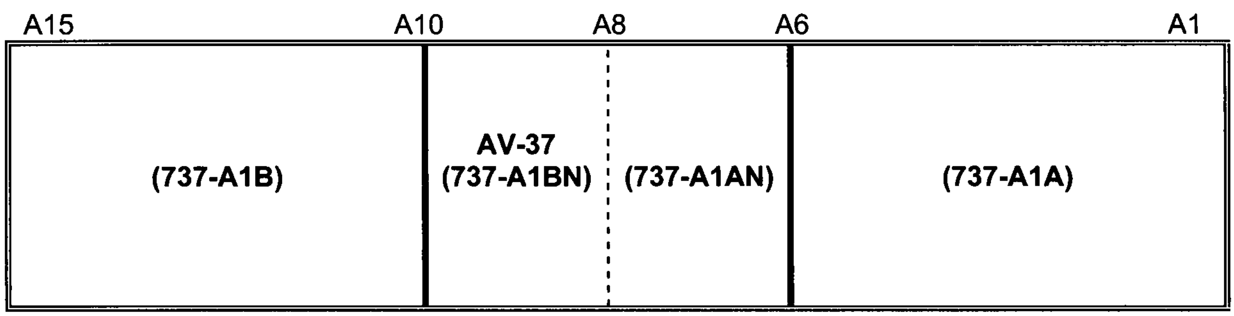


Figure 4.2
Sections of large general areas (Aux. Bldg. El. 737)

In this example, the 737' elevation of the auxiliary building was subdivided into smaller sections to facilitate analysis. First as shown in Figure 4.1, the 737' elevation was split into two main analysis volumes at column line A8 (AV-36 and AV-38). AV-36 covers the area between column lines A1 to A8. AV-38 covers the area between column lines A8 to A15. Each analysis volume includes a >20' buffer zone (737-A1BN and 737-A1AN) which forms the interface between the analysis volume subdivisions. Next as shown in Figure 4.2, a third analysis volume (AV-37) was formed that consisted of the AV-36 and AV-38 buffer zones. AV-37 consists of the area between column lines A6 to A10 and is approximately 42 feet in width.

TVA first evaluated the main analysis volumes (AV-36 and AV-38). In each of these analysis volumes, TVA performed an evaluation to ensure compliance with Appendix R Section III.G.2. Where cables of redundant safe shutdown equipment are located in an AV, one train is selected for protection with an ERFBS. The selected cables are protected from AV boundary to AV boundary. In this example, Train B cables are protected in the AV-36 area and Train A cables are protected in the AV-38 area. If a Train B cable were to transition AV-36, it would be protected from the rated fire barrier at A1 to the end of the analysis volume at A8.

TVA next evaluated the analysis volume created by combining the AV-36 and AV-38 buffer zones (AV-37). This evaluation addresses potential fires that may occur at the AV-36/AV-38 interface as well as address the potential for a fire to propagate across the interface. In performing the AV-37 analysis, TVA credited components and cables outside AV-37 to the maximum extent practical to ensure that separation between redundant trains was greater than 20 feet. Where cables of redundant safe shutdown equipment were located in AV-37, one train was selected for protection with an ERFBS. Any ERFBS needed are installed on the selected safe shutdown equipment cables throughout the boundaries of AV-37.

Theoretically, this evaluation process would result in an overlap area of greater than 20 feet where both trains of safe shutdown equipment cables are protected. For example, if Train A cables were selected to be protected throughout AV-37, both trains of safe shutdown equipment cables would be protected in AV-36's buffer zone (column lines A-6 to A-8) because Train B cables are protected throughout AV-36. In actual practice, the only cables that require protection in AV-37 are:

(1) A conduit containing Channel D instrumentation cables (to ensure adequate instrumentation is available)

(2) A conduit containing PORV and reactor head vent cables (for prevention of hot spurious shorts

In each of the above cases, the conduits are wrapped throughout AV-36 and AV-37. For other components, TVA credited cables located outside AV-37 to achieve separation much greater than 20 feet.

e. *Sections of Large Rooms* - Analysis volumes that consist of large room sections separated by an overlap region that is greater than 20 ft. The overlap region is considered to be part of both analysis volumes. If the overlap region contains intervening combustibles, enhanced automatic suppression and detection systems are installed in the large room. Refer to Section 2.4, "Intervening Combustibles," in Part VII for additional information. If redundant safe shutdown cables are located in the analysis volume, they are protected by an ERFBS throughout the analysis volume (i.e., from analysis volume boundary to analysis volume boundary). An example of this type of analysis volume is shown in Figures 5.1 and 5.2.

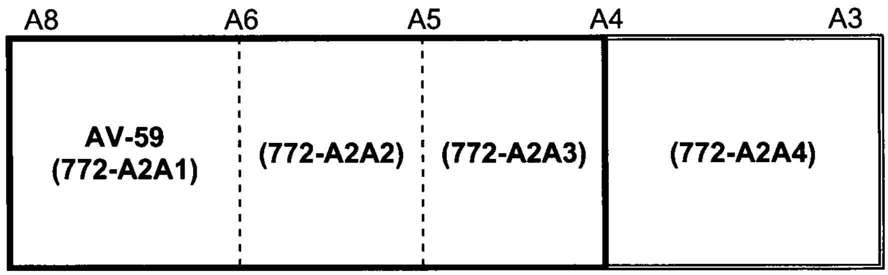


Figure 5.1

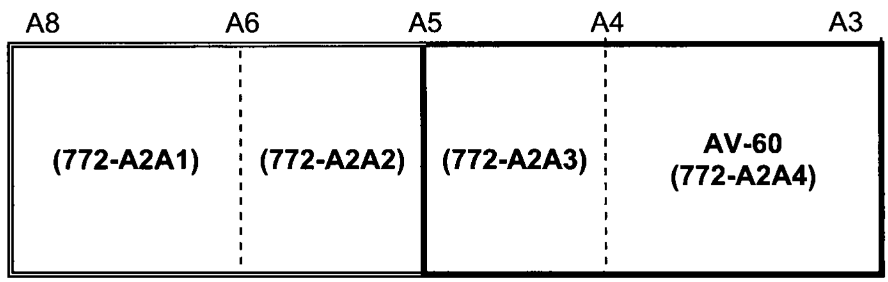


Figure 5.2
Sections of large rooms (Aux. Bldg. El. 772)

Room 772-A2 is a large room subdivided into two analysis volumes to facilitate analysis (AV-59 and AV-60). As showing in Figure 5.1, AV-59 consists of sections A2A1, A2A2, and A2A3. As showing in Figure 5.2, AV-60 consists of sections A2A3 and A2A4. Section A2A3 is the overlap area that is part of both analysis volumes. This overlap area was selected to provide a separation distance greater than 20 feet between the joining analysis volumes.

In each of these analysis volumes, TVA performed an evaluation to ensure compliance with Appendix R Section III.G.2. Where cables of redundant safe shutdown equipment are located in an AV, one train is selected for protection with an ERFBS. The selected cables are protected from AV boundary to AV boundary. In this example the only cables requiring ERFBS protection in AV-59 and AV-60 were located and protected in both AVs.

Table 3-3 identifies by analysis volume the rooms and portions of rooms included in the Appendix R separation analysis for each analysis volume. The compartmentation drawings, Figures II-27A through II-40A contained in Part II of the FPR, locate the fire areas and rooms at WBN.

Intervening combustibles consisting of exposed cable insulation in trays, ERFBS cable protection, or floor-based fixed and transient combustibles have been mitigated by:

(1) Enhanced suppression consisting of automatic preaction sprinklers located at ceiling level and below obstructions to provide coverage of floor based fires.

(2) Documented electrical cable protective device sizing to preclude electrical initiation of cable fire.

(3) Limited flame spread of cable insulation/jacket material - New cables are required to meet IEEE-383 vertical tray test if available; flame retardant coating is applied to all cables in a tray if it contains more than nine non-IEEE-383 qualified cables; and most old cables are covered with flame retardant coating.

(4) Very low flame spread of Thermo-Lag 330-1.

(5) Dedicated onsite fire brigade.

Refer to the intervening combustible deviation request in Part VII of the FPR for additional justification.

Where redundant cables or components could be damaged by fire in an analysis volume, that function was ensured primarily by either 1-hour raceway fire barriers (radiant energy shields or automatic suppression and detection inside containment) or manual operator actions. Three hour raceway fire barriers are used where automatic suppression and detection are not provided.

11.0 Multiple Spurious Operation (MSO) Evaluation

Regulatory Guide 1.189, Fire Protection for Nuclear Power Plants, Revision 2, formalized the requirements for addressing multiple fire induced circuit failures, or MSOs and multiple concurrent hot shorts. RG 1.189 (Part II, Reference 4.1.26) endorsed the methodology in NEI 00-01 Revision 2 (Part II, Reference 4.3.12) for addressing those issues. In accordance with the NEI 00-01 Rev. 2 guidance an expert panel was used to identify plant specific scenarios that might be caused by MSOs (Part II, Reference 4.3.14). Subsequent evaluation of the identified scenarios for Unit 1 resulted in a number of deficiencies which were entered into the plant corrective action tracking system. Results of the scenario evaluation for Unit 2 are documented in report number R1976-20-01, Multiple Spurious Operation Evaluation (Part II, Reference 4.3.13).

TABLE 3-1
SAFE SHUTDOWN SYSTEMS AND SUBSYSTEMS BY KEY

Key 1A	Centrifugal Charging Paths
Key 1B	Component Cooling Paths
Key 1C	Emergency Raw Cooling Water Paths
Key 2	Charging Flow Control Paths
Key 4	Volume Control Tank Suction
Key 5	RWST Suction
Key 7	RCS Pressure Boundary Isolation
Key 8	Excess Letdown Isolation
Key 9	RCP Thermal Barrier Cooling
Key 10	Containment Isolation
Key 11	Motor Driven Auxiliary Feedwater Paths
Key 12	Steam Generator Level Control Paths
Key 13	Auxiliary Control Air
Key 14	Turbine-Driven Auxiliary Feedwater Paths using FCV-1-15
Key 16	Steam Generator Level Control using TDAFW Pump
Key 17	Condensate Storage Tank Supply Paths to AFW
Key 19	Auxiliary Feedwater Pump Suction Paths from ERCW
Key 20	Secondary Side Isolation Using MSIVs
Key 21	Secondary Side Isolation Using TB Valves
Key 22	Main Feedwater Isolation Valves
Key 24	Steam Generator Blowdown Isolation Valves
Key 25	Secondary Side Safety Valves
Key 26	Secondary Side Relief Valves
Key 28	RCS Pressure Control
Key 29	Reactor Trip System
Key 30	RHR Cooling Flow Paths
Key 31	RHR Pump Paths
Key 36	Safety Injection System Accumulator Isolation
Key 37A	Main Control Room HVAC Paths
Key 37C	Diesel Generator Building HVAC Paths
Key 37J	Containment Cooling System
Key 37K	480V Transformer Rooms HVAC
Key 37O	CCS/AFW Pump Coolers and AFW Pump Room HVAC
Key 38, 38A	Electrical Power (includes Onsite and Offsite)
Key 48	RCS Letdown

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
0-BAT-236-1-D	125 V VITAL BATTERY I
0-BAT-236-2-E	125 V VITAL BATTERY II
0-BAT-236-3-F	125 V VITAL BATTERY III
0-BAT-236-4-G	125 V VITAL BATTERY IV
0-BAT-236-5-S	125 V VITAL BATTERY V
0-BAT-239-1	250V BATTERY 1
0-BAT-239-2	250V BATTERY 2
0-BD-200-C	COMMON SERVICE STATION BOARD C
0-BD-200-D	COMMON SERVICE STATION BOARD D
0-BD-236-1-D	125V VITAL BATTERY BOARD I
0-BD-236-2-E	125V VITAL BATTERY BOARD II
0-BD-236-3-F	125V VITAL BATTERY BOARD III
0-BD-236-4-G	125V VITAL BATTERY BOARD IV
0-BD-239-1	250V BATTERY BD1
0-BD-239-2	250V BATTERY BD2
0-CHGR-236-1-D	125V VITAL BATTERY CHARGER 1-D
0-CHGR-236-2-E	125V VITAL BATTERY CHARGER 2-E
0-CHGR-236-3-F	125V VITAL BATTERY CHARGER 3-F
0-CHGR-236-4-G	125V VITAL BATTERY CHARGER 4-G
0-CHGR-236-6-S	125V VITAL BATTERY CHARGER 6-S
0-CHGR-236-7-S	125V VITAL BATTERY CHARGER 7-S
0-CHGR-236-8-S	125V VITAL BATTERY CHARGER 8-S
0-CHGR-236-9-S	125V VITAL BATTERY CHARGER 9-S
0-DPL-239-1	250VDC TURBINE BLDG DISTRIBUTION BOARD 1
0-DPL-239-2	250VDC TURBINE BLDG DISTRIBUTION BOARD 2
0-FCO-31-11-B	MCR HVAC DAMPER
0-FCO-31-12-A	MCR HVAC DAMPER
0-FCO-31-82-A	MCR HVAC DAMPER
0-FCO-31-91-B	MCR HVAC DAMPER
0-FCV-26-126-A	HP FP AB TRAIN A HDR VALVE
0-FCV-26-127-B	HP FP AUX BLDG TRAIN B HDR VALVE
0-FCV-26-13-B	HPFP TRAIN B HDR FCV TO YARD
0-FCV-26-15	HPFP COMMON HDR FCV
0-FCV-26-16	HPFP COMMON HDR FCV
0-FCV-26-17-B	HPFP COMMON HEADER TO YARD FCV
0-FCV-26-6-A	HPFP TRAIN A HDR FCV TO YARD
0-FCV-67-144-B	CCS HX C ERCW BYPASS FCV
0-FCV-67-151-A	CCS HX C DISCHARGE VLV (HDR A)
0-FCV-67-152-B	CCS HX C DISCHARGE VLV (HDR B)
0-FCV-70-12-B	CCS HX C OUTLET VALVE
0-FCV-70-194-B	SFPCS HX SUPPLY HEADER FCV
0-FCV-70-197-A	SFPCS HX SUPPLY HDR FCV
0-FCV-70-22-B	CCS HX C INLET VALVE
0-FI-67-226	ERCW FLOW TO CCS HX-C INDICATOR
0-FT-67-226	ERCW TO CCS HX-C FLOW TRANSMITTER
0-INV-235-1-D	SPARE CHANNEL I VITAL INVERTER
0-INV-235-2-E	SPARE CHANNEL II VITAL INVERTER
0-INV-235-3-F	SPARE CHANNEL III VITAL INVERTER

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
0-INV-235-4-G	SPARE CHANNEL IV VITAL INVERTER
0-ISV-70-524A	CCS SUPPLY TO SFP HX-A ISOL
0-ISV-70-524B	CCS SUPPLY TO SFP HX-B ISOL VLV
0-MTR-31-11-B	MCR AHU B-B MOTOR
0-MTR-31-12-A	MCR AHU A-A MOTOR
0-MTR-31-80/1-A	CW CIRC PUMP A-A
0-MTR-31-80/2-A	WATER CHILLER A-A
0-MTR-31-96/1-B	CW CIRC PUMP B-B
0-MTR-31-96/2-B	WATER CHILLER B-B
0-MTR-32-461	AUX AIR COMP A-A CAM TIMER/AIR DRYER FCV
0-MTR-32-462	AUX AIR COMP B-B CAM TIMER/AIR DRYER FCV
0-MTR-32-60-A	CONTROL AIR COMPRESSOR A-A
0-MTR-32-86-B	CONTROL AIR COMPRESSOR B-B
0-MTR-67-28-A	ERCW PUMP MOTOR A-A
0-MTR-67-32-A	ERCW PUMP MOTOR B-A
0-MTR-67-36-A	ERCW PUMP MOTOR C-A
0-MTR-67-40-A	ERCW PUMP MOTOR D-A
0-MTR-67-47-B	ERCW PUMP MOTOR E-B
0-MTR-67-51-B	ERCW PUMP MOTOR F-B
0-MTR-67-55-B	ERCW PUMP MOTOR G-B
0-MTR-67-59-B	ERCW PUMP MOTOR H-B
0-MTR-70-51-S	CCS PUMP C-S MOTOR
0-PMP-26-3150	DIESEL DRIVEN FIRE PUMP
0-PNL-236-1-S	480 VAC VITAL DISCONNECT PNL CHANNEL I
0-PNL-236-2-S	480V AC VITAL DISCONNECT PNL CHANNEL II
0-PNL-236-3-S	480V AC VITAL DISCONNECT PNL CHANNEL III
0-PNL-236-4-S	480V AC VITAL DISCONNECT PNL CHANNEL IV
0-TB-31-80/2-A	WATER CHILLER A-A
0-TB-31-96/2-B	WATER CHILLER B-B
0-TCV-67-1051-A	MAIN CONTROL RM HVAC TCV
0-TCV-67-1053-B	MAIN CONTROL RM HVAC TCV
0-TE-70-162	CCS TEMPERATURE ELEMENT
0-TI-70-162	ERCW/CCS HX-C OUTLET TEMP (CCS)
0-XSW-236-1-S	480V AC VITAL TRANSFER SWITCH I
0-XSW-236-2-S	480V AC VITAL TRANSFER SWITCH II
0-XSW-236-3-S	480V AC VITAL TRANSFER SWITCH III
0-XSW-236-4-S	480V AC VITAL TRANSFER SWITCH IV
0-XSW-236-68AC1-S	480V AC TRANSFER SWITCH, NORM/ALT CHARGERS 6-S/8-S
0-XSW-236-68AC2-S	480V AC TRANSFER SWITCH, SELECT CHARGERS 6-S/8-S
0-XSW-236-68DC1-S	125V DC TRANSFER SWITCH, SELECT BATTERY BOARDS 1/2
0-XSW-236-68DC2-S	125V DC TRANSFER SWITCH, SELECT CHARGERS 6-S/8-S
0-XSW-236-79AC1-S	480V AC TRANSFER SWITCH, NORM/ALT, CHARGER 7-S/9-S
0-XSW-236-79AC2-S	480V AC TRANSFER SWITCH, SELECT CHARGERS 7-S/9-S
0-XSW-236-79DC1-S	125V DC TRANSFER SWITCH, SELECT BATTERY BOARDS 3/4
0-XSW-236-79DC2-S	125V DC TRANSFER SWITCH, SELECT CHARGERS 7-S/9-S
1-BD-211-A-A	6.9KV SHUTDOWN BOARD 1A-A
1-BD-211-B-B	6.9KV SHUTDOWN BOARD 1B-B
1-BD-212-A1-A	480V SHUTDOWN BOARD 1A1-A

PART III – SAFE SHUTDOWN CAPABILITIES

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-BD-212-A2-A	480V SHUTDOWN BOARD 1A2-A
1-BD-212-B1-B	480V SHUTDOWN BOARD 1B1-B
1-BD-212-B2-B	480V SHUTDOWN BOARD 1B2-B
1-BD-235-1-D	120V AC VITAL POWER BOARD 1-I
1-BD-235-2-E	120V AC VITAL POWER BOARD 1-II
1-BD-235-3-F	120V AC VITAL POWER BOARD 1-III
1-BD-235-4-G	120V AC VITAL POWER BOARD 1-IV
1-BD-237-A	INSTRUMENT POWER DISTRIBUTION PANEL 1A
1-BD-237-B	INSTRUMENT POWER DISTRIBUTION PANEL 1B
1-BKR-99-L116/1B-A	REACTOR TRIP SWGR A
1-BKR-99-L116/1C-B	REACTOR TRIP SWGR B
1-DG-82-A-A	UNIT 1 TRAIN A DIESEL GENERATOR
1-DG-82-B-B	UNIT 1 TRAIN B DIESEL GENERATOR
1-FCO-30-244A	480V TRANSFORMER RM 1A INTAKE AIR DAMPER
1-FCO-30-244B	480V TRANSFORMER RM 1A INTAKE AIR DAMPER
1-FCO-30-248A	480V TRANSFORMER RM 1B INTAKE AIR DAMPER
1-FCO-30-248B	480V TRANSFORMER RM 1B INTAKE AIR DAMPER
1-FCO-30-443-A	DIESEL GENERATOR VENT FAN DAMPER
1-FCO-30-445-B	DIESEL GENERATOR VENT FAN DAMPER
1-FCO-30-447-A	DG 1A-A ROOM EXHAUST FAN 1A MOTOR
1-FCO-30-449-B	DIESEL GENERATOR 1B-B ROOM EXHAUST FAN 1B
1-FCO-30-451-A	DG 1A-A ROOM EXHAUST FAN 2A MOTOR
1-FCO-30-453-B	DIESEL GENERATOR 1B-B ROOM EXHAUST FAN 2B
1-FCO-30-459-A	DG 1A-A ELECTRIC BOARD ROOM EXHAUST FAN MOTOR
1-FCO-30-461-B	DIESEL GEN 1B-B 480V ELEC BD ROOM EXHAUST FAN
1-FCV-1-103	MAIN STEAM COOL DOWN VALVE
1-FCV-1-104	MAIN STEAM DUMP VALVE
1-FCV-1-105	MAIN STEAM DUMP VALVE
1-FCV-1-106	MAIN STEAM DUMP VALVE
1-FCV-1-107	MAIN STEAM COOL DOWN VALVE
1-FCV-1-108	MAIN STEAM DUMP VALVE
1-FCV-1-109	MAIN STEAM DUMP VALVE
1-FCV-1-11	#2 SG MAIN STEAM ISOLATION VALVE
1-FCV-1-110	MAIN STEAM DUMP VALVE
1-FCV-1-111	MAIN STEAM COOL DOWN VALVE
1-FCV-1-112	MAIN STEAM DUMP VALVE
1-FCV-1-113	MAIN STEAM COOL DOWN VALVE
1-FCV-1-114	MAIN STEAM DUMP VALVE
1-FCV-1-147-A	STEAM LINE WARMING VALVE LOOP 1
1-FCV-1-148-B	STEAM LINE WARMING VALVE LOOP 2
1-FCV-1-149-A	STEAM LINE WARMING VALVE LOOP 3
1-FCV-1-14-A	SG 2 BLOWDOWN CONTROL VALVE
1-FCV-1-150-B	#4SG MSIV BYPASS
1-FCV-1-15-A	AFWPT STEAM SUPPLY FROM SG 1 FLOW CONTROL VALVE
1-FCV-1-17-A	STEAM FLOW TO AUX FWPT ISOL VALVE
1-FCV-1-181-A	SG 1 BLOWDOWN ISOLATION VALVE
1-FCV-1-182-B	SG 2 BLOWDOWN ISOLATION VALVE
1-FCV-1-183-A	SG 3 BLOWDOWN ISOLATION VALVE

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-FCV-1-184-B	SG 4 BLOWDOWN ISOLATION VALVE
1-FCV-1-18-B	STEAM FLOW TO AUX FWPT ISOLATION VALVE
1-FCV-1-22	#3 SG MAIN STEAM ISOLATION VALVE
1-FCV-1-25-B	SG 3 BLOWDOWN CONTROL VALVE
1-FCV-1-275	MSR A2 LOW POWER BYPASS CONTROL VALVE
1-FCV-1-277	MSR B2 LOW POWER BYPASS CONTROL VALVE
1-FCV-1-279	MSR C2 LOW POWER BYPASS CONTROL VALVE
1-FCV-1-284	MSR A1 LOW POWER BYPASS CONTROL VALVE
1-FCV-1-29	#4 SG MAIN STEAM ISOLATION VALVE
1-FCV-1-291	MSR B1 LOW POWER BYPASS CONTROL VALVE
1-FCV-1-298	MSR C1 LOW POWER BYPASS CONTROL VALVE
1-FCV-1-32-A	SG 4 BLOWDOWN CONTROL VALVE
1-FCV-1-36	MAIN FW PUMP TURBINE HP STOP VALVE
1-FCV-1-37	MAIN FW PUMP TURBINE HP CONTROL VALVE
1-FCV-1-4	#1 SG MAIN STEAM ISOLATION VALVE
1-FCV-1-43	MAIN FW PUMP TURBINE HP STOP VALVE
1-FCV-1-44	MAIN FW PUMP TURBINE HP CONTROL VALVE
1-FCV-1-51-S	AFW PUMP TURBINE TRIP & THROTTLE VALVE
1-FCV-1-52	TDAFWP TURBINE GOVERNOR VALVE
1-FCV-1-61	MAIN TURBINE CONTROL VALVE
1-FCV-1-62	MAIN TURBINE CONTROL VALVE
1-FCV-1-64	MAIN TURBINE CONTROL VALVE
1-FCV-1-65	MAIN TURBINE CONTROL VALVE
1-FCV-1-67	MAIN TURBINE CONTROL VALVE
1-FCV-1-68	MAIN TURBINE CONTROL VALVE
1-FCV-1-70	MAIN TURBINE CONTROL VALVE
1-FCV-1-71	MAIN TURBINE CONTROL VALVE
1-FCV-1-75	MOISTURE SEPARATOR REHEATER A2 CONTROL VALVE
1-FCV-1-77	MOISTURE SEPARATOR REHEATER B2 CONTROL VALVE
1-FCV-1-79	MOISTURE SEPARATOR REHEATER C2 CONTROL VALVE
1-FCV-1-7-B	SG 1 BLOWDOWN CONTROL VALVE
1-FCV-1-84	MOISTURE SEPARATOR REHEATER A1 CONTROL VALVE
1-FCV-1-91	MOISTURE SEPARATOR REHEATER B1 CONTROL VALVE
1-FCV-1-98	MOISTURE SEPARATOR REHEATER C1 CONTROL VALVE
1-FCV-26-240-A	CONTAINMENT STANDPIPE ISOLATION VALVE
1-FCV-26-241-B	ANNULUS STANDPIPE ISOLATION VALVE
1-FCV-26-242-A	ANNULUS STANDPIPE ISOLATION VALVE
1-FCV-26-243-A	RCP SPRAY ISOLATION VALVE
1-FCV-26-244-B	ANNULUS SPRINKLER ISOLATION VALVE
1-FCV-26-245-A	ANNULUS SPRINKLER ISOLATION VALVE
1-FCV-30-10-A	UPPER CONTAINMENT PURGE AIR SUPPLY
1-FCV-30-14-A	LOWER CONTAINMENT PURGE AIR SUPPLY
1-FCV-30-15-B	LOWER CONTAINMENT PURGE AIR SUPPLY
1-FCV-30-16-B	LOWER COMPARTMENT PURGE ISOLATION VALVE
1-FCV-30-17-A	LOWER COMPARTMENT PURGE ISOLATION VALVE
1-FCV-30-19-B	INSTRUMENT ROOM PURGE AIR SUPPLY
1-FCV-30-20-A	INSTRUMENT ROOM PURGE AIR SUPPLY
1-FCV-30-37-B	LOWER COMPARTMENT PURGE ISOLATION VALVE

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-FCV-30-40-A	LOWER COMPARTMENT PURGE ISOLATION VALVE
1-FCV-30-50-B	UPPER CONTAINMENT PURGE AIR EXHAUST
1-FCV-30-51-A	UPPER CONTAINMENT PURGE AIR EXHAUST
1-FCV-30-52-A	UPPER CONTAINMENT PURGE AIR EXHAUST
1-FCV-30-53-B	UPPER CONTAINMENT PURGE AIR EXHAUST
1-FCV-30-56-A	LOWER CONTAINMENT PURGE AIR EXHAUST
1-FCV-30-57-B	LOWER CONTAINMENT PURGE AIR EXHAUST
1-FCV-30-58-B	INSTRUMENT ROOM PURGE AIR EXHAUST
1-FCV-30-59-A	INSTRUMENT ROOM PURGE AIR EXHAUST
1-FCV-30-7-A	UPPER CONTAINMENT PURGE AIR SUPPLY
1-FCV-30-8-B	UPPER CONTAINMENT PURGE AIR SUPPLY
1-FCV-30-9-B	UPPER CONTAINMENT PURGE AIR SUPPLY
1-FCV-3-100-B	STEAM GENERATOR 4 FEEDWATER ISOLATION VALVE
1-FCV-3-103	STEAM GENERATOR 4 FW CONTROL VALVE
1-FCV-3-103A	STEAM GENERATOR 4 FW BYPASS VALVE
1-FCV-3-116A-A	ERCW HDR A ISOLATION VALVE
1-FCV-3-116B-A	ERCW HDR A ISOLATION VALVE
1-FCV-3-126A-B	ERCW HDR B ISOLATION VALVE
1-FCV-3-126B-B	ERCW HDR B ISOLATION VALVE
1-FCV-3-136A-A	ERCW HDR A ISOLATION VALVE
1-FCV-3-136B-A	ERCW HDR A ISOLATION VALVE
1-FCV-3-179A-B	ERCW HDR B ISOLATION VALVE
1-FCV-3-179B-B	ERCW HDR B ISOLATION VALVE
1-FCV-32-102-B	RB TRAIN B ISOLATION FCV
1-FCV-32-110-A	RB TRAIN A NON-ESSENTIAL CONTROL AIR ISLN VLV
1-FCV-3-236	STEAM GENERATOR 1 FW BYPASS ISOLATION VALVE
1-FCV-3-239	STEAM GENERATOR 2 FW BYPASS ISOL SOLENOID VALVE
1-FCV-3-242	STEAM GENERATOR 3 FW BYPASS ISOL VALVE
1-FCV-3-245	STEAM GENERATOR 4 FW BYPASS ISOLATION VALVE
1-FCV-32-80-A	RB TRAIN A ISOLATION FCV
1-FCV-3-33-A	STEAM GENERATOR 1 FEEDWATER ISOLATION VALVE
1-FCV-3-35	STEAM GENERATOR 1 FW CONTROL VALVE
1-FCV-3-355-A	TRAIN A MDAFW PUMP RECIRCULATION VALVE
1-FCV-3-359-B	TRAIN B MDAFW PUMP RECIRCULATION VALVE
1-FCV-3-35A	STEAM GENERATOR 1 FW BYPASS VALVE
1-FCV-3-47-B	STEAM GENERATOR 2 FEEDWATER ISOLATION VALVE
1-FCV-3-48	STEAM GENERATOR 2 FW CONTROL VALVE
1-FCV-3-48A	STEAM GENERATOR 2 FW BYPASS VALVE
1-FCV-3-87-A	STEAM GENERATOR 3 FEEDWATER ISOLATION VALVE
1-FCV-3-90	STEAM GENERATOR 3 FW CONTROL VALVE
1-FCV-3-90A	STEAM GENERATOR 3 FW BYPASS VALVE
1-FCV-62-1228-A	CCP SUCTION HI-POINT VENT
1-FCV-62-1229-B	CCP SUCTION HI-POINT VENT
1-FCV-62-22	RCP 2 SEAL RETURN FCV
1-FCV-62-35	RCP 3 SEAL RETURN FCV
1-FCV-62-48	RCP 4 SEAL RETURN FCV
1-FCV-62-55	EXCESS LETDOWN ISOLATION VALVE
1-FCV-62-56	EXCESS LETDOWN ISOL VALVE

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-FCV-62-69-A	REACTOR COOLANT LOOP 3 LETDOWN FLOW VALVE
1-FCV-62-70-A	REACTOR COOLANT LOOP 3 LETDOWN FLOW VALVE
1-FCV-62-72-A	REGEN HTX LETDOWN ISLN VLV A
1-FCV-62-73-A	REGEN HTX LETDOWN ISLN VLV B
1-FCV-62-74-A	REGEN HTX LETDOWN ISLN VLV C
1-FCV-62-84-A	PRESSURIZER AUXILIARY SPRAY VALVE
1-FCV-62-9	RCP 1 SEAL RETURN FCV
1-FCV-62-90-A	CHARGING FLOW ISOLATION VALVE
1-FCV-62-91-B	CHARGING FLOW ISOLATION VALVE
1-FCV-62-93	NORMAL MAKEUP FLOW CONTROL VALVE
1-FCV-62-98-A	CHGING PMP 1A-A FCV
1-FCV-62-99-B	CHGING PMP 1A-A FCV
1-FCV-63-118-A	SIS ACCUMULATOR TANK 1 FLOW ISOLATION VALVE
1-FCV-63-11-B	RHR PUMP SUPPLY TO SIS PUMPS
1-FCV-63-172-B	RHR TO RCS HOT LEG 1 & 3 ISOLATION VALVE
1-FCV-63-186	RHR SUPPLY TEST LINE VALVE
1-FCV-63-1-A	RWST TO RHR PUMP FCV
1-FCV-63-25-B	SIS BORON INJECTION TANK SHUTOFF VLV
1-FCV-63-26-A	SIS BORON INJECTION TANK SHUTOFF VLV
1-FCV-63-67-B	SIS ACCUMULATOR TANK 4 FLOW ISOLATION VALVE
1-FCV-63-72-A	CONTAINMENT SUMP TO RHR PUMP A-A
1-FCV-63-73-B	CONTAINMENT SUMP TO RHR PUMP B-B
1-FCV-63-80-A	SIS ACCUMULATOR TANK 3 FLOW ISOLATION VALVE
1-FCV-63-8-A	RHR HX 1A TO CVCS CHARGING PMP CONTROL VALVE
1-FCV-63-93-A	SIS TO RCS LOOPS 2 & 3 FLOW CONTROL VALVE
1-FCV-63-94-B	SIS TO RCS LOOPS 1 & 4 FLOW CONTROL VALVE
1-FCV-63-98-B	SIS ACCUMULATOR TANK 2 FLOW ISOLATION VALVE
1-FCV-67-103-B	LOWER CNTMT 1B CLRS DISCH ISLN VLV INSIDE CNTMT
1-FCV-67-104-A	LOWER CNTMT 1B CLRS DISCH ISLN VLV OUTSIDE CNTMT
1-FCV-67-105-B	LOWER CNTMT 1B CLRS SUPPLY ISLN VLV INSIDE CNTMT
1-FCV-67-107-A	LOWER CNTMT 1D CLRS SUPPLY ISLN VLV OUTSIDE CNTMT
1-FCV-67-10A-B	ERCW STRAINER 1B-B BACKWASH VLV
1-FCV-67-10B-B	ERCW STRAINER 1B-B FLUSH VLV
1-FCV-67-111-B	LOWER CNTMT 1D CLRS DISCH ISLN VLV INSIDE CNTMT
1-FCV-67-112-A	LOWER CNTMT 1D CLRS DISCH ISLN VLV OUTSIDE CNTMT
1-FCV-67-113-B	LOWER CNTMT 1D CLRS SUPPLY ISLN VLV INSIDE CNTMT
1-FCV-67-123-B	CNTMT SPRAY HX 1B SUPPLY VLV
1-FCV-67-124-B	CNTMT SPRAY HX 1B DISCHARGE VLV
1-FCV-67-125-A	CONTAINMENT SPRAY HX 1A SUPPLY VLV
1-FCV-67-126-A	CNTMT SPRAY HX 1A DISCHARGE VLV
1-FCV-67-127-A	AUX BLDG AIR CLRS SUP HDR 1A FCV
1-FCV-67-128-B	AUX BLDG AIR CLRS HDR 1B ISLN VLV
1-FCV-67-143-A	CCS HX A ERCW BYPASS FCV
1-FCV-67-146-A	CCS HX A DISCHARGE CONTROL VLV
1-FCV-67-147-A	ERCW SUP HDR 1A TO HDR 2B ISOL VLV
1-FCV-67-162-A	CCS/AFW PUMP SPACE COOLER FLOW CONT AOV
1-FCV-67-164-B	CCS/AFW PUMP RM COOLER 1B FLOW CONT AOV
1-FCV-67-168-A	CCP 1A ROOM COOLER ERCW ISOL

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-FCV-67-170-B	CCP-1B ROOM COOLER ISOL VALVE
1-FCV-67-188-A	RHR PUMP 1A-A RM COOLER ERCW ISOL AOV
1-FCV-67-190-B	RHR PUMP 1B-B RM COOLER ERCW ISOL AOV
1-FCV-67-223-A	SUPPLY HDR 1B TO HDR 2A ISLN VLV
1-FCV-67-22-A	ERCW HDR 1A ISLN VLV BEFORE STRAINER
1-FCV-67-24-B	ERCW HDR 1B ISLN VLV BEFORE STRAINER
1-FCV-67-458-A	ERCW TO CCS HX A ISLN VLV
1-FCV-67-478-B	ERCW TO CCS HX A ISLN VLV
1-FCV-67-66-A	EMERG DSL HT EXH 1A1 & 1A2 SUPP VALVE FM HDR 1A
1-FCV-67-67-B	EMERG DSL HT EXH 1B1 & 1B2 SUPP VALVE FM HDR 1B
1-FCV-67-81-A	AUX BLDG ERCW SUP HDR 1A ISLN VLV
1-FCV-67-82-B	AUX BLDG ERCW SUP HDR 1B ISLN VLV
1-FCV-67-83-B	LOWER CNTMT 1A CLRS SUPPLY ISLN VLV OUTSIDE CNTMT
1-FCV-67-87-A	LOWER CNTMT 1A CLRS DISCH ISLN VLV INSIDE CNTMT
1-FCV-67-88-B	LOWER CNTMT 1A CLRS DISCH ISLN VLV OUTSIDE CNTMT
1-FCV-67-89-A	LOWER CNTMT 1A CLRS SUPPLY ISLN VLV INSIDE CNTMT
1-FCV-67-91-B	LOWER CNTMT 1C CLRS SUPPLY ISLN VLV OUTSIDE CNTMT
1-FCV-67-95-A	LOWER CNTMT 1C CLRS DISCH ISLN VLV INSIDE CNTMT
1-FCV-67-96-B	LOWER CNTMT 1C CLRS DISCH ISLN VLV OUTSIDE CNTMT
1-FCV-67-97-A	LOWER CNTMT 1C CLRS SUPPLY ISLN VLV INSIDE CNTMT
1-FCV-67-99-A	LOWER CNTMT 1B CLRS SUPPLY ISLN VLV OUTSIDE CNTMT
1-FCV-67-9A-A	ERCW STRAINER 1A-A BACKWASH VALVE
1-FCV-67-9B-A	ERCW STRAINER 1A-A FLUSH VLV
1-FCV-68-332-B	REACTOR COOLANT PRESS RELIEF FLOW CONTROL VALVE
1-FCV-68-333-A	REACTOR COOLANT PRESS RELIEF FLOW CONTROL VALVE
1-FCV-70-10-A	CCS HX A & C OUTLET ISLN VLV
1-FCV-70-133-A	RCP THERMAL BARRIER CONTAINMENT ISOLATION VALVE
1-FCV-70-134-B	RCP THERMAL BARRIER CONTAINMENT ISOLATION VALVE
1-FCV-70-13-B	CCS HX A & C INLET ISOLATION VLV
1-FCV-70-143-A	EXCESS LTDN HX INLET ISLN VLV
1-FCV-70-153-B	RHR HX B-B OUTLET VALVE
1-FCV-70-156-A	RHR HX A-A OUTLET VLV
1-FCV-70-23-A	CCS HX A & C INLET ISOLATION VLV
1-FCV-70-25-A	CCS HX A INLET VLV
1-FCV-70-26-B	CCS PMPS 1A-A & 1B-B TO C-S VLV
1-FCV-70-27-B	CCS PMPS 1A-A & 1B-B TO C-S VLV
1-FCV-70-2-A	RHR HX A HDR INLET VLV
1-FCV-70-34-B	CCS PMPS 1A-A TO 1B-B ISLN VLV
1-FCV-70-3-B	RHR HX 1B-B HDR INLET VLV
1-FCV-70-4-A	MISC EQUIPMENT HDR INLET VLV
1-FCV-70-64-B	CCS PMPS 1A-A & 1B-B TO C-S VLV
1-FCV-70-74-B	CCS PMPS 1A-A & 1B-B TO C-S VLV
1-FCV-70-75-B	RHR HX 1B-B RETURN HDR ISLN VLV
1-FCV-70-85-B	EXCESS LTDN HX OUTLET VLV
1-FCV-70-87-B	RCP THERMAL BARRIER RETURN CONTAINMENT ISOL VALVE
1-FCV-70-8-A	CCS HX A OUTLET VLV
1-FCV-70-90-A	RCP THERMAL BARRIER RETURN CONTAINMENT ISOL VALVE
1-FCV-70-9-B	CCS HX A & C OUTLET ISLN VLV

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-FCV-72-21-B	RWST TO SPRAY HDR 1B FCV
1-FCV-72-22-A	RWST TO SPRAY HDR 1A FCV
1-FCV-72-2-B	CNTMT SPRAY HDR 1B ISLN VLV
1-FCV-72-39-A	CNTMT SPRAY HDR 1A ISLN VLV
1-FCV-72-40-A	RHR SPRAY HDR 1A ISOLATION VALVE
1-FCV-72-41-B	RHR SPRAY HDR 1B ISOLATION VALVE
1-FCV-72-44-A	CNTMT SUMP TO SPRAY HDR 1A FCV
1-FCV-72-45-B	CNTMT SUMP TO SPRAY HDR 1B FCV
1-FCV-74-12-A	RHR PUMP 1A-A MINIMUM FLOW VALVE
1-FCV-74-16	RHR HX 1A OUTLET FLOW CONTROL VALVE
1-FCV-74-1-A	RHR SYSTEM ISOLATION VALVE
1-FCV-74-21-B	RHR PUMP 1B-B INLET FCV
1-FCV-74-24-B	RHR PUMP 1B-B MINIMUM FLOW VALVE
1-FCV-74-28	RHR HX 1B OUTLET FLOW CONTROL VALVE
1-FCV-74-2-B	RHR SYSTEM ISOLATION VALVE
1-FCV-74-32	RHR HEAT EXCHANGER BYPASS
1-FCV-74-33-A	RHR PUMP HEAT EXCHANGER 1A BYPASS VALVE
1-FCV-74-35-B	RHR PUMP HEAT EXCHANGER 1B BYPASS VALVE
1-FCV-74-3-A	RHR PUMP 1A-A INLET FCV
1-FCV-74-8-A	RHR SYSTEM ISOLATION BYPASS VALVE
1-FCV-74-9-B	RHR SYSTEM ISOLATION BY-PASS VALVE
1-FI-3-142A	TDAFW PUMP DISCHARGE FLOW
1-FI-3-147A	AFW FLOW TO #3SG
1-FI-3-147B	AFW FLOW TO #3SG
1-FI-3-147C	AFW FLOW TO #3 SG
1-FI-3-155A	AFW FLOW TO #2SG
1-FI-3-155B	AFW FLOW TO #2SG
1-FI-3-155C	AFW FLOW TO #2 SG
1-FI-3-163A	AFW FLOW TO #1SG
1-FI-3-163B	AFW FLOW TO #1SG
1-FI-3-163C	AFW FLOW TO #1 SG
1-FI-3-170A	AFW FLOW TO #4SG
1-FI-3-170B	AFW FLOW TO #4 SG
1-FI-3-170C	AFW FLOW TO #4 SG
1-FI-62-14A	RCP-2 SEAL INJECTION FLOW INDICATOR
1-FI-62-1A	RCP-1 SEAL INJECTION FLOW INDICATOR
1-FI-62-27A	RCP-3 SEAL INJECTION FLOW INDICATOR
1-FI-62-40A	RCP-4 SEAL INJECTION FLOW INDICATOR
1-FI-62-93A	NORMAL CHARGING FLOW INDICATOR
1-FI-62-93C	NORMAL CHARGING FLOW INDICATOR (ACR)
1-FI-67-61	ERCW SUPPLY HEADER 1A FLOW INDICATOR
1-FI-67-61C	ERCW SUPPLY HEADER 1A FLOW INDICATOR
1-FI-67-62	ERCW SUPPLY HEADER 1B FLOW INDICATOR
1-FI-67-62C	ERCW SUPPLY HEADER 1B FLOW INDICATOR
1-FSV-1-11A-A	#2SG MSIV OPERATING SOLENOID
1-FSV-1-11B-B	#2SG MSIV OPERATING SOLENOID
1-FSV-1-11D-A	#2SG MSIV OPERATING SOLENOID
1-FSV-1-11E-A	#2SG MSIV OPERATING SOLENOID

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-FSV-1-11F-A	#2SG MSIV OPERATING SOLENOID
1-FSV-1-11G-B	#2SG MSIV OPERATING SOLENOID
1-FSV-1-11H-B	#2SG MSIV OPERATING SOLENOID
1-FSV-1-11J-B	#2SG MSIV OPERATING SOLENOID
1-FSV-1-22A-A	#3SG MSIV OPERATING SOLENOID
1-FSV-1-22B-B	#3SG MSIV OPERATING SOLENOID
1-FSV-1-22D-A	#3SG MSIV OPERATING SOLENOID
1-FSV-1-22E-A	#3SG MSIV OPERATING SOLENOID
1-FSV-1-22F-A	#3SG MSIV OPERATING SOLENOID
1-FSV-1-22G-B	#3SG MSIV OPERATING SOLENOID
1-FSV-1-22H-B	#3SG MSIV OPERATING SOLENOID
1-FSV-1-22J-B	#3SG MSIV OPERATING SOLENOID
1-FSV-1-29A-A	#4SG MSIV OPERATING SOLENOID
1-FSV-1-29B-B	#4SG MSIV OPERATING SOLENOID
1-FSV-1-29D-A	#4SG MSIV OPERATING SOLENOID
1-FSV-1-29E-A	#4SG MSIV OPERATING SOLENOID
1-FSV-1-29F-A	#4SG MSIV OPERATING SOLENOID
1-FSV-1-29G-B	#4SG MSIV OPERATING SOLENOID
1-FSV-1-29H-B	#4SG MSIV OPERATING SOLENOID
1-FSV-1-29J-B	#4SG MSIV OPERATING SOLENOID
1-FSV-1-4A-A	#1SG MSIV OPERATING SOLENOID
1-FSV-1-4B-B	#1SG MSIV OPERATING SOLENOID
1-FSV-1-4D-A	#1SG MSIV OPERATING SOLENOID
1-FSV-1-4E-A	#1SG MSIV OPERATING SOLENOID
1-FSV-1-4F-A	#1SG MSIV OPERATING SOLENOID
1-FSV-1-4G-B	#1SG MSIV OPERATING SOLENOID
1-FSV-1-4H-B	#1SG MSIV OPERATING SOLENOID
1-FSV-1-4J-B	#1SG MSIV OPERATING SOLENOID
1-FSV-47-24	TRAIN A MAIN TURBINE TRIP SOLENOID
1-FSV-47-26A-A	EHC OVERSPEED PROTECTION CONTROL
1-FSV-47-26B-B	EHC OVERSPEED PROTECTION CONTROL
1-FSV-47-27	TRAIN B MAIN TURBINE TRIP SOLENOID
1-FSV-67-162-A	CCS AND AUX FW PMP CLR A SOL VALVE
1-FSV-67-164-B	CCS AND AUX FW PMP CLR B SOL VALVE
1-FSV-68-394-A	REACTOR VESSEL HEAD VENT ISOLATION VALVE
1-FSV-68-395-B	REACTOR VESSEL HEAD VENT ISOLATION VALVE
1-FSV-68-396-B	REACTOR VESSEL HEAD VENT THROTTLE VALVE
1-FSV-68-397-A	REACTOR VESSEL HEAD VENT THROTTLE VALVE
1-FT-3-142	TDAFW PUMP DISCHARGE FLOW TRANSMITTER
1-FT-3-147A	AFW TO #3SG FLOW TRANSMITTER
1-FT-3-147B	AFW TO #3SG FLOW TRANSMITTER
1-FT-3-155A	AFW TO #2 SG FLOW TRANSMITTER
1-FT-3-155B	AFW TO #2 SG FLOW TRANSMITTER
1-FT-3-163A	AFW TO #1 SG FLOW TRANSMITTER
1-FT-3-163B	SG1 FW FLOW
1-FT-3-170A	AFW TO #4 SG FLOW TRANSMITTER
1-FT-3-170B	SG4 FW FLOW
1-FT-62-1	RCP-1 SEAL INJECTION FLOW TRANSMITTER

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-FT-62-14	RCP-2 SEAL INJECTION FLOW TRANSMITTER
1-FT-62-27	RCP-3 SEAL INJECTION FLOW TRANSMITTER
1-FT-62-40	RCP-4 SEAL INJECTION FLOW TRANSMITTER
1-FT-62-93A	CHARGING HEADER FLOW CONT
1-FT-62-93C	CVCS CHARGING HEADER FLOW
1-FT-67-61	ERCW SUPPLY HEADER 1A FLOW TRANSMITTER
1-FT-67-61C	ERCW SUPPLY HEADER 1A FLOW TRANSMITTER
1-FT-67-62	ERCW SUPPLY HEADER 1B FLOW TRANSMITTER
1-FT-67-62C	ERCW SUPPLY HEADER 1B FLOW TRANSMITTER
1-FT-70-81A	THERMAL BARRIER OUTLET FLOW TRANSMITTER
1-FT-70-81B	THERMAL BARRIER BOOSTER PUMP DISCHARGE FLOW
1-FT-70-81D	THERMAL BARRIER OUTLET FLOW TRANSMITTER
1-FT-70-81E	THERMAL BARRIER BOOSTER PUMP DISCHARGE FLOW
1-HCV-74-36	RHR HX-A BYPASS MANUAL ISOL VLV
1-HCV-74-37	RHR HX-B BYPASS MANUAL ISOL VLV
1-HS-30-63A-A	MANUAL CI PH-A MCR HAND SWITCH
1-HS-30-63B-B	MANUAL CI PH-A MCR HAND SWITCH
1-HS-30-64A-A	MANUAL CI PH-B MCR HAND SWITCH
1-HS-30-64B-B	MANUAL CI PH-B MCR HAND SWITCH
1-HS-30-68A-A	MANUAL CI PH-B MCR HAND SWITCH
1-HS-30-68B-B	MANUAL CI PH-B MCR HAND SWITCH
1-HS-63-133A-T	HAND SWITCH
1-HS-63-133B-T	HAND SWITCH
1-HTR-68-341A/A1-A7	PZR BACKUP HEATER GROUP A
1-HTR-68-341D/B1-B7	PZR BACKUP HEATER GROUP B
1-HTR-68-341F/D1-D6	PZR CONTROL HEATER GROUP D
1-HTR-68-341H/C1-C6	PZR BACKUP HEATER GROUP C
1-HTX-62-66	CVCS SEAL WATER HTX
1-INV-235-1-D	CHANNEL I VITAL INVERTER
1-INV-235-2-E	CHANNEL II VITAL INVERTER
1-INV-235-3-F	CHANNEL III VITAL INVERTER
1-INV-235-4-G	CHANNEL IV VITAL INVERTER
1-ISIV-30-42A	CTMT PRES XMTR INST SENSING LINE/ISO VLV
1-ISIV-30-43A	CTMT PRES XMTR INST SENSING LINE/ISO VLV
1-ISIV-30-44A	CTMT PRES XMTR INST SENSING LINE/ISO VLV
1-ISIV-30-45A	CTMT PRES XMTR INST SENSING LINE/ISO VLV
1-ISV-3-826	SG 3 MDAFWP LCV ISOLATION VALVE
1-ISV-3-827	SG 2 MDAFWP LCV ISOLATION VALVE
1-ISV-3-828	SG 1 MDAFW LCV ISOLATION VALVE
1-ISV-3-829	SG 4 MDAFWP LCV ISOLATION VALVE
1-ISV-3-834	SG 3 MDAFWP LCV ISOLATION VALVE
1-ISV-3-835	SG 2 MDAFWP LCV ISOLATION VALVE
1-ISV-3-836	SG 1 MDAFWP LCV ISOLATION VALVE
1-ISV-3-837	SG 4 MDAFWP ISOLATION VALVE
1-ISV-62-526	CCP 1A-A SEAL INJECTION BYPASS
1-ISV-62-527	CCP 1A-A DISCHARGE VALVE
1-ISV-62-533	CCP 1B-B DISCHARGE VALVE
1-ISV-62-534	CCP 1B-B SEAL INJECTION BYPASS

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-ISV-62-535	1-FCV-62-93 ISOLATION VALVE
1-ISV-62-536	1-FCV-62-93 ISOLATION VALVE
1-ISV-62-537	FCV-62-89 UPSTREAM ISOL
1-ISV-62-539	FCV-62-89 DOWNSTREAM ISOL
1-ISV-62-549	SEAL WATER INJECTION FILTER OUTLET
1-ISV-62-550	SEAL WATER INJECTION FILTER OUTLET
1-ISV-70-545A	RHR HX 1A-A INLET ISOLATION VALVE (MANUAL)
1-ISV-70-574	CCS SUPPLY TO NON-REGEN LETDOWN HX ISOL
1-ISV-70-587	CCS OUT/SEAL WTR & NON-RGN LETDOWN HX ISO
1-L-256	N2 OPERATING STATION
1-L-737-A	N2 OPERATING STATION
1-L-738-B	N2 OPERATING STATION
1-LCV-3-148	MDAFW FLOW CONTROL VALVE TO #3SG
1-LCV-3-156	MDAFW FLOW CONTROL VALVE TO #2SG
1-LCV-3-164	MDAFW FLOW CONTROL VALVE TO #1SG
1-LCV-3-171	MDAFW FLOW CONTROL VALVE TO #4SG
1-LCV-3-172	TDAFW FLOW CONTROL VALVE TO #3SG
1-LCV-3-173	TDAFW FLOW CONTROL VALVE TO #2SG
1-LCV-3-174	TDAFW FLOW CONTROL VALVE TO #1SG
1-LCV-3-175	TDAFW FLOW CONTROL VALVE TO #4SG
1-LCV-62-132-A	VCT OUTLET ISOLATION VALVE
1-LCV-62-133-B	VCT OUTLET ISOLATION VALVE
1-LCV-62-135-A	RWST TO CHARGING PUMPS VALVE CONTROL
1-LCV-62-136-B	RWST TO CHARGING PUMPS VALVE CONTROL
1-LI-3-106	#4SG LEVEL INDICATOR (NR)
1-LI-3-107	#4SG LEVEL INDICATOR (NR)
1-LI-3-110	#4SG LEVEL INDICATOR (NR)
1-LI-3-111	#4SG LEVEL INDICATOR (WR)
1-LI-3-148C	SG 3 NARROW RANGE LEVEL
1-LI-3-156C	SG 2 NARROW RANGE LEVEL
1-LI-3-164C	SG 1 NARROW RANGE LEVEL
1-LI-3-171C	SG 4 NARROW RANGE LEVEL
1-LI-3-38	#1SG LEVEL INDICATOR (NR)
1-LI-3-39	#1SG LEVEL INDICATOR (NR)
1-LI-3-42	#1SG LEVEL INDICATOR (NR)
1-LI-3-43	#1SG LEVEL INDICATOR (WR)
1-LI-3-51	#2SG LEVEL INDICATOR (NR)
1-LI-3-52	#2SG LEVEL INDICATOR (NR)
1-LI-3-55	#2SG LEVEL INDICATOR (NR)
1-LI-3-56	#2SG LEVEL INDICATOR (WR)
1-LI-3-93	#3SG LEVEL INDICATOR (NR)
1-LI-3-94	#3SG LEVEL INDICATOR (NR)
1-LI-3-97	#3SG LEVEL INDICATOR (NR)
1-LI-3-98	#3SG LEVEL INDICATOR (WR)
1-LI-62-129A	VCT LEVEL INDICATION
1-LI-62-129C	VCT LEVEL INDICATION
1-LI-63-50	RWST LEVEL INDICATOR
1-LI-63-52	RWST LEVEL INDICATOR

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-LI-68-320-F	PZR LEVEL INDICATOR
1-LI-68-325C	RCS PRESSURIZER LEVEL
1-LI-68-326C	RCS PRESSURIZER LEVEL
1-LI-68-335A-E	PZR LEVEL INDICATOR
1-LI-68-339A-D	PZR LEVEL INDICATOR
1-LIC-3-148A	SG 3 LEVEL CONTROLLER
1-LIC-3-156A	SG 2 LEVEL CONTROLLER
1-LIC-3-164A	SG 1 LEVEL CONTROLLER
1-LIC-3-171A	SG 4 LEVEL CONTROLLER
1-LM-3-148A	1-LCV-3-148/148A MODULATOR
1-LM-3-156A	1-LCV-3-156/156A MODULATOR
1-LM-3-164A	1-LCV-3-164/164A MODULATOR
1-LM-3-171A	1-LCV-3-171/171A MODULATOR
1-LM-3-172A	LCV-3-172 MODULATOR
1-LM-3-173A	LCV-3-173 MODULATOR
1-LM-3-174A	LCV-3-174 MODULATOR
1-LM-3-175A	LCV-3-175 MODULATOR
1-LT-3-106	#4SG LEVEL TRANSMITTER (NR)
1-LT-3-107	#4SG LEVEL TRANSMITTER (NR)
1-LT-3-110	#4SG LEVEL TRANSMITTER (NR)
1-LT-3-111	#4SG LEVEL TRANSMITTER (WR)
1-LT-3-38	#1SG LEVEL TRANSMITTER (NR)
1-LT-3-39	#1SG LEVEL TRANSMITTER (NR)
1-LT-3-42	#1SG LEVEL TRANSMITTER (NR)
1-LT-3-43	#1SG LEVEL TRANSMITTER (WR)
1-LT-3-51	#2SG LEVEL TRANSMITTER (NR)
1-LT-3-52	#2SG LEVEL TRANSMITTER (NR)
1-LT-3-55	#2SG LEVEL TRANSMITTER (NR)
1-LT-3-56	#2SG LEVEL TRANSMITTER (WR)
1-LT-3-93	#3SG LEVEL TRANSMITTER (NR)
1-LT-3-94	#3SG LEVEL TRANSMITTER (NR)
1-LT-3-97	#3SG LEVEL TRANSMITTER (NR)
1-LT-3-98	#3SG LEVEL TRANSMITTER (WR)
1-LT-62-129A	VCT LEVEL TRANSMITTER
1-LT-62-129C	VCT LEVEL TRANSMITTER
1-LT-62-130A	VCT LEVEL TRANSMITTER
1-LT-63-50	RWST LEVEL TRANSMITTER
1-LT-63-52	RWST LEVEL TRANSMITTER
1-LT-68-320	PZR LEVEL TRANSMITTER
1-LT-68-325C	RCS PRESSURIZER LEVEL
1-LT-68-326C	RCS PRESSURIZER LEVEL
1-LT-68-335	PZR LEVEL TRANSMITTER
1-LT-68-339	PZR LEVEL TRANSMITTER
1-MCC-213-A1-A	REACTOR MOV BD 1A1-A
1-MCC-213-A2-A	REACTOR MOV BD 1A2-A
1-MCC-213-B1-B	REACTOR MOV BD 1B1-B
1-MCC-213-B2-B	REACTOR MOV BD 1B2-B
1-MCC-214-A1-A	480V CONT AND AUX BLDG VENT BOARD 1A1-A

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-MCC-214-B1-B	480V CONT AND AUX BLDG VENT BOARD 1B1-B
1-MCC-215-A1-A	DIESEL AUX BD 1A1-A
1-MCC-215-A2-A	DIESEL AUX BD 1A2-A
1-MCC-215-B1-B	DIESEL AUX BD 1B1-B
1-MCC-215-B2-B	DIESEL AUX BD 1B2-B
1-MTR-26-1-A	HP FIRE PUMP
1-MTR-26-4-B	HP FIRE PUMP
1-MTR-30-175-A	RHR PMP 1A-A RM COOLER MOTOR
1-MTR-30-176-B	RHR PMP 1B-B RM COOLER MOTOR
1-MTR-30-182-B	CCP 1B-B ROOM COOLER FAN
1-MTR-30-183-A	CCP 1A-A ROOM COOLER FAN
1-MTR-30-190-A	CCS/AFW PUMP SPACE COOLER 1A-A MOTOR
1-MTR-30-191-B	CCS/AFW PUMP SPACE COOLER 1B-B MOTOR
1-MTR-30-214	TURBINE DRIVEN AUX FW PUMP ROOM VENT FAN
1-MTR-30-244F-A	XMFR RM 1A EXHAUST FAN 1A1-A MOTOR
1-MTR-30-244G-A	XMFR RM 1A EXHAUST FAN 1A2-A MOTOR
1-MTR-30-244H-A	XMFR RM 1A EXHAUST FAN 1A3-A MOTOR
1-MTR-30-248E-B	XMFR RM 1B EXHAUST FAN 1B1-B MOTOR
1-MTR-30-248F-B	XMFR RM 1B EXHAUST FAN 1B2-B MOTOR
1-MTR-30-248G-B	XMFR RM 1B EXHAUST FAN 1B3-B MOTOR
1-MTR-30-38-A	CONTAINMENT AIR RETURN FAN 1A-A
1-MTR-30-39-B	CONTAINMENT AIR RETURN FAN 1B-B
1-MTR-30-447-A	DG 1A-A ROOM EXHAUST FAN 1A MOTOR
1-MTR-30-449-B	DG 1B-B ROOM EXHAUST FAN 1B MOTOR
1-MTR-30-451-A	DG 1A-A ROOM EXHAUST FAN 2A MOTOR
1-MTR-30-453-B	DG 1B-B ROOM EXHAUST FAN 2B MOTOR
1-MTR-30-459-A	DG 1A-A ELECTRIC BOARD ROOM EXHAUST FAN MOTOR
1-MTR-30-461-B	DG 1B-B ELECTRIC BOARD ROOM EXHAUST FAN MOTOR
1-MTR-30-491-A	DG ELEC PANEL/GENERATOR VENT FAN MOTOR
1-MTR-30-493-B	DG ELEC PANEL/GENERATOR VENT FAN MOTOR
1-MTR-30-74-A	CONTAINMENT LOWER COMPARTMENT COOLER 1A-A MOTOR
1-MTR-30-75-B	CONTAINMENT LOWER COMPARTMENT COOLER 1B-B MOTOR
1-MTR-30-77-A	CONTAINMENT LOWER COMPARTMENT COOLER 1C-A MOTOR
1-MTR-30-78-B	CONTAINMENT LOWER COMPARTMENT COOLER 1D-B MOTOR
1-MTR-30-80-B	CONTROL ROD DRIVE MOTOR COOLER 1D-B
1-MTR-30-83-A	CONTROL ROD DRIVE MOTOR COOLER 1A-A
1-MTR-30-88-A	CONTROL ROD DRIVE MOTOR COOLER 1C-A
1-MTR-30-92-B	CONTROL ROD DRIVE MOTOR COOLER 1B-B
1-MTR-3-118-A	MDAFW PUMP 1A-A
1-MTR-3-118D-A	AUX FEEDWATER PUMP A-A LUBE OIL PUMP A-A
1-MTR-3-128-B	MDAFW PUMP 1B-B
1-MTR-3-128D-B	AUX FEEDWATER PUMP B-B LUBE OIL PUMP B-B
1-MTR-62-104-B	CENTRIFUGAL CHARGING PUMP 1B-B
1-MTR-62-108-A	CENTRIFUGAL CHARGING PUMP 1A-A
1-MTR-63-10-A	SAFETY INJECTION PUMP 1A-A
1-MTR-63-15-B	SAFETY INJECTION PUMP 1B-B
1-MTR-67-10B-B	ERCW STRAINER 1B-B
1-MTR-67-431-A	ERCW SCREEN WASH PUMP 1A-A

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-MTR-67-434-A	ERCW TRAVELING SCREEN 1A-A
1-MTR-67-440-B	ERCW SCREEN WASH PUMP 1B-B
1-MTR-67-445-B	ERCW TRAVELING SCREEN 1B-B
1-MTR-67-9A-A	ERCW STRAINER 1A-A
1-MTR-68-31	REACTOR COOLING PUMP NUMBER 2
1-MTR-68-50	REACTOR COOLING PUMP NUMBER 3
1-MTR-68-73	REACTOR COOLING PUMP NUMBER 4
1-MTR-68-8	REACTOR COOLANT PUMP NUMBER 1
1-MTR-70-130-B	THERMAL BARRIER BOOSTER PUMP 1B-B
1-MTR-70-131-A	THERMAL BARRIER BOOSTER PUMP 1A-A
1-MTR-70-38-B	COMPONENT COOLING SYSTEM PUMP 1B-B
1-MTR-70-46-A	COMPONENT COOLING SYSTEM PUMP 1A-A
1-MTR-72-10-B	CONTAINMENT SPRAY PUMP 1B-B
1-MTR-72-27-A	CONTAINMENT SPRAY PUMP 1A-A
1-MTR-74-10-A	RESIDUAL HEAT REMOVAL PUMP 1A-A
1-MTR-74-20-B	RESIDUAL HEAT REMOVAL PUMP 1B-B
1-MTR-81-3	PRIMARY MAKEUP WATER PUMP 1A
1-MTR-81-7	PRIMARY MAKEUP WATER PUMP 1B
1-NI-92-131-D	SOURCE RANGE NEUTRON DETECTOR
1-NI-92-132-E	SOURCE RANGE NEUTRON DETECTOR
1-NI-92-138	NEUTRON SOURCE RANGE INDICATOR
1-NI-92-138P	PORTABLE NEUTRON SOURCE RANGE INDICATOR
1-NM-92-131-D	AMPLIFIER
1-NM-92-132-E	AMPLIFIER
1-NMD-92-131-D	NEUTRON DETECTOR
1-NMD-92-132-E	NEUTRON DETECTOR
1-OXF-212-A1-A	480V SHUTDOWN BOARD XMFR 1A1-A
1-OXF-212-A2-A	480V SHUTDOWN BOARD XMFR 1A2-A
1-OXF-212-B1-B	480V SHUTDOWN BOARD XMFR 1B1-B
1-OXF-212-B2-B	480V SHUTDOWN BOARD XMFR 1B2-B
1-PCV-1-12	STEAM GENERATOR ATMOSPHERIC RELIEF VALVE
1-PCV-1-23	STEAM GENERATOR ATMOSPHERIC RELIEF VALVE
1-PCV-1-30	STEAM GENERATOR ATMOSPHERIC RELIEF VALVE
1-PCV-1-5	STEAM GENERATOR ATMOSPHERIC RELIEF VALVE
1-PCV-3-122-A	MDAFWP 1A-A DISCHARGE VALVE
1-PCV-3-132-B	MDAFWP 1B-B DISCHARGE VALVE
1-PCV-68-334-B	PZR PORV
1-PCV-68-340A-A	PZR PORV
1-PCV-68-340B	PRESSURIZER SPRAY VALVE
1-PCV-68-340D	PRESSURIZER SPRAY VALVE
1-PDIC-3-122C	MDAFW PMP 1A-A DISCH PRES CONT ACS (IND)
1-PDIC-3-132C	MDAFW PMP 1B-B DISCH PRES CONT ACS (IND)
1-PDT-30-42-G	PROTECT SET IV - CTMT HI PRESS
1-PDT-30-43-F	PROTECT SET III - CTMT HI PRESS
1-PDT-30-44-E	PROTECT SET II - CTMT HI PRESS
1-PDT-30-45-D	PROTECT SET I - CTMT PRESS HIGH
1-PI-1-12	#2SG PRESSURE INDICATION
1-PI-1-19C	SG 3 STEAM HEADER PRESSURE

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-PI-1-1C	SG 1 STEAM HEADER PRESSURE
1-PI-1-20A	#3SG PRESSURE INDICATION
1-PI-1-20B	#3SG PRESSURE INDICATION
1-PI-1-23	#3SG PRESSURE INDICATION
1-PI-1-26C	SG 4 STEAM HEADER PRESSURE
1-PI-1-27A	#4SG PRESSURE INDICATION
1-PI-1-27B	#4SG PRESSURE INDICATION
1-PI-1-2A	#1SG PRESSURE INDICATION
1-PI-1-2B	#1SG PRESSURE INDICATION
1-PI-1-30	#4SG PRESSURE INDICATION
1-PI-1-5	#1SG PRESSURE INDICATION
1-PI-1-8C	SG 2 STEAM HEADER PRESSURE
1-PI-1-9A	#2SG PRESSURE INDICATION
1-PI-1-9B	#2SG PRESSURE INDICATION
1-PI-3-117	LOCAL MDAFWP A SUCTION PRES INDICATOR
1-PI-3-127	LOCAL MDAFWP B SUCTION PRES INDICATOR
1-PI-3-137	LOCAL TDAFW PUMP SUCTION PRES INDICATOR
1-PI-68-342A	PRESSURIZER PRESSURE INSTRUMENT
1-PI-68-342C	PRESSURIZER PRESSURE INSTRUMENT LOOP
1-PI-68-63	RCS LOOP 1 PRESSURE (RHR INLET)
1-PIC-1-13A	SG 2 PRESSURE CONTROLLER
1-PIC-1-24A	SG 3 PRESSURE CONTROLLER
1-PIC-1-31A	SG 4 PRESSURE CONTROLLER
1-PIC-1-6A	SG 1 PRESSURE CONTROLLER
1-PM-1-13	PCV-1-12 MODULATOR
1-PM-1-24	PCV-1-23 MODULATOR
1-PM-1-31	PCV-1-30 MODULATOR
1-PM-1-6	PCV-1-5 MODULATOR
1-PM-3-122	PCV-3-122 MODULATOR
1-PM-3-132	PCV-3-132 MODULATOR
1-PMP-18-54/1	1-DG-82-A-A FO XFER PP #2
1-PMP-18-54/2	1-DG-82-B-B FO XFER PP #2
1-PMP-18-55/1	1-DG-82-A-A FO XFER PP #1
1-PMP-18-55/2	1-DG-82-B-B FO XFER PP #1
1-PNL-276-L112	1-FCV-62-93 PNEUMATIC STOP INST PANEL
1-PSV-1-13B-B	SG-2 MAIN STM HDR
1-PSV-1-13C-A	SOLENOID VALVE
1-PSV-1-24B-A	SG-3 MAIN STM HDR
1-PSV-1-24C-B	SOLENOID VALVE
1-PSV-1-31B-B	SG-4 MAIN STM HDR
1-PSV-1-31C-A	SOLENOID VALVE
1-PSV-1-6B-A	SG-1 MAIN STM HDR
1-PSV-1-6C-B	SOLENOID VALVE
1-PT-1-12-F	PROTECT SET III - SG LOOP 2
1-PT-1-13	SG-2 PRESSURE TRANSMITTER FOR PCV-1-12
1-PT-1-20A-D	MAIN STEAM LOOP 3 PRESSURE
1-PT-1-20B-E	MAIN STEAM LOOP 3 PRESSURE
1-PT-1-23-F	PROTECT SET III -SG LOOP 3

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-PT-1-24	SG-3 PRESSURE TRANSMITTER FOR PCV-1-23
1-PT-1-27A-D	MAIN STEAM LOOP 4 PRESSURE
1-PT-1-27B-E	MAIN STEAM LOOP 4 PRESSURE
1-PT-1-2A-D	MAIN STEAM LOOP 1 PRESSURE
1-PT-1-2B-E	PROTECT SET II - SG LOOP 3
1-PT-1-30A-G	PROTECT SET IV - SG LOOP 4
1-PT-1-31	MAIN STEAM LOOP 4 PRESSURE
1-PT-1-5-G	PROTECT SET IV - SG LOOP 1
1-PT-1-6	MAIN STEAM LOOP 1 PRESSURE
1-PT-1-9A-D	MAIN STEAM LOOP 2 PRESSURE
1-PT-1-9B-E	MAIN STEAM LOOP 2 PRESSURE
1-PT-68-323-F	PRESSURIZER PRESSURE
1-PT-68-334-E	PRESSURIZER PRESSURE
1-PT-68-340-D	PRESSURIZER PRESSURE
1-PT-68-342	PRESSURIZER PRESSURE INSTRUMENT
1-PT-68-63	RCS LOOP 1 PRESSURE (RHR INLET)
1-SC-46-57	TDAFW PUMP SPEED CONTROLLER
1-SW-46-AC-S	AC MANUAL TRANSFER SW
1-SW-46-DC-S	DC MANUAL TRANSFER SW
1-TCO-30-82-B	CONTROL ROD DRIVE CLING 1D-B RM DIVERSION DMPR
1-TCO-30-85-A	CONTROL ROD DRIVE CLING 1A-A RM DIVERSION DMPR
1-TCO-30-90-A	CONTROL ROD DRIVE CLING 1C-A RM DIVERSION DMPR
1-TCO-30-94-B	CONTROL ROD DRIVE CLING 1B-B RM DIVERSION DMPR
1-TCV-67-100-B	LOWER CNTMT VENT CLR B SUPPLY CONTROL VLV
1-TCV-67-101-B	CONTROL ROD DRIVE VENT CLR B SUPPLY CONTROL VLV
1-TCV-67-108-B	LOWER CNTMT VENT CLR D SUPPLY CONTROL VLV
1-TCV-67-109-B	CONTROL ROD DRIVE VENT CLR D SUPPLY CONTROL VLV
1-TCV-67-84-A	LOWER CNTMT VENT CLR A SUPPLY CONTROL VLV
1-TCV-67-85-A	CONTROL ROD DRIVE VENT CLR A SUPPLY CONTROL VLV
1-TCV-67-92-A	LOWER CNTMT VENT CLR C SUPPLY CONTROL VLV
1-TCV-67-93-A	CONTROL ROD DRIVE VENT CLR C SUPPLY CONTROL VLV
1-TE-68-1	RCS LOOP 1 HOT LEG TEMPERATURE
1-TE-68-18	RCS LOOP 1 COLD LEG TEMPERATURE
1-TE-68-1C	RCS LOOP 1 HOT LEG TEMPERATURE
1-TE-68-24	RCS LOOP 2 HOT LEG TEMPERATURE
1-TE-68-24C	RCS LOOP 2 HOT LEG TEMPERATURE
1-TE-68-41	RCS LOOP 2 COLD LEG TEMPERATURE
1-TE-68-43	RCS LOOP 3 HOT LEG TEMPERATURE
1-TE-68-43C	RCS LOOP 3 HOT LEG TEMPERATURE
1-TE-68-60	RCS LOOP 3 COLD LEG TEMPERATURE
1-TE-68-65	RCS LOOP 4 HOT LEG TEMPERATURE
1-TE-68-65C	RCS LOOP 4 HOT LEG TEMPERATURE
1-TE-68-83	RCS LOOP 4 COLD LEG TEMPERATURE
1-TE-70-154	RHR HEAT EXCHANGE 1B CCS RETURN TEMP
1-TE-70-157	RHR HEAT EXCHANGE 1A CCS RETURN TEMP
1-TE-70-161	ERCW/CCS HX-A OUTLET TEMP (CCS)
1-TE-74-14	RHR PMP 1A-A OUTLET TEMP
1-TE-74-25	RHR PMP 1B-B OUTLET TEMP

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
1-TE-74-29	RHR HEAT EXCHANGER A OUTLET TEMP
1-TE-74-39	RHR HEAT EXCHANGER B OUTLET TEMP
1-THV-70-546A	RHR HX 1A-A OUTLET VALVE (MANUAL)
1-TI-68-1	RCS LOOP 1 HOT LEG TEMPERATURE
1-TI-68-18	RCS LOOP 1 COLD LEG TEMPERATURE
1-TI-68-1C	RCS LOOP 1 HOT LEG TEMPERATURE
1-TI-68-24A	RCS LOOP 2 HOT LEG TEMPERATURE
1-TI-68-24C	RCS LOOP 2 HOT LEG TEMPERATURE
1-TI-68-41	RCS LOOP 2 COLD LEG TEMPERATURE
1-TI-68-43	RCS LOOP 3 HOT LEG TEMPERATURE
1-TI-68-43C	RCS LOOP 3 HOT LEG TEMPERATURE
1-TI-68-60	RCS LOOP 3 COLD LEG TEMPERATURE
1-TI-68-65	RCS LOOP 4 HOT LEG TEMPERATURE
1-TI-68-65C	RCS LOOP 4 HOT LEG TEMPERATURE
1-TI-68-83	RCS LOOP 4 COLD LEG TEMPERATURE
1-TI-70-154	RHR HX-B OUTLET TEMP (CCS)
1-TI-70-157	RHR HX-A OUTLET TEMP (CCS)
1-TI-70-161	ERCW/CCS HX-A OUTLET TEMP (CCS)
1-TI-74-14	RHR HX-A INLET TEMPERATURE
1-TI-74-15	RHR HX-A OUTLET TEMPERATURE
1-TI-74-25	RHR HX-B INLET TEMPERATURE
1-TI-74-27	RHR HX-B OUTLET TEMPERATURE
1-TI-74-38C	RCS HEAT EXCHANGER A OUTLET TEMPERATURE
1-TI-74-40C	RCS HEAT EXCHANGER B OUTLET TEMPERATURE
1-TR-74-14P002	RHR HX-A TEMPERATURE RECORDER
1-TR-74-25P002	RHR HX-B TEMPERATURE RECORDER
1-XS-99-1-D	REACTOR PROTECTION SET I TRANSFER SWITCH 1-D
2-BD-211-A-A	6.9KV SHUTDOWN BOARD 2A-A
2-BD-211-B-B	6.9KV SHUTDOWN BOARD 2B-B
2-BD-212-A1-A	480V SHUTDOWN BOARD 2A1-A
2-BD-212-A2-A	480V SHUTDOWN BOARD 2A2-A
2-BD-212-B1-B	480V SHUTDOWN BOARD 2B1-B
2-BD-212-B2-B	480V SHUTDOWN BOARD 2B2-B
2-BD-235-1-D	120V AC VITAL POWER BOARD 2-I
2-BD-235-2-E	120V AC VITAL POWER BOARD 2-II
2-BD-235-3-F	120V AC VITAL POWER BOARD 2-III
2-BD-235-4-G	120V AC VITAL POWER BOARD 2-IV
2-BD-237-A	INSTRUMENT POWER DISTRIBUTION PANEL 2A
2-BD-237-B	INSTRUMENT POWER DISTRIBUTION PANEL 2B
2-BKR-99-L116/1B-A	REACTOR TRIP SWGR A
2-BKR-99-L116/1C-B	REACTOR TRIP SWGR B
2-DG-82-A-A	UNIT 2 TRAIN A DIESEL GENERATOR
2-DG-82-B-B	UNIT 2 TRAIN B DIESEL GENERATOR
2-FCO-30-246A	480V TRANSFORMER RM 2B INTAKE AIR DAMPER
2-FCO-30-246B	480V TRANSFORMER RM 2B INTAKE AIR DAMPER
2-FCO-30-250A	480V TRANSFORMER RM 2A INTAKE AIR DAMPER
2-FCO-30-250B	480V TRANSFORMER RM 2A INTAKE AIR DAMPER
2-FCO-30-444-A	DIESEL GENERATOR VENT FAN DAMPER

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-FCO-30-446-B	DIESEL GENERATOR VENT FAN DAMPER
2-FCO-30-448-A	DG 2A-A ROOM EXHAUST FAN 2A DISCHARGE
2-FCO-30-450-B	DG 2B-B ROOM EXHAUST FAN 2B DISCHARGE
2-FCO-30-452-A	DG 2A-A ROOM EXHAUST FAN 2A DISCHARGE
2-FCO-30-454-B	DG 2B-B ROOM EXHAUST FAN 2B DISCHARGE
2-FCO-30-460-A	DG 2A-A ELECTRIC BOARD ROOM EXHAUST FAN DISCHARGE
2-FCO-30-462-B	DG 2B-B ELECTRIC BOARD ROOM EXHAUST FAN DISCHARGE
2-FCV-1-103	MAIN STEAM COOL DOWN VALVE
2-FCV-1-104	MAIN STEAM DUMP VALVE
2-FCV-1-105	MAIN STEAM DUMP VALVE
2-FCV-1-106	MAIN STEAM DUMP VALVE
2-FCV-1-107	MAIN STEAM COOL DOWN VALVE
2-FCV-1-108	MAIN STEAM DUMP VALVE
2-FCV-1-109	MAIN STEAM DUMP VALVE
2-FCV-1-11	#2 SG MAIN STEAM ISOLATION VALVE
2-FCV-1-110	MAIN STEAM DUMP VALVE
2-FCV-1-111	MAIN STEAM COOL DOWN VALVE
2-FCV-1-112	MAIN STEAM DUMP VALVE
2-FCV-1-113	MAIN STEAM COOL DOWN VALVE
2-FCV-1-114	MAIN STEAM DUMP VALVE
2-FCV-1-147-A	STEAM LINE WARMING VALVE LOOP 1
2-FCV-1-148-B	STEAM LINE WARMING VALVE LOOP 2
2-FCV-1-149-A	STEAM LINE WARMING VALVE LOOP 3
2-FCV-1-14-A	SG 2 BLOWDOWN CONTROL VALVE
2-FCV-1-150-B	STEAM LINE WARMING VALVE LOOP 4
2-FCV-1-15-A	AFWPT STEAM SUPPLY FROM SG 1 FLOW CONTROL VALVE
2-FCV-1-17-A	STEAM FLOW AUX FWPT ISOL VALVE
2-FCV-1-181-A	SG 1 BLOWDOWN ISOLATION VALVE
2-FCV-1-182-B	SG 2 BLOWDOWN ISOLATION VALVE
2-FCV-1-183-A	SG 3 BLOWDOWN ISOLATION VALVE
2-FCV-1-184-B	SG 4 BLOWDOWN ISOLATION VALVE
2-FCV-1-18-B	STEAM FLOW TO AUX FWPT ISOLATION VALVE
2-FCV-1-22	#3 SG MAIN STEAM ISOLATION VALVE
2-FCV-1-25-B	SG 3 BLOWDOWN CONTROL VALVE LOOP 3
2-FCV-1-275	MSR A2 LOW POWER BYPASS CONTROL VALVE
2-FCV-1-277	MSR B2 LOW POWER BYPASS CONTROL VALVE
2-FCV-1-279	MSR C2 LOW POWER BYPASS CONTROL VALVE
2-FCV-1-284	MSR A1 LOW POWER BYPASS CONTROL VALVE
2-FCV-1-29	#4 SG MAIN STEAM ISOLATION VALVE
2-FCV-1-291	MSR B1 LOW POWER BYPASS CONTROL VALVE
2-FCV-1-298	MSR C1 LOW POWER BYPASS CONTROL VALVE
2-FCV-1-32-A	SG 4 BLOWDOWN CONTROL VALVE LOOP 4
2-FCV-1-36	MAIN FW PUMP TURBINE HP STOP VALVE
2-FCV-1-37	MAIN FW PUMP TURBINE HP CONTROL VALVE
2-FCV-1-4	#1 SG MAIN STEAM ISOLATION VALVE
2-FCV-1-43	MAIN FW PUMP TURBINE HP STOP VALVE
2-FCV-1-44	MAIN FW PUMP TURBINE HP CONTROL VALVE
2-FCV-1-51-S	AFW PUMP TURBINE TRIP & THROTTLE VALVE

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-FCV-1-52	TDAFWP TURBINE GOVERNOR VALVE
2-FCV-1-61	MAIN TURBINE CONTROL VALVE
2-FCV-1-62	MAIN TURBINE CONTROL VALVE
2-FCV-1-64	MAIN TURBINE CONTROL VALVE
2-FCV-1-65	MAIN TURBINE CONTROL VALVE
2-FCV-1-67	MAIN TURBINE CONTROL VALVE
2-FCV-1-68	MAIN TURBINE CONTROL VALVE
2-FCV-1-70	MAIN TURBINE CONTROL VALVE
2-FCV-1-71	MAIN TURBINE CONTROL VALVE
2-FCV-1-75	MOISTURE SEPARATOR REHEATER A2 CONTROL VALVE
2-FCV-1-77	MOISTURE SEPARATOR REHEATER B2 CONTROL VALVE
2-FCV-1-79	MOISTURE SEPARATOR REHEATER C2 CONTROL VALVE
2-FCV-1-7-B	SG 1 BLOWDOWN CONTROL VALVE
2-FCV-1-84	MOISTURE SEPARATOR REHEATER A1 CONTROL VALVE
2-FCV-1-91	MOISTURE SEPARATOR REHEATER B1 CONTROL VALVE
2-FCV-1-98	MOISTURE SEPARATOR REHEATER C1 CONTROL VALVE
2-FCV-26-240-A	CONTAINMENT STANDPIPE ISOLATION VALVE
2-FCV-26-241-B	ANNULUS STANDPIPE ISOLATION VALVE
2-FCV-26-242-A	ANNULUS STANDPIPE ISOLATION VALVE
2-FCV-26-243-A	RCP SPRAY ISOLATION VALVE
2-FCV-26-244-B	ANNULUS SPRINKLER ISOLATION VALVE
2-FCV-26-245-A	ANNULUS SPRINKLER ISOLATION VALVE
2-FCV-30-10-A	UPPER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-14-A	LOWER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-15-B	LOWER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-16-B	LOWER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-17-A	LOWER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-19-B	INSTRUMENT ROOM PURGE ISOLATION VALVE
2-FCV-30-20-A	INSTRUMENT ROOM PURGE ISOLATION VALVE
2-FCV-30-37-B	LOWER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-40-A	LOWER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-50-B	UPPER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-51-A	UPPER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-52-A	UPPER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-53-B	UPPER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-56-A	LOWER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-57-B	LOWER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-58-B	INSTRUMENT ROOM PURGE ISOLATION VALVE
2-FCV-30-59-A	INSTRUMENT ROOM PURGE ISOLATION VALVE
2-FCV-30-7-A	UPPER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-8-B	UPPER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-30-9-B	UPPER COMPARTMENT PURGE ISOLATION VALVE
2-FCV-3-100-B	STEAM GENERATOR 4 FEEDWATER ISOLATION VALVE
2-FCV-3-103	STEAM GENERATOR 4 FW CONTROL VALVE
2-FCV-3-103A	STEAM GENERATOR 4 FW BYPASS VALVE
2-FCV-3-116A-A	ERCW HDR A ISOLATION VALVE
2-FCV-3-116B-A	ERCW HDR A ISOLATION VALVE
2-FCV-3-126A-B	ERCW HDR B ISOLATION VALVE

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-FCV-3-126B-B	ERCW HDR B ISOLATION VALVE
2-FCV-3-136A-A	ERCW HDR A ISOLATION VALVE
2-FCV-3-136B-A	ERCW HDR A ISOLATION VALVE
2-FCV-3-179A-B	ERCW HDR B ISOLATION VALVE
2-FCV-3-179B-B	ERCW HDR B ISOLATION VALVE
2-FCV-32-111-B	RB TRAIN B NON-ESSENTIAL CONTROL AIR ISLN VLV
2-FCV-3-236	SG1 FEEDWATER BYPASS ISOLATION VALVE
2-FCV-3-239	SG2 FEEDWATER BYPASS ISOLATION VALVE
2-FCV-3-242	SG3 FEEDWATER BYPASS ISOLATION VALVE
2-FCV-3-245	SG4 FEEDWATER BYPASS ISOLATION VALVE
2-FCV-3-33-A	STEAM GENERATOR 1 FEEDWATER ISOLATION VALVE
2-FCV-3-35	STEAM GENERATOR 1 FEEDWATER CONTROL VALVE
2-FCV-3-355-A	TRAIN A MDAFW PUMP RECIRCULATION VALVE
2-FCV-3-359-B	TRAIN B MDAFW PUMP RECIRCULATION VALVE
2-FCV-3-35A	STEAM GENERATOR 1 FEEDWATER BYPASS VALVE
2-FCV-3-47-B	STEAM GENERATOR 2 FEED WATER ISOL VALVE
2-FCV-3-48	STEAM GENERATOR 2 FW CONTROL VALVE
2-FCV-3-48A	STEAM GENERATOR 2 FW BYPASS VALVE
2-FCV-3-87-A	STEAM GENERATOR 3 FEEDWATER ISOLATION VALVE
2-FCV-3-90	STEAM GENERATOR 3 FW CONTROL VALVE
2-FCV-3-90A	STEAM GENERATOR 3 FW BYPASS VALVE
2-FCV-62-1228-A	CCP SUCTION HI-POINT VENT VALVE
2-FCV-62-1229-B	CCP SUCTION HI-POINT VENT VALVE
2-FCV-62-22	RCP 2 SEAL RETURN FCV
2-FCV-62-35	RCP 3 SEAL RETURN FCV
2-FCV-62-48	RCP 4 SEAL RETURN FCV
2-FCV-62-55	EXCESS LETDOWN ISOLATION VALVE
2-FCV-62-56	EXCESS LETDOWN FLOW CONTROL VALVE
2-FCV-62-69-A	REACTOR COOLANT LOOP 3 LETDOWN FLOW VALVE
2-FCV-62-70-A	REACTOR COOLANT LOOP 3 LETDOWN FLOW VALVE
2-FCV-62-72-A	REGEN HT EXCH LETDOWN ISOL VALVE A
2-FCV-62-73-A	REGEN HT EXCH LETDOWN ISOL VALVE B
2-FCV-62-74-A	REGEN HT EXCH LETDOWN ISOL VALVE C
2-FCV-62-84-A	CHARGING FLOW TO RCS SPRAY VALVE
2-FCV-62-89	CHARGING FLOW CONTROL VALVE
2-FCV-62-9	RCP 1 SEAL RETURN FCV
2-FCV-62-90-A	CHARGING FLOW ISOLATION VALVE
2-FCV-62-91-B	CHARGING FLOW ISOLATION VALVE
2-FCV-62-93	NORMAL MAKEUP FLOW CONTROL VALVE
2-FCV-62-98-A	CHGING PMP 2A-A FCV
2-FCV-62-99-B	CHGING PMP 2A-A FCV
2-FCV-63-118-A	SIS ACCUMULATOR TANK 1 FLOW ISOLATION VALVE
2-FCV-63-11-B	RHR PUMP SUPPLY TO SIS PUMPS
2-FCV-63-172-B	RHR TO RCS HOT LEG 1 & 3 ISOLATION VALVE
2-FCV-63-186	RHR SUPPLY TEST LINE VALVE
2-FCV-63-1-A	RWST TO RHR PUMP
2-FCV-63-25-B	SIS BORON INJECTION TANK SHUTOFF VALVE
2-FCV-63-26-A	SIS BORON INJECTION TANK SHUTOFF VALVE

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-FCV-63-39-A	SIS BORON INJ TANK INLET SHUTOFF VALVE
2-FCV-63-40-B	SIS BORON INJ TANK INLET SHUTOFF VALVE
2-FCV-63-67-B	SIS ACCUMULATOR TANK 4 FLOW ISOLATION VALVE
2-FCV-63-72-A	CONTAINMENT SUMP TO RHR PUMP A-A
2-FCV-63-73-B	CONTAINMENT SUMP TO RHR PUMP B-B
2-FCV-63-80-A	SIS ACCUMULATOR TANK 3 FLOW ISOLATION VALVE
2-FCV-63-8-A	RHR HX 2A TO CVCS CHARGING PUMP CONTROL VALVE
2-FCV-63-93-A	SIS TO RCS LOOPS 2 & 3 FLOW CONTROL VALVE
2-FCV-63-94-B	SIS TO RCS LOOPS 1 & 4 FLOW CONTROL VALVE
2-FCV-63-98-B	SIS ACCUMULATOR TANK 2 FLOW ISOLATION VALVE
2-FCV-67-103-B	LOWER CNTMT 2B CLRS DISCH ISLN VLV INSIDE CNTMT
2-FCV-67-104-A	LOWER CNTMT 2B CLRS DISCH ISLN VLV OUTSIDE CNTMT
2-FCV-67-105-B	LOWER CNTMT 2B CLRS SUP ISLN VLV INSIDE CNTMT
2-FCV-67-107-A	LOWER CNTMT 2D CLRS SUP ISLN VLV OUTSIDE CNTMT
2-FCV-67-10A-B	ERCW STRAINER 2B-B BACKWASH VLV
2-FCV-67-10B-B	ERCW STRAINER 2B-B FLUSH VLV
2-FCV-67-111-B	LOWER CNTMT 2D CLRS DISCH ISLN VLV INSIDE CNTMT
2-FCV-67-112-A	LOWER CNTMT 2D CLRS DISCH ISLN VLV OUTSIDE CNTMT
2-FCV-67-113-B	LOWER CNTMT 2D CLRS SUP ISLN VLV INSIDE CNTMT
2-FCV-67-123-B	CNTMT SPRAY HX 2B SUPPLY VLV
2-FCV-67-124-B	CNTMT SPRAY HX 2B DISCHARGE VLV
2-FCV-67-125-A	CONTAINMENT SPRAY HX 2A SUPPLY VLV
2-FCV-67-126-A	CNTMT SPRAY HX 2A DISCHARGE VLV
2-FCV-67-127-A	AUX BLDG AIR COOLERS SUP HDR 2A FCV
2-FCV-67-128-B	AUX BLDG AIR CLRS SUP HDR 2B VLV
2-FCV-67-143-A	CCS HX B ERCW BYPASS FCV
2-FCV-67-146-A	CCS HX B DISCHARGE CONTROL VLV
2-FCV-67-147-B	ERCW SUP HDR 2B TO HDR 1A ISOL VLV
2-FCV-67-168-A	CCP 1A ROOM COOLER ERCW ISOL
2-FCV-67-170-B	CCP-1B ROOM COOLER ISOL VALVE
2-FCV-67-188-A	RHR PUMP 2A-A RM COOLER ERCW ISOL AOV
2-FCV-67-190-B	RHR PUMP 2B-B RM COOLER ERCW ISOL AOV
2-FCV-67-217-A	BA TRANSFER & AUX FW PMPS SPACE CLR A
2-FCV-67-219-B	BA/AFW PUMP ROOM COOLER 2B FLOW CONT AOV
2-FCV-67-223-A	SUPPLY HDR 2A TO HDR 1B ISLN VLV
2-FCV-67-22-A	ERCW HDR 2A ISLN VLV BEFORE STRAINER
2-FCV-67-24-B	ERCW HDR 2B ISLN VLV BEFORE STRAINER
2-FCV-67-66-A	EMERG DSL HEAT EXH 2A1 & 2A2 SUPP VALVE FM HDR 1A
2-FCV-67-67-B	EMERG DSL HEAT EXH 2B1 & 2B2 SUPP VALVE FM HDR 1B
2-FCV-67-81-A	AUX BLDG ERCW SUP HDR 2A ISLN VLV
2-FCV-67-82-B	AUX BLDG ERCW SUP HDR 2B ISLN VLV
2-FCV-67-83-B	LOWER CNTMT 2A CLRS SUP ISLN VLV OUTSIDE CNTMT
2-FCV-67-87-A	LOWER CNTMT 2A CLRS DISCH ISLN VLV INSIDE CNTMT
2-FCV-67-88-B	LOWER CNTMT 2A CLRS DISCH ISLN VLV OUTSIDE CNTMT
2-FCV-67-89-A	LOWER CNTMT 2A CLRS SUP ISLN VLV INSIDE CNTMT
2-FCV-67-91-B	LOWER CNTMT 2C CLRS SUP ISLN VLV OUTSIDE CNTMT
2-FCV-67-95-A	LOWER CNTMT 2C CLRS DISCH ISLN VLV INSIDE CNTMT
2-FCV-67-96-B	LOWER CNTMT 2C CLRS DISCH ISLN VLV OUTSIDE CNTMT

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-FCV-67-97-A	LOWER CNTMT 2C CLRS SUP ISLN VLV INSIDE CNTMT
2-FCV-67-99-A	LOWER CNTMT 2B CLRS SUP ISLN VLV OUTSIDE CNTMT
2-FCV-67-9A-A	ERCW STRAINER 2A-A BACKWASH VALVE
2-FCV-67-9B-A	ERCW STRAINER 2A-A FLUSH VLV
2-FCV-68-332-B	REACTOR COOLANT PRESS RELIEF FLOW CONTROL VALVE
2-FCV-68-333-A	REACTOR COOLANT PRESS RELIEF FLOW CONTROL VALVE
2-FCV-70-133-A	RCP THERMAL BARRIER CONTAINMENT ISOLATION VALVE
2-FCV-70-134-B	RCP THERMAL BARRIER CONTAINMENT ISOLATION VALVE
2-FCV-70-143-A	EXCESS LTDN HX INLET ISLN VLV
2-FCV-70-14-B	CCS HX B & C INLET ISOLATION VALVE
2-FCV-70-153-B	RHR HX B-B OUTLET VALVE
2-FCV-70-156-A	RHR HX A-A OUTLET VLV
2-FCV-70-15-A	CCS HX B OUTLET VALVE
2-FCV-70-16-A	CCS HX B INLET VALVE
2-FCV-70-18-A	CCS HX B & C INLET ISOLATION VALVE
2-FCV-70-195-A	CCS HX B & C OUTLET VLV
2-FCV-70-196-B	CCS HX B & C OUTLET VLV
2-FCV-70-28-B	CCS PMPS 2A-A & 2B-B TO C-S OUTLET ISOL VLV- LC
2-FCV-70-29-B	CCS PMPS 2A-A & 2B-B TO C-S OUTLET ISOL VLV- LC
2-FCV-70-2-A	RHR HX A HEADER INLET VALVE
2-FCV-70-39-B	CCS PMP 2A-A TO 2B-B ISLN VLV
2-FCV-70-3-B	RHR HX 2B-B HDR INLET VLV
2-FCV-70-4-A	MISC EQUIPMENT HEADER INLET VALVE
2-FCV-70-75-B	RHR HX 2B-B RETURN HDR ISLN VLV
2-FCV-70-76-B	CCS PMPS 2A-A & 2B-B TO C-S VLV
2-FCV-70-78-B	CCS PMPS 2A-A & 2B-B TO C-S VLV
2-FCV-70-85-B	EXCESS LTDN HX OUTLET VLV
2-FCV-70-87-B	RCP THERMAL BARRIER RETURN CONTAINMENT ISOL VALVE
2-FCV-70-90-A	RCP THERMAL BARRIER RETURN CONTAINMENT ISOL VALVE
2-FCV-72-21-B	RWST TO SPRAY HDR 2B FCV
2-FCV-72-22-A	RWST TO SPRAY HDR 2A FCV
2-FCV-72-2-B	CONTAINMENT SPRAY HEADER 2B ISOLATION VALVE
2-FCV-72-39-A	CONTAINMENT SPRAY HEADER 2A ISOLATION VALVE
2-FCV-72-40-A	RHR SPRAY HDR 2A ISOLATION VALVE
2-FCV-72-41-B	RHR SPRAY HDR 2B ISOLATION VALVE
2-FCV-72-44-A	CONTAINMENT SUMP TO SPRAY HEADER 2A FCV
2-FCV-72-45-B	CONTAINMENT SUMP TO SPRAY HEADER 2B FCV
2-FCV-74-12-A	RHR PUMP 2A-A MINIMUM FLOW VALVE
2-FCV-74-16	RHR HX 2A OUTLET FLOW CONTROL VALVE
2-FCV-74-1-A	RHR SYSTEM ISOLATION VALVE
2-FCV-74-21-B	RHR PUMP 2B-B INLET VALVE
2-FCV-74-24-B	RHR PUMP 2B-B MINIMUM FLOW VALVE
2-FCV-74-28	RHR HX 2B OUTLET FLOW CONTROL VALVE
2-FCV-74-2-B	RHR SYSTEM ISOLATION VALVE
2-FCV-74-32	RHR HEAT EXCHANGER BYPASS
2-FCV-74-33-A	RHR PUMP HEAT EXCHANGER 2A BYPASS VALVE
2-FCV-74-35-B	RHR PUMP HEAT EXCHANGER 2B BYPASS VALVE
2-FCV-74-3-A	RHR PUMP 2A-A INLET FCV

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-FCV-74-8-A	RHR SYSTEM ISOLATION BYPASS VALVE
2-FCV-74-9-B	RHR SYSTEM ISOLATION BYPASS VALVE
2-FI-3-142A	TDAFW PUMP DISCHARGE FLOW
2-FI-3-142C	TDAFW PUMP DISCHARGE FLOW
2-FI-3-147A	AFW FLOW TO #3SG
2-FI-3-147B	AFW FLOW TO #3SG
2-FI-3-147C	AFW FLOW TO #3 SG
2-FI-3-155A	SG 2 AFW INLET FLOW
2-FI-3-155B	SG 2 AFW INLET FLOW
2-FI-3-155C	SG 2 AFW INLET FLOW
2-FI-3-163A	SG 1 AFW INLET FLOW
2-FI-3-163B	SG 1 AFW INLET FLOW
2-FI-3-163C	SG 1 AFW INLET FLOW
2-FI-3-170A	AFW FLOW TO #4SG
2-FI-3-170B	AFW FLOW TO #4SG
2-FI-3-170C	SG 4 AFW INLET FLOW
2-FI-62-14A	RCP-2 SEAL INJECTION FLOW INDICATOR
2-FI-62-1A	RCP-1 SEAL INJECTION FLOW INDICATOR
2-FI-62-27A	RCP-3 SEAL INJECTION FLOW INDICATOR
2-FI-62-40A	RCP-4 SEAL INJECTION FLOW INDICATOR
2-FI-62-93A	NORMAL CHARGING FLOW INDICATOR
2-FI-62-93C	NORMAL CHARGING FLOW INDICATOR (ACR)
2-FI-67-222	ERCW SUPPLY HEADER 2A FLOW INDICATOR
2-FI-67-61	ERCW SUPPLY HEADER 2A FLOW INDICATOR
2-FI-67-61C	ERCW SUPPLY HEADER 2A FLOW INDICATOR
2-FI-67-62	ERCW SUPPLY HEADER 2B FLOW INDICATOR
2-FI-67-62C	ERCW SUPPLY HEADER 2B FLOW INDICATOR
2-FIC-3-103	SG 4 FW CONTROL VALVE FLOW CONTROLLER
2-FIC-3-35	SG 1 FEEDWATER CONTROL VALVE FLOW CONTROLLER
2-FIC-3-48	SG 2 FEEDWATER CONTROL VALVE FLOW CONTROLLER
2-FIC-3-90	SG 3 FW CONTROL VALVE FLOW CONTROLLER
2-FM-62-56	EXCESS LETDOWN FLOW CONTROL VALVE E/P MODULE
2-FSV-1-11A-A	#2SG MSIV OPERATING SOLENOID
2-FSV-1-11B-B	#2SG MSIV OPERATING SOLENOID
2-FSV-1-11D-A	#2SG MSIV OPERATING SOLENOID
2-FSV-1-11E-A	#2SG MSIV OPERATING SOLENOID
2-FSV-1-11F-A	#2SG MSIV OPERATING SOLENOID
2-FSV-1-11G-B	#2SG MSIV OPERATING SOLENOID
2-FSV-1-11H-B	#2SG MSIV OPERATING SOLENOID
2-FSV-1-11J-B	#2SG MSIV OPERATING SOLENOID
2-FSV-1-22A-A	#3SG MSIV OPERATING SOLENOID
2-FSV-1-22B-B	#3SG MSIV OPERATING SOLENOID
2-FSV-1-22D-A	#3SG MSIV OPERATING SOLENOID
2-FSV-1-22E-A	#3SG MSIV OPERATING SOLENOID
2-FSV-1-22F-A	#3SG MSIV OPERATING SOLENOID
2-FSV-1-22G-B	#3SG MSIV OPERATING SOLENOID
2-FSV-1-22H-B	#3SG MSIV OPERATING SOLENOID
2-FSV-1-22J-B	#3SG MSIV OPERATING SOLENOID

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-FSV-1-29A-A	#4SG MSIV OPERATING SOLENOID
2-FSV-1-29B-B	#4SG MSIV OPERATING SOLENOID
2-FSV-1-29D-A	#4SG MSIV OPERATING SOLENOID
2-FSV-1-29E-A	#4SG MSIV OPERATING SOLENOID
2-FSV-1-29F-A	#4SG MSIV OPERATING SOLENOID
2-FSV-1-29G-B	#4SG MSIV OPERATING SOLENOID
2-FSV-1-29H-B	#4SG MSIV OPERATING SOLENOID
2-FSV-1-29J-B	#4SG MSIV OPERATING SOLENOID
2-FSV-1-4A-A	#1SG MSIV OPERATING SOLENOID
2-FSV-1-4B-B	#1SG MSIV OPERATING SOLENOID
2-FSV-1-4D-A	#1SG MSIV OPERATING SOLENOID
2-FSV-1-4E-A	#1SG MSIV OPERATING SOLENOID
2-FSV-1-4F-A	#1SG MSIV OPERATING SOLENOID
2-FSV-1-4G-B	#1SG MSIV OPERATING SOLENOID
2-FSV-1-4H-B	#1SG MSIV OPERATING SOLENOID
2-FSV-1-4J-B	#1SG MSIV OPERATING SOLENOID
2-FSV-3-103-A	STEAM GENERATOR 4 FW BYPASS VALVE
2-FSV-3-103AA-A	STEAM GENERATOR 4 FW CONTROL SOLENOID VALVE
2-FSV-3-103AB-A	STEAM GENERATOR 4 FW CONTROL SOLENOID VALVE
2-FSV-3-103BA-B	STEAM GENERATOR 4 FW CONTROL SOLENOID VALVE
2-FSV-3-103BB-B	STEAM GENERATOR 4 FW CONTROL SOLENOID VALVE
2-FSV-3-236A-A	STEAM GENERATOR 1 FW BYPASS ISOL SOLENOID VALVE
2-FSV-3-236B-B	STEAM GENERATOR 1 FW BYPASS ISOL SOLENOID VALVE
2-FSV-3-239A-A	STEAM GENERATOR 2 FW BYPASS ISOL SOLENOID VALVE
2-FSV-3-239B-B	SG 2 FW BYPASS ISOLATION SOLENOID VALVE
2-FSV-3-242A-A	STEAM GENERATOR 3 FW BYPASS ISOL SOLENOID VALVE
2-FSV-3-242B-B	STEAM GENERATOR 3 FW BYPASS ISOL SOLENOID VALVE
2-FSV-3-245A-A	STEAM GENERATOR 4 FW BYPASS ISOL SOLENOID VALVE
2-FSV-3-245B-B	STEAM GENERATOR 4 FW BYPASS ISOL SOLENOID VALVE
2-FSV-3-35AA-A	SG 1 FEEDWATER CONTROL SOLENOID VALVE
2-FSV-3-35AB-A	SG 1 FEEDWATER CONTROL SOLENOID VALVE
2-FSV-3-35-B	SG 1 FW BYPASS SOLENOID VALVE
2-FSV-3-35BA-B	SG 1 FEEDWATER CONTROL SOLENOID VALVE
2-FSV-3-35BB-B	SG 1 FEEDWATER CONTROL SOLENOID VALVE
2-FSV-3-48-A	STEAM GENERATOR 2 FW BYPASS SOLENOID VALVE
2-FSV-3-48AA-A	STEAM GENERATOR 2 FW CONTROL SOLENOID VALVE
2-FSV-3-48AB-A	STEAM GENERATOR 2 FW CONTROL SOLENOID VALVE
2-FSV-3-48BA-B	STEAM GENERATOR 2 FW CONTROL SOLENOID VALVE
2-FSV-3-48BB-B	STEAM GENERATOR 2 FW CONTROL SOLENOID VALVE
2-FSV-3-90AA-A	STEAM GENERATOR 3 FW CONTROL SOLENOID VALVE
2-FSV-3-90AB-A	STEAM GENERATOR 3 FW CONTROL SOLENOID VALVE
2-FSV-3-90-B	STEAM GENERATOR 3 FW BYPASS SOLENOID VALVE
2-FSV-3-90BA-B	STEAM GENERATOR 3 FW CONTROL SOLENOID VALVE
2-FSV-3-90BB-B	STEAM GENERATOR 3 FW CONTROL SOLENOID VALVE
2-FSV-46-36D	MFPT B TRIP SOLENOID VALVE
2-FSV-46-9D	MFPT A TRIP SOLENOID VALVE
2-FSV-47-24	TRAIN A MAIN TURBINE TRIP SOLENOID
2-FSV-47-26A-A	EHC OVERSPEED PROTECTION CONTROL

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-FSV-47-26B-B	EHC OVERSPEED PROTECTION CONTROL
2-FSV-47-27	TRAIN B MAIN TURBINE TRIP SOLENOID
2-FSV-67-217-A	BA TRANSFER AND AFW PMPS SPACE CLR A SUP
2-FSV-67-219-B	BA TRANSFER AND AFW PMPS SPACE CLR B SUP
2-FSV-68-394-A	REACTOR VESSEL HEAD VENT ISOLATION VALVE
2-FSV-68-395-B	REACTOR VESSEL HEAD VENT ISOLATION VALVE
2-FSV-68-396-B	REACTOR VESSEL HEAD VENT THROTTLE VALVE
2-FSV-68-397-A	REACTOR VESSEL HEAD VENT THROTTLE VALVE
2-FT-3-142	TDAFW PUMP DISCHARGE FLOW
2-FT-3-147A	AFW FLOW TO #3SG
2-FT-3-147B	AFW FLOW TO #3SG
2-FT-3-155A	SG 2 AFW INLET FLOW
2-FT-3-155B	SG 2 AFW INLET FLOW
2-FT-3-163A	SG 1 AFW INLET FLOW
2-FT-3-163B	SG 1 AFW INLET FLOW
2-FT-3-170A	AFW FLOW TO #4SG
2-FT-3-170B	AFW FLOW TO #4SG
2-FT-62-1	RCP-1 SEAL INJECTION FLOW
2-FT-62-14	RCP-2 SEAL INJECTION FLOW INDICATOR
2-FT-62-27	RCP-3 SEAL INJECTION FLOW
2-FT-62-40	RCP-4 SEAL INJECTION FLOW
2-FT-62-93A	NORMAL CHARGING FLOW INDICATOR
2-FT-62-93C	NORMAL CHARGING FLOW (ACR)
2-FT-67-222	FLOW TRANSMITTER
2-FT-67-61	FLOW TRANSMITTER
2-FT-67-61C	ERCW SUPPLY HEADER 2A FLOW TRANSMITTER
2-FT-67-62	ERCW SUPPLY HEADER 2B FLOW TRANSMITTER
2-FT-67-62C	ERCW SUPPLY HEADER 2B FLOW TRANSMITTER
2-FT-70-81A	THERMAL BARRIER SUPPLY HEADER FLOW
2-FT-70-81B	THERMAL BARRIER SUPPLY HEADER FLOW
2-FT-70-81D	THERMAL BARRIER SUPPLY HEADER FLOW
2-FT-70-81E	THERMAL BARRIER SUPPLY HEADER FLOW
2-HCV-74-36	RHR HX-A BYPASS MANUAL ISOL VLV
2-HCV-74-37	RHR HX-B BYPASS MANUAL ISOL VLV
2-HS-30-63A-T	CONTAINMENT ISOLATION PHASE A (CIPA)
2-HS-30-63B-T	CONTAINMENT ISOLATION PHASE A (CIPA)
2-HS-30-64A-T	CONTAINMENT ISOLATION PHASE B (CIPB)
2-HS-30-64B-T	CONTAINMENT ISOLATION PHASE B (CIPB)
2-HS-30-68A-T	CONTAINMENT ISOLATION PHASE B (CIPB)
2-HS-30-68B-T	CONTAINMENT ISOLATION PHASE B (CIPB)
2-HS-63-133A-T	HAND SWITCH
2-HS-63-133B-T	HAND SWITCH
2-HTR-68-341A/A1-A7	PRESSURIZER HEATER BACKUP GROUP 2A-A
2-HTR-68-341D/B1-B7	PRESSURIZER HEATER BACKUP GROUP 2B-B
2-HTR-68-341F/D1-D6	PRESSURIZER HEATER CONTROL GROUP 2D
2-HTR-68-341H/C1-C6	PRESSURIZER HEATER CONTROL GROUP 2C
2-HTX-62-66	SEAL WATER HEAT EXCHANGER
2-INV-235-1-D	120V AC VITAL INVERTER 2-I

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-INV-235-2-E	120V AC VITAL INVERTER 2-II
2-INV-235-3-F	120V AC VITAL INVERTER 2-III
2-INV-235-4-G	120V AC VITAL INVERTER 2-IV
2-ISIV-30-42A	2-PDT-30-42-G CTMT PRES XMTR SENSE LINE/ISO VLV
2-ISIV-30-43A	2-PDT-30-43-F CTMT PRES XMTR SENSE LINE/ISO VLV
2-ISIV-30-44A	2-PDT-30-44-E CTMT PRES XMTR SENSE LINE/ISO VLV
2-ISIV-30-45A	2-PDT-30-45-D CTMT PRES XMTR SENSE LINE/ISO VLV
2-ISV-3-826	AFW PUMP 2B-B TO SG 3 ISOLATION VALVE
2-ISV-3-827	AFW PUMP 2A-A TO SG 2 ISOLATION VALVE
2-ISV-3-828	AFW PUMP 2A-A TO SG 1 ISOLATION VALVE
2-ISV-3-829	AFW PUMP 2B-B TO SG 4 ISOLATION VALVE
2-ISV-3-834	AFW PUMP 2B-B TO SG 3 ISOLATION VALVE
2-ISV-3-835	AFW PUMP 2A-A TO SG 2 ISOLATION VALVE
2-ISV-3-836	AFW PUMP 2A-A TO SG 2 ISOLATION VALVE
2-ISV-3-837	AFW PUMP 2B-B TO SG 4 ISOLATION VALVE
2-ISV-62-526	CCP 1A-A SEAL INJECTION BYPASS
2-ISV-62-527	CCP 1A-A DISCHARGE VALVE
2-ISV-62-535	2-FCV-62-93 ISOLATION VALVE
2-ISV-62-537	FCV-62-89 UPSTREAM ISOL
2-ISV-62-549	SEAL WATER INJECTION FILTER OUTLET
2-ISV-62-550	SEAL WATER INJECTION FILTER OUTLET
2-ISV-70-545A	RHR HX 2A-A INLET VALVE (MANUAL)
2-ISV-70-574	CCS SUPPLY TO NON-REGEN LETDOWN HX ISOL
2-ISV-70-587	CCS OUT/SEAL WTR & NON-RGN LETDOWN HX ISO
2-L-256	N2 OPERATING STATION FOR 2-PCV-1-23, -30
2-L-737-A	N2 OPERATING STATION FOR 2-PCV-1-5
2-L-738-B	N2 OPERATING STATION FOR 2-PCV-1-12
2-LCV-3-148	MOTOR DRIVEN AUX FEEDWATER PMP SG 3 LVL CONT VALVE
2-LCV-3-156	MOTOR DRIVEN AUX FEEDWATER PMP SG 2 LVL CONT VALVE
2-LCV-3-164	MOTOR DRIVEN AUX FEEDWATER PMP SG 1 LVL CONT VALVE
2-LCV-3-171	MOTOR DRIVEN AUX FEEDWATER PMP SG 4 LVL CONT VALVE
2-LCV-3-172	TDAFW PUMP SG 3 LEVEL CONTROL VALVE
2-LCV-3-173	TDAFW PUMP SG 2 LEVEL CONTROL VALVE
2-LCV-3-174	TDAFW PUMP SG 1 LEVEL CONTROL VALVE
2-LCV-3-175	TDAFW PUMP SG 4 LEVEL CONTROL VALVE
2-LCV-62-132-A	VCT OUTLET ISOLATION VALVE
2-LCV-62-133-B	VCT OUTLET ISOLATION VALVE
2-LCV-62-135-A	RWST TO CHARGING PUMPS VALVE CONTROL
2-LCV-62-136-B	RWST TO CHARGING PUMPS VALVE CONTROL
2-LI-3-106	#4SG LEVEL INDICATOR (NR)
2-LI-3-107	#4SG LEVEL INDICATOR (NR)
2-LI-3-110	#4SG LEVEL INDICATOR (NR)
2-LI-3-111	#4SG LEVEL INDICATOR (WR)
2-LI-3-148C	SG 3 NARROW RANGE LEVEL
2-LI-3-156C	SG 2 NARROW RANGE LEVEL
2-LI-3-164C	SG 1 NARROW RANGE LEVEL
2-LI-3-171C	SG 4 NARROW RANGE LEVEL
2-LI-3-38	SG 1 NARROW RANGE LEVEL

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-LI-3-39	SG 1 NARROW RANGE LEVEL
2-LI-3-42	SG 1 NARROW RANGE LEVEL
2-LI-3-43	SG 1 WIDE RANGE LEVEL
2-LI-3-51	SG 2 NARROW RANGE LEVEL
2-LI-3-52	#2SG LEVEL INDICATOR (NR)
2-LI-3-55	#2SG LEVEL INDICATOR (NR)
2-LI-3-56	#2SG LEVEL INDICATOR (WR)
2-LI-3-93	#3SG LEVEL INDICATOR (NR)
2-LI-3-94	#3SG LEVEL INDICATOR (NR)
2-LI-3-97	#3SG LEVEL INDICATOR (NR)
2-LI-3-98	#3SG LEVEL INDICATOR (WR)
2-LI-62-129A	VCT LEVEL INDICATION
2-LI-62-129C	VCT LEVEL INDICATION
2-LI-63-50	RWST LEVEL INDICATOR
2-LI-63-52	RWST LEVEL INDICATOR
2-LI-68-320-F	PZR LEVEL INDICATOR
2-LI-68-325C	RCS PRESSURIZER LEVEL
2-LI-68-326C	RCS PRESSURIZER LEVEL
2-LI-68-335A-E	PZR LEVEL INDICATOR
2-LI-68-339A-D	PZR LEVEL INDICATOR
2-LIC-3-103A	STEAM GENERATOR 4 FW BYPASS VALVE CONTROLLER
2-LIC-3-148A	MDAF STEAM GENERATOR 3 LEVEL CONTROLLER
2-LIC-3-156A	SG 2 LEVEL INDICATING CONTROLLER
2-LIC-3-164A	SG 1 LEVEL INDICATING CONTROLLER
2-LIC-3-171A	MDAF STEAM GENERATOR 4 LEVEL CONTROLLER
2-LIC-3-172A	TDAFW PUMP SG 3 LEVEL CONTROLLER
2-LIC-3-173A	TDAFW PUMP SG 2 LEVEL CONTROLLER
2-LIC-3-174A	TDAFW PUMP SG 1 LEVEL CONTROLLER
2-LIC-3-175A	TDAFW PUMP SG 4 LEVEL CONTROLLER
2-LIC-3-35A	STEAM GENERATOR 1 FW BYPASS VALVE CONTROLLER
2-LIC-3-48A	STEAM GENERATOR 2 FW BYPASS VALVE CONTROLLER
2-LIC-3-90A	STEAM GENERATOR 3 FW BYPASS VALVE CONTROLLER
2-LT-3-106	#4SG LEVEL TRANSMITTER (NR)
2-LT-3-107	#4SG LEVEL TRANSMITTER (NR)
2-LT-3-110	#4SG LEVEL TRANSMITTER (NR)
2-LT-3-111	#4SG LEVEL TRANSMITTER (WR)
2-LT-3-148	MDAF STEAM GENERATOR 3 LEVEL TRANSMITTER
2-LT-3-156	SG NO. 2 NARROW RANGE LEVEL TRANSMITTER
2-LT-3-164	SG NO. 1 NARROW RANGE LEVEL TRANSMITTER
2-LT-3-171	MDAF STEAM GENERATOR 4 LEVEL TRANSMITTER
2-LT-3-172	TDAFW PUMP SG 3 LEVEL TRANSMITTER
2-LT-3-173	TDAFW PUMP SG 2 LEVEL TRANSMITTER
2-LT-3-174	TDAFW PUMP SG 1 LEVEL TRANSMITTER
2-LT-3-175	TDAFW PUMP SG 4 LEVEL TRANSMITTER
2-LT-3-38	#1SG LEVEL TRANSMITTER (NR)
2-LT-3-39	#1SG LEVEL TRANSMITTER (NR)
2-LT-3-42	#1SG LEVEL TRANSMITTER (NR)
2-LT-3-43	#1SG LEVEL TRANSMITTER (WR)

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-LT-3-51	#2SG LEVEL TRANSMITTER (NR)
2-LT-3-52	#2SG LEVEL TRANSMITTER (NR)
2-LT-3-55	#2SG LEVEL TRANSMITTER (NR)
2-LT-3-56	#2SG LEVEL TRANSMITTER (WR)
2-LT-3-93	#3SG LEVEL TRANSMITTER (NR)
2-LT-3-94	#3SG LEVEL TRANSMITTER (NR)
2-LT-3-97	#3SG LEVEL TRANSMITTER (NR)
2-LT-3-98	#3SG LEVEL TRANSMITTER (WR)
2-LT-62-129A	VCT LEVEL TRANSMITTER
2-LT-62-129C	VCT LEVEL TRANSMITTER
2-LT-62-130A	VCT LEVEL TRANSMITTER
2-LT-63-50	RWST LEVEL TRANSMITTER
2-LT-63-52	RWST LEVEL TRANSMITTER
2-LT-68-320	PZR LEVEL TRANSMITTER
2-LT-68-325C	RCS PRESSURIZER LEVEL
2-LT-68-326C	RCS PRESSURIZER LEVEL
2-LT-68-335	PZR LEVEL TRANSMITTER
2-LT-68-339	PZR LEVEL TRANSMITTER
2-MCC-213-A1-A	REACTOR MOV BD 1A1-A
2-MCC-213-A2-A	REACTOR MOV BD 2A2-A
2-MCC-213-B1-B	REACTOR MOV BD 1B1-B
2-MCC-213-B2-B	REACTOR MOV BD 2B2-B
2-MCC-214-A1-A	480V CONTROL AND AUX BLDG VENT BOARD 2A1-A
2-MCC-214-A2-A	480V CONTROL AND AUX BLDG VENT BOARD 2A2-A
2-MCC-214-B1-B	480V CONTROL AND AUX BLDG VENT BOARD 2B1-B
2-MCC-214-B2-B	480V CONTROL AND AUX BLDG VENT BOARD 2B2-B
2-MCC-215-A1-A	DIESEL AUX BD 2A1-A
2-MCC-215-A2-A	DIESEL AUX BD 2A2-A
2-MCC-215-B1-B	DIESEL AUX BD 2B1-B
2-MCC-215-B2-B	DIESEL AUX BD 2B2-B
2-MTR-26-11-B	HP FIRE PUMP
2-MTR-26-9-A	HP FIRE PUMP
2-MTR-30-175-A	RHR PUMP 2A-A ROOM COOLER FAN
2-MTR-30-176-B	RHR PUMP 2B-B ROOM COOLER FAN
2-MTR-30-182-B	CCP 2B-B ROOM COOLER FAN
2-MTR-30-183-A	CCP 2A-A ROOM COOLER FAN
2-MTR-30-184-A	AFW/BA XFER PUMP SPACE COOLER 2A-A MOTOR
2-MTR-30-185-B	AFW/BA XFER PUMP SPACE COOLER 2B-B MOTOR
2-MTR-30-214	TURBINE DRIVEN AUX FW PUMP ROOM VENT FAN
2-MTR-30-246F-B	XMFR RM 2B EXHAUST FAN 2B1-B MOTOR
2-MTR-30-246G-B	XMFR RM 2B EXHAUST FAN 2B2-B MOTOR
2-MTR-30-246H-B	XMFR RM 2B EXHAUST FAN 2B3-B MOTOR
2-MTR-30-250E-A	XMFR RM 2A EXHAUST FAN 2A1-A MOTOR
2-MTR-30-250F-A	XMFR RM 2A EXHAUST FAN 2A2-A MOTOR
2-MTR-30-250G-A	XMFR RM 2A EXHAUST FAN 2A3-A MOTOR
2-MTR-30-38-A	CONTAINMENT AIR RETURN FAN 2A-A
2-MTR-30-39-B	CONTAINMENT AIR RETURN FAN 2B-B
2-MTR-30-448-A	DG 2A-A ROOM EXHAUST FAN 1A MOTOR

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-MTR-30-450-B	DG 2B-B ROOM EXHAUST FAN 1B MOTOR
2-MTR-30-452-A	DG 2A-A ROOM EXHAUST FAN 2A MOTOR
2-MTR-30-454-B	DG 2B-B ROOM EXHAUST FAN 2B MOTOR
2-MTR-30-460-A	DG 2A-A ELECTRIC BOARD ROOM EXHAUST FAN MOTOR
2-MTR-30-462-B	DG 2B-B ELECTRIC BOARD ROOM EXHAUST FAN MOTOR
2-MTR-30-492-A	DG ELEC PANEL/GENERATOR VENT FAN
2-MTR-30-494-B	DG ELEC PANEL/GENERATOR VENT FAN
2-MTR-30-74-A	REACTOR LOWER COMPARTMENT COOLER FAN 2A-A
2-MTR-30-75-B	REACTOR LOWER COMPARTMENT COOLER FAN 2B-B
2-MTR-30-77-A	REACTOR LOWER COMPARTMENT COOLER FAN 2C-A
2-MTR-30-78-B	REACTOR LOWER COMPARTMENT COOLER FAN 2D-B
2-MTR-30-80-B	CONTROL ROD DRIVE MOTOR COOLER 2D-B
2-MTR-30-83-A	CONTROL ROD DRIVE MOTOR COOLER 2A-A
2-MTR-30-88-A	CONTROL ROD DRIVE MOTOR COOLER 2C-A
2-MTR-30-92-B	CONTROL ROD DRIVE MOTOR COOLER 2B-B
2-MTR-3-118-A	MDAFW PUMP 2A-A
2-MTR-3-118D-A	AUX FEEDWATER PUMP A-A LUBE OIL PUMP A-A
2-MTR-3-128-B	MDAFW PUMP 2B-B
2-MTR-3-128D-B	AUX FEEDWATER PUMP B-B LUBE OIL PUMP B-B
2-MTR-62-104-B	CENTRIFUGAL CHARGING PUMP 2B-B
2-MTR-62-108-A	CENTRIFUGAL CHARGING PUMP 2A-A
2-MTR-63-10-A	SAFETY INJECTION PUMP 2A-A
2-MTR-63-15-B	SAFETY INJECTION PUMP 2B-B
2-MTR-67-10B-B	ERCW STRAINER 2B-B
2-MTR-67-437-A	ERCW SCREEN WASH PUMP 2A-A
2-MTR-67-439-A	ERCW TRAVELING SCREEN 2A-A
2-MTR-67-447-B	ERCW SCREEN WASH PUMP 2B-B
2-MTR-67-451-B	ERCW TRAVELING SCREEN 2B-B
2-MTR-67-9A-A	ERCW STRAINER 2A-A
2-MTR-68-31	REACTOR COOLING PUMP NUMBER 2
2-MTR-68-50	REACTOR COOLING PUMP NUMBER 3
2-MTR-68-73	REACTOR COOLING PUMP NUMBER 4
2-MTR-68-8	REACTOR COOLANT PUMP NUMBER 1
2-MTR-70-130-B	THERMAL BARRIER BOOSTER PUMP 2B-B
2-MTR-70-131-A	THERMAL BARRIER BOOSTER PUMP 2A-A
2-MTR-70-33-B	COMPONENT COOLING SYSTEM PUMP 2B-B
2-MTR-70-59-A	COMPONENT COOLING SYSTEM PUMP 2A-A
2-MTR-72-10-B	CONTAINMENT SPRAY PUMP 2B-B
2-MTR-72-27-A	CONTAINMENT SPRAY PUMP 2A-A
2-MTR-74-10-A	RHR PUMP 2A-A
2-MTR-74-20-B	RHR PUMP 2B-B
2-MTR-81-3	PRIMARY MAKEUP WATER PUMP 2A
2-MTR-81-7	PRIMARY MAKEUP WATER PUMP 2B
2-NI-92-131-D	SOURCE RANGE DETECTOR AND INDICATION
2-NI-92-132-E	SOURCE RANGE DETECTOR AND INDICATION
2-NI-92-138	NEUTRON SOURCE RANGE INDICATOR
2-NM-92-131-D	AMPLIFIER
2-NM-92-132-E	AMPLIFIER

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-NMD-92-131-D	NEUTRON DETECTOR
2-NMD-92-132-E	NEUTRON DETECTOR
2-OXF-212-A1	480V SHUTDOWN BOARD XMFR 2A1-A
2-OXF-212-A2	480V SHUTDOWN BOARD XMFR 2A2-A
2-OXF-212-B1	480V SHUTDOWN BOARD XMFR 2B1-B
2-OXF-212-B2	480V SHUTDOWN BOARD XMFR 2B2-B
2-PCV-1-12	SG 2 POWER RELIEF VALVE
2-PCV-1-23	SG 3 POWER RELIEF VALVE
2-PCV-1-30	SG 4 POWER RELIEF VALVE
2-PCV-1-5	SG 1 POWER RELIEF VALVE
2-PCV-3-122-A	AFW PUMP OUTLET PRESSURE CONTROL VALVE
2-PCV-3-132-B	AFW PUMP OUTLET PRESSURE CONTROL VALVE
2-PCV-3-40	DEAERATION LINE BACK PRESSURE CONTROL VALVE
2-PCV-68-334-B	PRESSURIZER PORV
2-PCV-68-340A-A	PRESSURIZER PORV
2-PCV-68-340B	PRESSURIZER SPRAY VALVE
2-PCV-68-340D	PRESSURIZER SPRAY VALVE
2-PDIC-3-122C	MDAFW PMP 2A-A DISCH PRES CONT ACS(IND)
2-PDIC-3-132C	MDAFW PMP 2B-B DISCH PRES CONT ACS(IND)
2-PDT-30-42-G	U2 CONTAINMENT PRESSURE INSTRUMENTATION LOOP
2-PDT-30-43-F	U2 CONTAINMENT PRESSURE INSTRUMENTATION LOOP
2-PDT-30-44-E	U2 CONTAINMENT PRESSURE INSTRUMENTATION LOOP
2-PDT-30-45-D	U2 CONTAINMENT PRESSURE INSTRUMENTATION LOOP
2-PI-1-12	#2SG PRESSURE INDICATION
2-PI-1-19C	SG 3 STEAM HEADER PRESSURE
2-PI-1-1C	SG 1 STEAM HEADER PRESSURE
2-PI-1-20A	#3SG PRESSURE INDICATION
2-PI-1-20B	#3SG PRESSURE INDICATION
2-PI-1-23	#3SG PRESSURE INDICATION
2-PI-1-26C	SG 4 STEAM HEADER PRESSURE
2-PI-1-27A	#4SG PRESSURE INDICATION
2-PI-1-27B	#4SG PRESSURE INDICATION
2-PI-1-2A	SG 1 MAIN STEAM HEADER PRESSURE
2-PI-1-2B	SG 1 MAIN STEAM HEADER PRESSURE
2-PI-1-30	#4SG PRESSURE INDICATION
2-PI-1-5	SG 1 MAIN STEAM HEADER PRESSURE POWER RELIEF
2-PI-1-8C	SG 2 STEAM HEADER PRESSURE
2-PI-1-9A	#2SG PRESSURE INDICATION
2-PI-1-9B	#2SG PRESSURE INDICATION
2-PI-3-117	LOCAL MDAFWP A SUCTION PRES INDICATOR
2-PI-3-127	LOCAL MDAFWP B SUCTION PRES INDICATOR
2-PI-3-137	LOCAL TDAFW PUMP SUCTION PRES INDICATOR
2-PI-68-342A	PRESSURIZER PRESSURE INSTRUMENT LOOP
2-PI-68-342C	PRESSURIZER PRESSURE INSTRUMENT LOOP
2-PI-68-63	RCS LOOP 1 PRESSURE (RHR INLET)
2-PIC-1-13A	SG 2 POWER RELIEF VALVE
2-PIC-1-13C	SG 2 POWER RELIEF VALVE
2-PIC-1-24A	SG 3 POWER RELIEF VALVE

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-PIC-1-24C	SG 3 POWER RELIEF VALVE
2-PIC-1-31A	SG 4 POWER RELIEF VALVE
2-PIC-1-31C	SG 4 POWER RELIEF VALVE
2-PIC-1-6A	SG 1 POWER RELIEF VALVE
2-PIC-1-6C	SG 1 POWER RELIEF VALVE
2-PM-1-13	SG 2 POWER RELIEF VALVE MODIFIER
2-PM-1-24	SG 3 POWER RELIEF VALVE MODIFIER
2-PM-1-31	SG 4 POWER RELIEF VALVE MODIFIER
2-PM-1-6	SG1 POWER RELIEF VALVE MODIFIER
2-PM-3-122	PCV-3-122 MODULATOR
2-PM-3-132	PCV-3-132 MODULATOR
2-PMP-18-54/3	2-DG-82-A-A FO XFER PP #2
2-PMP-18-54/4	2-DG-82-B-B FO XFER PP #2
2-PMP-18-55/3	2-DG-82-A-A FO XFER PP #1
2-PMP-18-55/4	2-DG-82-B-B FO XFER PP #1
2-PNL-276-L112/A	CHARGING PUMP 2B & 2C PANEL
2-PSV-1-13B-B	SG 2 POWER RELIEF SOLENOID VALVE
2-PSV-1-13C-A	SG 2 POWER RELIEF SOLENOID VALVE
2-PSV-1-24B-A	SG 3 POWER RELIEF SOLENOID VALVE
2-PSV-1-24C-B	SG 3 POWER RELIEF SOLENOID VALVE
2-PSV-1-31B-B	SG 4 POWER RELIEF SOLENOID VALVE
2-PSV-1-31C-A	SG 4 POWER RELIEF SOLENOID VALVE
2-PSV-1-6B-A	SG 1 POWER RELIEF SOLENOID VALVE
2-PSV-1-6C-B	SG 1 POWER RELIEF SOLENOID VALVE
2-PT-1-12-F	LOOP 2 ATMOSPHERIC RELIEF INSTRUMENT LOOP
2-PT-1-13	SG-2 PRESSURE TRANSMITTER FOR PCV-1-12
2-PT-1-20A-D	LOOP 3 MAIN STEAM PRESSURE INSTRUMENTATION LOOP
2-PT-1-20B-E	LOOP 3 MAIN STEAM PRESSURE INSTRUMENTATION LOOP
2-PT-1-23-F	LOOP 3 ATMOSPHERIC RELIEF INSTRUMENT LOOP
2-PT-1-24	SG-3 PRESSURE TRANSMITTER FOR PCV-1-23
2-PT-1-27A-D	LOOP 4 MAIN STEAM PRESSURE INSTRUMENTATION LOOP
2-PT-1-27B-E	LOOP 4 MAIN STEAM PRESSURE INSTRUMENTATION LOOP
2-PT-1-2A-D	LOOP 1 MAIN STEAM PRESSURE INSTRUMENTATION LOOP
2-PT-1-2B-E	LOOP 1 MAIN STEAM PRESSURE INSTRUMENTATION LOOP
2-PT-1-30-G	LOOP 4 ATMOSPHERIC RELIEF INSTRUMENT LOOP
2-PT-1-31	MAIN STEAM LOOP 4 PRESSURE
2-PT-1-5-G	LOOP 1 ATMOSPHERIC RELIEF INSTRUMENTATION LOOP
2-PT-1-6	MAIN STEAM LOOP 1 PRESSURE
2-PT-1-9A-D	LOOP 2 MAIN STEAM PRESSURE INSTRUMENTATION LOOP
2-PT-1-9B-E	LOOP 2 MAIN STEAM PRESSURE INSTRUMENTATION LOOP
2-PT-68-323-F	U2 PRESSURIZER PRESSURE INSTRUMENTATION LOOP
2-PT-68-334-E	U2 PRESSURIZER PRESSURE INSTRUMENTATION LOOP
2-PT-68-340-D	U2 PRESSURIZER PRESSURE INSTRUMENTATION LOOP
2-PT-68-342	PRESSURIZER PRESSURE INSTRUMENT
2-PT-68-63	RCS LOOP 1 PRESSURE (RHR INLET)
2-PT-70-17A-B	CCS HEADER PRESSURE
2-SC-46-57	TDAFW PUMP SPEED CONTROLLER
2-SW-46-AC-S	AC MANUAL TRANSFER SW

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-SW-46-DC-S	DC MANUAL TRANSFER SW
2-TCO-30-82-B	CONTROL ROD DRIVE COOLING 2D-B RM DIVERSION DMPR
2-TCO-30-85-A	CRD COOLING UNIT 2A-A ROOM DIVERSION DAMPER
2-TCO-30-90-A	CONTROL ROD DRIVE COOLING 2C-A RM DIVERSION DMPR
2-TCO-30-94-B	CONTROL ROD DRIVE COOLING 2B-B DIVERSION DMPR
2-TCV-67-100-B	LOWER CNTMT VENT CLR B SUPPLY VLV
2-TCV-67-101-B	CONTROL ROD DRIVE VENT CLR B SUPPLY VLV
2-TCV-67-108-B	LOWER CNTMT VENT CLR D SUPPLY VLV
2-TCV-67-109-B	CONTROL ROD DRIVE VENT COOLER D SUPPLY VLV
2-TCV-67-84-A	LOWER CNTMT VENT CLR A SUPPLY VLV
2-TCV-67-85-A	CONTROL ROD DRIVE VENT CLR A SUPPLY VLV
2-TCV-67-92-A	LOWER CNTMT VENT CLR C SUPPLY VLV
2-TCV-67-93-A	CONTROL ROD DRIVE VENT CLR C SUPPLY VLV
2-TCV-70-192	NON REGEN LETDOWN HEAT EXCHANGER OUTLET VALVE
2-TE-68-1	RCS LOOP 1 HOT LEG TEMPERATURE
2-TE-68-18	RCS LOOP 1 COLD LEG TEMPERATURE
2-TE-68-1C	RCS LOOP 1 HOT LEG TEMPERATURE
2-TE-68-24	RCS LOOP 2 HOT LEG TEMPERATURE
2-TE-68-24C	RCS LOOP 2 HOT LEG TEMPERATURE
2-TE-68-41	RCS LOOP 2 COLD LEG TEMPERATURE
2-TE-68-43	RCS LOOP 3 HOT LEG TEMPERATURE
2-TE-68-43C	RCS LOOP 3 HOT LEG TEMPERATURE
2-TE-68-60	RCS LOOP 3 COLD LEG TEMPERATURE
2-TE-68-65	RCS LOOP 4 HOT LEG TEMPERATURE
2-TE-68-65C	RCS LOOP 4 HOT LEG TEMPERATURE
2-TE-68-83	RCS LOOP 4 COLD LEG TEMPERATURE
2-TE-70-154	RHR HEAT EXCHANGE 2B CCS RETURN TEMP
2-TE-70-157	RHR HEAT EXCHANGE 2A CCS RETURN TEMP
2-TE-70-161	ERCW/CCS HX-B OUTLET TEMP (CCS)
2-TE-74-14	RHR PMP 2A-A OUTLET TEMP
2-TE-74-25	RHR PMP 2B-B OUTLET TEMP
2-TE-74-29	RHR HEAT EXCHANGER A OUTLET TEMP
2-TE-74-38C	RCS HEAT EXCHANGER 2A OUTLET TEMPERATURE
2-TE-74-39	RHR HEAT EXCHANGER B OUTLET TEMP
2-TE-74-40C	RCS HEAT EXCHANGER 2B OUTLET TEMPERATURE
2-THV-70-546A	RHR HX 2A-A OUTLET VALVE (MANUAL)
2-TI-68-1	RCS LOOP 1 HOT LEG TEMPERATURE
2-TI-68-18	RCS LOOP 1 COLD LEG TEMPERATURE
2-TI-68-1C	RCS LOOP 1 HOT LEG TEMPERATURE
2-TI-68-24A	RCS LOOP 2 HOT LEG TEMPERATURE
2-TI-68-24C	RCS LOOP 2 HOT LEG TEMPERATURE
2-TI-68-41	RCS LOOP 2 COLD LEG TEMPERATURE
2-TI-68-43	RCS LOOP 3 HOT LEG TEMPERATURE
2-TI-68-43C	RCS LOOP 3 HOT LEG TEMPERATURE
2-TI-68-60	RCS LOOP 3 COLD LEG TEMPERATURE
2-TI-68-65	RCS LOOP 4 HOT LEG TEMPERATURE
2-TI-68-65C	RCS LOOP 4 HOT LEG TEMPERATURE
2-TI-68-83	RCS LOOP 4 COLD LEG TEMPERATURE

TABLE 3-2 - SAFE SHUTDOWN EQUIPMENT LIST

EQUIPMENT	DESCRIPTION
2-TI-70-154	RHR HX-B OUTLET TEMP (CCS)
2-TI-70-157	RHR HX-A OUTLET TEMP (CCS)
2-TI-70-161	ERCW/CCS HX-B OUTLET TEMP (CCS)
2-TI-74-14	RHR HX-A INLET TEMPERATURE
2-TI-74-15	RHR HX-A OUTLET TEMPERATURE
2-TI-74-25	RHR HX-B INLET TEMPERATURE
2-TI-74-27	RHR HX-B OUTLET TEMPERATURE
2-TI-74-38C	RCS HEAT EXCHANGER 2A OUTLET TEMPERATURE
2-TI-74-40C	RCS HEAT EXCHANGER 2B OUTLET TEMPERATURE
2-TIS-62-79	LETDOWN FLOW TEMPERATURE IND SWITCH
2-TR-74-14P002	RHR HX-A TEMPERATURE RECORDER
2-TR-74-25P002	RHR HX-B TEMPERATURE RECORDER
2-XSV-32-112	UNIT 2 CONTAINMENT NON-ESSENTIAL HDR DUMP SOLENOID

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-001	674.0-A1	Waste Holdup Tank Room
	674.0-A2	Waste Evaporator Feed Pump Room
	676.0-A1	Corridor
	676.0-A2	Holdup Tank Room A
	676.0-A3	Holdup Tank Room B
	676.0-A4	Floor Drain Collection Pump and Filter Room
	676.0-A4a	Floor Drain Collection Tank Room
	676.0-A5	Gas Stripper Feed Pump Room
	676.0-A6	Spare
	676.0-A7	Spare
	676.0-A16	Unit 1 Pipe Gallery and Chase
	692.0-A1C	Corridor
	692.0-A8	Unit 1 Pipe Gallery and Chase
	692.0-A31	Spare
	713.0-A28	Unit 1 Pipe Gallery and Chase

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-002	692.0-A1A1	Corridor, Column Lines Q-U/A1-A4
	692.0-A1A2	Corridor, Column Lines S-T/A4-A5
	692.0-A2	Valve Gallery
	692.0-A3	Gas Decay Tank Room
	692.0-A4	Chemical Drain Tank Room
	692.0-A5	Gas Decay Tank Room
	676.0-A2	Holdup Tank Room A
	676.0-A3	Holdup Tank Room B

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-003	692.0-A1A2	Corridor, Column Lines S-T/A4-A5
	692.0-A1A3	Corridor, Column Lines S-T/A5-A6
	692.0-A1AN	Corridor, Column Lines S-U/A6-A8
	676.0-A2	Holdup Tank Room A
	676.0-A3	Holdup Tank Room B

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-004A	692.0-A1AN	Corridor, Column Lines S-U/A6-A8
AV-004B	692.0-A1BN	Corridor, Column Lines S-U/A8-A10
(Note 1)	676.0-A2	Holdup Tank Room A
	676.0-A3	Holdup Tank Room B

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-004AC	692.0-A1AN	Corridor, Column Lines S-U/A6-A8
AV-004BC	692.0-A1BN	Corridor, Column Lines S-U/A8-A10
(Note 2)	692.0-A1C	Corridor

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-005	692.0-A1B1	Corridor, Col Lines S-T/A12-A13, S-U/A13-A14, Q-T/A14-A15
	692.0-A1B2	Corridor, Col Lines S-T/A11-A12
	692.0-A1B3	Corridor, Col Lines S-T/A10-A11
	692.0-A1BN	Corridor, Column Lines S-U/A8-A10
	692.0-A27	Concentrate Filter Room
	692.0-A29	Boric Acid Evaporator Package Room B
	692.0-A30	Boric Acid Evaporator Package Room A
	692.0-A31	Spare
	676.0-A2	Holdup Tank Room A
	676.0-A3	Holdup Tank Room B

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-006	692.0-A1C	Corridor, Column Lines U-RxCL/A5-A11
	692.0-A17	RPV Stud Maintenance Room
	692.0-A18	Hot Tool Room

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-007	676.0-A8	Containment Spray Pump 1B-B

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-008	676.0-A9	Containment Spray Pump 1A-A

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-009	692.0-A9	Charging Pump 1A-A

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-010	692.0-A12	Safety Injection Pump 1B-B

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-011	692.0-A13	Safety Injection Pump 1A-A

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-100	676.0-A14	Containment Spray Pump 2A-A

FIRE AREA 1	ROOM NO.	DESCRIPTION
AV-101	676.0-A15	Containment Spray Pump 2B-B

FIRE AREA 1-1	ROOM NO.	DESCRIPTION
AV-102	692.0-A20	Safety Injection Pump 2B-B

FIRE AREA 1-2	ROOM NO.	DESCRIPTION
AV-012	692.0-A19	Safety Injection Pump 2A-A

FIRE AREA 2-1	ROOM NO.	DESCRIPTION
AV-013	676.0-A10	RHR Pump Room 1B-B

FIRE AREA 2-2	ROOM NO.	DESCRIPTION
AV-014	676.0-A13	RHR Pump Room 2B-B

FIRE AREA 3-1	ROOM NO.	DESCRIPTION
AV-015	676.0-A11	RHR Pump Room 1A-A

FIRE AREA 3-2	ROOM NO.	DESCRIPTION
AV-016	676.0-A12	RHR Pump Room 2A-A

FIRE AREA 4	ROOM NO.	DESCRIPTION
AV-017	692.0-A6	Turbine Driven Auxiliary Feedwater Pump Room 1A-S

FIRE AREA 5	ROOM NO.	DESCRIPTION
AV-018	692.0-A7	Unit 1 Pipe Gallery

FIRE AREA 6	ROOM NO.	DESCRIPTION
AV-019	692.0-A10	Charging Pump Room 1B-B

FIRE AREA 7	ROOM NO.	DESCRIPTION
AV-020	692.0-A11	Charging Pump Room 1C

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-021	713.0-A1A1	Corridor, Col Lines S-U/A1-A4, ceiling level only S-CCS Wall/A1-A3
	713.0-A9	Unit 1 Mixed Bed and Cation Valve Gallery

PART III – SAFE SHUTDOWN CAPABILITIES

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-022	713.0-A1A2	Corridor, Col Lines S-U/A1-A4, ceiling level only CCS Wall-U/A1-A3
	713.0-A9	Unit 1 Mixed Bed and Cation Valve Gallery

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-023	713.0-A1A3	Corridor, Column Lines Q-CCS Wall/A1-A4
	713.0-A24	Waste Gas Compressor Valve Gallery
	713.0-A25	Waste Gas Compressor B
	713.0-A26	Waste Gas Compressor A
	713.0-A27	Decontamination Room

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-024	713.0-A1A4	Corridor, Column Lines Q-U/A3-A8
	713.0-A1AN	Corridor, Column Lines Q-U/A6-A8
	713.0-A9	Unit 1 Mixed Bed and Cation Valve Gallery
	713.0-A10	Seal Water Heat Exchanger 1A
	713.0-A22	Holdup Tank Valve Gallery
	713.0-A23	CVCS Valve Gallery
	713.0-A24	Waste Gas Compressor Valve Gallery
	713.0-A25	Waste Gas Compressor B
	713.0-A26	Waste Gas Compressor A

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-025	713.0-A1AN	Corridor, Column Lines Q-U/A6-A8
	713.0-A1BN	Corridor, Column Lines Q-U/A8-A10
	713.0-A22	Holdup Tank Valve Gallery
	713.0-A23	CVCS Valve Gallery

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-025C	713.0-A1AN	Corridor, Column Lines Q-U/A6-A8
(Note 3)	713.0-A1BN	Corridor, Column Lines Q-U/A8-A10
	713.0-A1C	Corridor, Column Lines U-W/A7-A9
	713.0-A10	Seal Water Heat Exchanger 1A
	713.0-A17	Seal Water Heat Exchanger 2A

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-026	713.0-A1B	Corridor, Column Lines Q-U/A10-A15
	713.0-A1BN	Corridor, Column Lines Q-U/A8-A10
	713.0-A17	Seal Water Heat Exchanger 2A
	713.0-A18	Unit 2 Mixed Bed and Cation Valve Gallery
	713.0-A22	Holdup Tank Valve Gallery
	713.0-A23	CVCS Valve Gallery

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-26A	713.0-A1C	Corridor, Column Lines U-W/A7-A9
	713.0-A13	Sample Room 1
	713.0-A14	Sample Room 2
	713.0-A31	Waste Gas Analyzer Room

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-027	713.0-A2	Air Lock
	713.0-A3	Titration Room
	713.0-A4	Radio Chemical Lab
	713.0-A5	Counting Room
	713.0-A30	Air Lock

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-028	713.0-A11	Heat Exchanger 1B

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-029	713.0-A12	Heat Exchanger 1A

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-108	713.0-A15	Heat Exchanger 2A

FIRE AREA 8	ROOM NO.	DESCRIPTION
AV-109	713.0-A16	Heat Exchanger 2B

FIRE AREA 9	ROOM NO.	DESCRIPTION
AV-030	713.0-A6	Unit 1 Pipe Gallery
	713.0-A8	Unit 1 Reactor Building Access Room

FIRE AREA 9-1	ROOM NO.	DESCRIPTION
AV-031	713.0-A7	Unit 1 Volume Control Tank (VCT) room

FIRE AREA 10	ROOM NO.	DESCRIPTION
AV-032	Stair No. 4	Stairwell
	692.0-A14	Cask Decontamination Collection Tank Room
	692.0-A15	Spent Resin Tank Room
	692.0-A16	Valve Gallery
	728.0-A7	Cask Decontamination Room
	729.0-A5	Cask Unloading Area
	729.0-A6	Nitrogen Storage Area
	729.0-A8	Unit 1 Post Accident Sampling Room
	757.0-A13	Refueling Room (Includes New Storage Area 741.5)
	772.0-A9	HEPA Filter Plenum Room
	776.0-A1	Elevator Machine Room
	786.0-A1	Fan Room
	814.075-ACS	Roof Access Room

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 10	ROOM NO.	DESCRIPTION
AV-119	729.0-A9	Unit 2 Post Accident Sampling Room

FIRE AREA 11	ROOM NO.	DESCRIPTION
AV-033	729.0-A3	Waste Package Area
	729.0-A4	Waste Package Area

FIRE AREA 12	ROOM NO.	DESCRIPTION
AV-034	729.0-A1	Main Steam Valve Room (Unit 1 South)
	737.0-A6	Air Lock

FIRE AREA 13	ROOM NO.	DESCRIPTION
AV-035	729.0-A12	Unit 1 Steam Valve Instrument Room A
	729.0-A14	Unit 1 UHI Equipment Room
	729.5-A16	Unit 1 Shield Building Vent Radiation Monitoring Room
	737.0-A13	Air Lock
	763.5-A1	Ice Equipment Room
	775.25-A1	Ice Equipment Room
	786.5-A1	Package Chiller Equipment Room

FIRE AREA 13	ROOM NO.	DESCRIPTION
AV-035A	729.0-A2	Main Steam Valve Room (Unit 1 North)

FIRE AREA 14	ROOM NO.	DESCRIPTION
AV-036	737.0-A1A	Auxiliary Building, Column Lines Q-U/A1-A6
	737.0-A1AN	Auxiliary Building, Column Lines Q-U/A6-A8
	737.0-A2	Hot Instrument Shop
	737.0-A4	Air Lock

FIRE AREA 14	ROOM NO.	DESCRIPTION
AV-037	737.0-A1AN	Auxiliary Building, Column Lines Q-U/A6-A8
	737.0-A1BN	Auxiliary Building, Column Lines Q-U/A8-A10

FIRE AREA 14	ROOM NO.	DESCRIPTION
AV-37A	737.0-A7	Unit 1 Letdown Heat Exchanger
	737.0-A8	Unit 2 Letdown Heat Exchanger
	737.0-A1C	Auxiliary Building, Column Lines U-RxCL/A5-A11
	737.0-A1CN	Auxiliary Building, Column Lines V-U/A5-A11

FIRE AREA 14	ROOM NO.	DESCRIPTION
AV-037C	737.0-A1AN	Auxiliary Building, Column Lines Q-U/A6-A8
(Note 4)	737.0-A1BN	Auxiliary Building, Column Lines Q-U/A8-A10
	737.0-A1CN	Auxiliary Building, Column Lines V-U/A5-A11
	737.0-A7	Unit 1 Letdown Heat Exchanger
	737.0-A8	Unit 2 Letdown Heat Exchanger

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 14	ROOM NO.	DESCRIPTION
AV-038	737.0-A1B	Auxiliary Building, Column Lines Q-U/A10-A15
	737.0-A1BN	Auxiliary Building, Column Lines Q-U/A8-A10
	737.0-A11	Air Lock

FIRE AREA 15-1	ROOM NO.	DESCRIPTION
AV-039	737.0-A3	Unit 1 Heat and Vent Equipment Room

FIRE AREA 15-2	ROOM NO.	DESCRIPTION
AV-040	737.0-A12	Unit 2 Heat and Vent Equipment Room

FIRE AREA 16	ROOM NO.	DESCRIPTION
AV-041M	737.0-A5M	Ventilation and Purge Air Room, 2' north of column line V to 2'-6" south of Reactor Building centerline
	737.0-A15	Gross Failed Fuel Detector Room

FIRE AREA 16	ROOM NO.	DESCRIPTION
AV-041N	737.0-A5N	Ventilation and Purge Air Room, 2' north of 737.0-A15 to the north wall of 737.0-A5
AV-041S	737.0-A5S	Ventilation and Purge Air Room, column line U to column line W

FIRE AREA 17	ROOM NO.	DESCRIPTION
AV-042	757.0-A2	6.9kV and 480V Shutdown Board Room A
(Note 5 AV-042D, E, F, G)	757.0-A9	Unit 1 Personnel and Equipment Access

FIRE AREA 18	ROOM NO.	DESCRIPTION
AV-043	757.0-A3	125V Vital Battery Board Room II

FIRE AREA 19	ROOM NO.	DESCRIPTION
AV-044	757.0-A4	125V Vital Battery Board Room I

FIRE AREA 20	ROOM NO.	DESCRIPTION
AV-045	757.0-A1	Auxiliary Control Room

FIRE AREA 21	ROOM NO.	DESCRIPTION
AV-046	757.0-A25	Auxiliary Control Instrument Room 1A

FIRE AREA 22	ROOM NO.	DESCRIPTION
AV-047	757.0 A26	Auxiliary Control Instrument Room 1B

FIRE AREA 23	ROOM NO.	DESCRIPTION
AV-048	757.0-A27	Auxiliary Control Instrument Room 2A

FIRE AREA 24	ROOM NO.	DESCRIPTION
AV-049	757.0-A28	Auxiliary Control Instrument Room 2B

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 25	ROOM NO.	DESCRIPTION
AV-050	782.0-A1	Unit 1 Control Rod Drive Equipment Room
	782.0-A2	Pressurizer Heater Transformer Room 1
	757.0-A10	Reverse Osmosis Equipment Room

FIRE AREA 25	ROOM NO.	DESCRIPTION
AV-051	757.0-A12	Reactor Building Access Room (Unit 1)

FIRE AREA 26	ROOM NO.	DESCRIPTION
AV-052	757.0-A11	Reactor Bldg Equip Hatch (During power, part of U1 Rx Bldg)

FIRE AREA 27	ROOM NO.	DESCRIPTION
AV-053	757.0-A5	480V Shutdown Board Room 1B

FIRE AREA 28	ROOM NO.	DESCRIPTION
AV-054	757.0-A21	480V Shutdown Board Room 2A

FIRE AREA 29	ROOM NO.	DESCRIPTION
AV-055	757.0-A22	125V Vital Battery Board Room IV

FIRE AREA 30	ROOM NO.	DESCRIPTION
AV-056	757.0-A23	125V Vital Battery Board Room III

FIRE AREA 31	ROOM NO.	DESCRIPTION
AV-057	757.0-A24	6.9kV and 480V Shutdown Board Room B
(Note 5 AV-057D, E, F, G)	757.0-A17	Unit 2 Personnel and Equipment Access Room

FIRE AREA 32	ROOM NO.	DESCRIPTION
AV-058	772.0-A1	480V Board Room 1-A

FIRE AREA 33	ROOM NO.	DESCRIPTION
AV-059	772.0-A2A1	480-V Board Room 1-B, Column Lines A8-A6
	772.0-A2A2	480-V Board Room 1-B, Column Lines A6-A5
	772.0-A2A3	480-V Board Room 1-B, Column Lines A5-A4
AV-060	772.0-A2A3	480-V Board Room 1-B, Column Lines A5-A4
	772.0-A2A4	480-V Board Room 1-B, Column Lines A4-A3

FIRE AREA 34	ROOM NO.	DESCRIPTION
AV-061	772.0-A3	125-V Vital Battery Room II

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 35	**ROOM NO.**	**DESCRIPTION**
AV-062	772.0-A4	125-V Vital Battery Room I

FIRE AREA 36	**ROOM NO.**	**DESCRIPTION**
AV-063	772.0-A5	480-V Transformer Room 1-B

FIRE AREA 37	**ROOM NO.**	**DESCRIPTION**
AV-064	772.0-A6	480-V Transformer Room 1-A

FIRE AREA 38	**ROOM NO.**	**DESCRIPTION**
AV-065	772.0-A7	Unit 1 Mechanical Equipment Room

FIRE AREA 39	**ROOM NO.**	**DESCRIPTION**
AV-066 (Note 5 AV-066D, E, F, G)	772.0-A8	Fifth Vital Battery and Board Room

FIRE AREA 40	**ROOM NO.**	**DESCRIPTION**
AV-067	772.0-A10	Unit 2 Mechanical Equipment Room

FIRE AREA 41	**ROOM NO.**	**DESCRIPTION**
AV-068	772.0-A11	480-V Transformer Room 2-B

FIRE AREA 42	**ROOM NO.**	**DESCRIPTION**
AV-069	772.0-A12	480-V Transformer Room 2-A

FIRE AREA 43	**ROOM NO.**	**DESCRIPTION**
AV-070	772.0-A13	125-V Vital Battery Room IV

FIRE AREA 44	**ROOM NO.**	**DESCRIPTION**
AV-071	772.0-A14	125-V Vital Battery Room III

FIRE AREA 45	**ROOM NO.**	**DESCRIPTION**
AV-072	772.0-A15A1	480-V Board Room 2-B, Column Lines A13-A12
	772.0-A15A2	480-V Board Room 2-B, Column Lines A12-A11

FIRE AREA 45	**ROOM NO.**	**DESCRIPTION**
AV-073	772.0-A15A2	480-V Board Room 2-B, Column Lines A12-A11
	772.0-A15A3	480-V Board Room 2-B, Column Lines A11-A10
	772.0-A15A4	480-V Board Room 2-B, Column Lines A10-A8

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 46	ROOM NO.	DESCRIPTION
AV-074	772.0-A16	480-V Board Room 2-A

FIRE AREA 47	ROOM NO.	DESCRIPTION
AV-075	786.0-A2	Roof Access Air Lock
	786.0-A3	Mechanical Equipment Room 2B
	786.0-A4	Mechanical Equipment Room 1B
	786.0-AR	Roof

FIRE AREA 48	ROOM NO.	DESCRIPTION
AV-076	Stair C1	Stairwell, elevation 692 through 755
	Stair C2	Stairwell, elevation 692 through 755
	692.0-C1	Mechanical Equipment Room
	692.0-C2	Mechanical Equipment Room
	692.0-C3	250V Battery Room 1
	692.0-C4	250-V Battery Board Room 1
	692.0-C5	250-V Battery Board Room 2
	692.0-C6	250-V Battery Room 2
	692.0-C7	24-V and 48-V Battery Room
	692.0-C8	24-V and 48-V Battery Board and Charger Room
	692.0-C9	Communications Room
	692.0-C10	Mechanical Equipment Room
	692.0-C11	Corridor
	692.0-C12	Secondary Alarm Station Room
	708.0-C1	Unit 1 Auxiliary Instrument Room
	708.0-C2	Corridor
	708.0-C3	Computer Room
	708.0-C4	Unit 2 Auxiliary Instrument Room
	729.0-C1	Spreading Room
	755.0-C1	Mechanical Equipment Room
	755.0-C2	Women's Restroom
	755.0-C3	Corridor
	755.0-C4	Kitchen
	755.0-C5	Toilet
	755.0-C6	Locker Room
	755.0-C7	Shower
	755.0-C8	Shower
	755.0-C9	Conference Room
	755.0-C10	Shift Engineer's Office
	755.0-C12	Main Control Room
	755.0-C13	Relay Room
	755.0-C14	Technical Support Center

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 48	ROOM NO.	DESCRIPTION
	755.0-C15	Corridor
	755.0-C16	Conference Room
	755.0-C17	Telephone Room
	755.0-C18	NRC Office
	755.0-C19	Corridor
	755.0-C20	DPSO Shop
	CB Roof	Control Building Roof
	763.0	Space Above OPS Office and Living Area

FIRE AREA 49	ROOM NO.	DESCRIPTION
AV-077	DGB-1A	Diesel Generator Building 1A 742.0-D4, Diesel Generator Unit 1A-A 760.5-D3, Unit 1A-A Air Exhaust Room 760.5-D4, 480-V Board Room 1A-A 760.5-D5, Unit 1A-A Air Intake Room

FIRE AREA 50	ROOM NO.	DESCRIPTION
AV-078	DGB-2A	Diesel Generator Building 2A 742.0-D5, Diesel Generator Unit 2A-A 760.5-D6, Unit 2A-A Air Exhaust Room 760.5-D7, 480-V Board Room 2A-A 760.5-D8, Unit 2A-A Air Intake Room

FIRE AREA 51	ROOM NO.	DESCRIPTION
AV-079	DGB-1B	Diesel Generator Building 1B 742.0-D6, Diesel Generator Unit 1B-B 760.5-D9, Unit 1B-B Air Exhaust Room 760.5-D10, 480-V Board Room 1B-B 760.5-D11, Unit 1B-B Air Intake Room

FIRE AREA 52	ROOM NO.	DESCRIPTION
AV-080	DGB-2B	Diesel Generator Building 2B 742.0-D7, Diesel Generator Unit 2B-B 760.5-D12, Unit 2B-B Air Exhaust Room 760.5-D13, 480-V Board Room 2B-B 760.5-D14, Unit 2B-B Air Intake Room

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 53	ROOM NO.	DESCRIPTION
AV-081A	DGB-PGA	Diesel Generator Building Pipe Gallery A 742.0-9A, Pipe Gallery/Corridor, West wall to Door D11 742.0-9N, Pipe Gallery/Corridor, Door D11 to Door D12 742.0-D3, Toilet

FIRE AREA 53	ROOM NO.	DESCRIPTION
AV-081B	DGB-PGB	Diesel Generator Building Pipe Gallery B 742.0-9B, Pipe Gallery/Corridor, East wall to Door D12 742.0-9N, Pipe Gallery/Corridor, Door D11 to Door D12 742.0-D8, Fuel Oil Transfer Room

FIRE AREA 54	ROOM NO.	DESCRIPTION
AV-082	DGB-CO	Diesel Generator Building Corridor 742.0-D1, CO_2 Storage Room 742.0-D2, Lube Oil Storage Room 742.0-D10, Conduit Interface Room 742.0-760.5, Stairwell D1 760.5-D1, Corridor 760.5-D2, Radiation Shelter

FIRE AREA 55	ROOM NO.	DESCRIPTION
AV-083	DGB-A	Cable Chase A (From 713.0-A1A3 to DG Building Pipe Gallery A)

FIRE AREA 56	ROOM NO.	DESCRIPTION
AV-084	DGB-B	Cable Chase B (From 713.0-A1B to DG Building Pipe Gallery B)

FIRE AREA 57	ROOM NO.	DESCRIPTION
AV-085	DGB-OS	Additional Diesel Generator Building 742.0-1, Diesel Generator Unit C-S 742.0-2, Fuel Oil Transfer Room 742.0-3, Pipe Gallery 742.0-4, 6.9-KV Switchgear Room 742.0-5, Corridor 742.0-6, Closet 742.0-760.5, Stairwell D3 760.5-1, Air Intake Room 760.5-2, 480-V Auxiliary Board Room 760.5-3, Air Exhaust Room

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 57	ROOM NO.	DESCRIPTION
		760.5-4, Transformer Room
		760.5-5, Fire Protection Room
		760.5-6, Janitor's Closet
		760.5-7, Corridor
		760.5-8, Closet

FIRE AREA 58	ROOM NO.	DESCRIPTION
AV-086	IPS-A	El. 741 ERCW Pump Room A
	IPS-A	El. 741 Screen Wash and HPFP A Pumps Room
	IPS-A	El. 722 ERCW Strainer Room A

FIRE AREA 59	ROOM NO.	DESCRIPTION
AV-087	IPS-B	El. 741 ERCW Pump Room B
	IPS-B	El. 741 HPFP B Pump Room
	IPS-B	El. 722 ERCW Strainer Room B

FIRE AREA 60	ROOM NO.	DESCRIPTION
AV-088	IPS-CA	El. 711.0 Board Room, 20ft west of 480V Bd/Transformer
	IPS-CC-A	El. 711.0 Board Room, Mid to 20ft west of 480V Bd/Transformer

FIRE AREA 60	ROOM NO.	DESCRIPTION
AV-089	IPS-CC-A	El. 711.0 Board Room, Mid to 20ft west of 480V Bd/Transformer
	IPS-CC-B	El. 711.0 Board Room, Mid to 20ft east of 480V Bd/Transformer
	IPS-EL 728	RCW Pump Deck

FIRE AREA 60	ROOM NO.	DESCRIPTION
AV-090	IPS-CB	El. 711.0 Board Room, 20ft east of 480V Bd/Transformer
	IPS-CC-B	El. 711.0 Board Room, Mid to 20ft east of 480V Bd/Transformer

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-091	ANN	Unit 1 Reactor Building - Annulus

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092A		Unit 1 Reactor Building - Lower Containment:
	RO-2	Outside Crane Wall (90° – 180°)
	RO-3	Outside Crane Wall (180° - 270°)
	RA2	Accumulator Room 2
	RF2	Fan Room 2

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092B		Unit 1 Reactor Building - Lower Containment
	RO-2	Outside Crane Wall (90° – 180°)
	RO-3	Outside Crane Wall (180° – 270°)
	RA3	Accumulator Room 3
	RF2	Fan Room 2

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092C		Unit 1 Reactor Building - Lower Containment
	RO-3	Outside Crane Wall (180° - 270°)
	RO-4	Outside Crane Wall (270° – 360°)
	RA3	Accumulator Room 3
	RA4	Accumulator Room 4

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092D		Unit 1 Reactor Building - Lower Containment
	RO-1	Outside Crane Wall (0° – 90°)
	RO-4	Outside Crane Wall (270° – 360°)
	RF1	Fan Room 1
	RA4	Accumulator Room 4

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092E		Unit 1 Reactor Building - Lower Containment
	RO-1	Outside Crane Wall (0° – 90°)
	RO-4	Outside Crane Wall (270° – 360°)
	RF1	Fan Room 1
	RA1	Accumulator Room 1

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092F	RIR	Unit 1 Reactor Building - Lower Containment Instrument Room

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092G	RU	Unit 1 Reactor Building - Primary Containment Upper Containment

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092H		Unit 1 Reactor Building - Lower Containment
	RI-2	Inside Crane Wall (90° – 180°)
	RI-3	Inside Crane Wall (180° – 270°)
	RA2	Accumulator Room 2
	RF2	Fan Room 2

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092J		Unit 1 Reactor Building - Lower Containment
	RI-2	Inside Crane Wall (90° – 180°)
	RI-3	Inside Crane Wall (180° – 270°)
	RA3	Accumulator Room 3
	RF2	Fan Room 2

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092K		Unit 1 Reactor Building - Lower Containment
	RI-1	Inside Crane Wall (0° – 90°)
	RI-4	Inside Crane Wall (270° – 360°)
	RA4	Accumulator Room 4
	RF1	Fan Room 1

FIRE AREA 61	ROOM NO.	DESCRIPTION
AV-092L		Unit 1 Reactor Building - Lower Containment
	RI-1	Inside Crane Wall (0° – 90°)
	RI-4	Inside Crane Wall (270° – 360°)
	RA1	Accumulator Room 1
	RF1	Fan Room 1

FIRE AREA 62	ROOM NO.	DESCRIPTION
AV-093	CDWE	Condensate Demineralizer Waste Evaporator Building

FIRE AREA 63	ROOM NO.	DESCRIPTION
AV-094	TB	Turbine Building

FIRE AREA 64	ROOM NO.	DESCRIPTION
AV-095	Yard	Yard Area

FIRE AREA 65	ROOM NO.	DESCRIPTION
AV-099	676.0-A17	Unit 2 Pipe Gallery and Chase
	692.0-A24	Unit 2 Pipe Gallery and Chase
	713.0-A29	Unit 2 Pipe Gallery and Chase

FIRE AREA 66	ROOM NO.	DESCRIPTION
AV-103	692.0-A21	Charging Pump 2C

PART III – SAFE SHUTDOWN CAPABILITIES

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 67	ROOM NO.	DESCRIPTION
AV-104	692.0-A22	Charging Pump 2B-B

FIRE AREA 68	ROOM NO.	DESCRIPTION
AV-105	692.0-A23	Charging Pump 2A-A

FIRE AREA 69	ROOM NO.	DESCRIPTION
AV-107	692.0-A26	Turbine Driven Aux Feedwater Pump 2A-S

FIRE AREA 70	ROOM NO.	DESCRIPTION
AV-106	692.0-A25	Unit 2 Pipe Gallery

FIRE AREA 71	ROOM NO.	DESCRIPTION
AV-110	713.0-A19	Unit 2 Pipe Gallery
	713.0-A21	Unit 2 Reactor Bldg Access Room

FIRE AREA 71-1	ROOM NO.	DESCRIPTION
AV-111	713.0-A20	Unit 2 VCT Room

FIRE AREA 72	ROOM NO.	DESCRIPTION
AV-113	729.0-A11	Unit 2 South Main Steam Valve Room
	737.0-A10	Air Lock

FIRE AREA 73	ROOM NO.	DESCRIPTION
AV-112A	729.0-A10	Unit 2 North Main Steam Valve Room
AV-112	729.0-A13	Unit 2 Steam Valve Instrument Room B
	729.0-A15	UHI Equipment Room
	729.5-A17	Unit 2 Shield Bldg Vent Radiation Monitoring Room
	737.0-A14	Air Lock
	763.5-A2	UHI Equipment Room

FIRE AREA 74	ROOM NO.	DESCRIPTION
AV-114S	737.0-A9S	Vent & Purge Air (A11-A13 / Q-W)
AV-114M	737.0-A9M	Vent & Purge Air (A11-A13 / 2ft N of V to 2½ft S of U2 RB ℄)
	737.0-A16	Unit 2 Gross Failed Fuel Detector Room
AV-114N	737.0-A9N	Vent & Purge Air (A11-U2 RB/2 ft north of 737.0-A16 to N Wall 737.0-A9)

PART III – SAFE SHUTDOWN CAPABILITIES

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 75	ROOM NO.	DESCRIPTION
AV-115	757.0-A16	Emergency Gas Treatment Filter Room
	782.0-A3	Unit 2 Control Rod Drive Equipment Room
	782.0-A4	Pressurizer Heater Transformer Room 2
AV-116	757.0-A14	Unit 2 RB Access Room

FIRE AREA 76	ROOM NO.	DESCRIPTION
AV-096	757.0-A15	Unit 2 Reactor Bldg Equipment Hatch

FIRE AREA 77	ROOM NO.	DESCRIPTION
AV-117	2 ANN	Unit 2 Annulus

FIRE AREA 77	ROOM NO.	DESCRIPTION
AV-118A		Unit 2Reactor Bldg – Lower Containment
	2RO-2	Outside Crane Wall (90° – 180°)
	2RO-3	Outside Crane Wall (180° – 270°)
	2RA2	Accumulator Room 2
	2RF2	Fan Room 2

FIRE AREA 77	ROOM NO.	DESCRIPTION
AV-118B		Unit 2 Reactor Bldg – Lower Containment
	2RO-2	Outside Crane Wall (90° – 180°)
	2RO-3	Outside Crane Wall (180° – 270°)
	2RA3	Accumulator Room 3
	2RF2	Fan Room 2

FIRE AREA 77	ROOM NO.	DESCRIPTION
AV-118C		Unit 2 Reactor Bldg – Lower Containment
	2RO-3	Outside Crane Wall (180° – 270°)
	2RO-4	Outside Crane Wall (270° – 360°)
	2RA3	Accumulator Room 3
	2RA4	Accumulator Room 4
AV-118D		Unit 2 Reactor Bldg – Lower Containment
	2RO-1	Outside Crane Wall (0° – 90°)
	2RO-4	Outside Crane Wall (270° – 360°)
	2RF1	Fan Room 1
	2RA4	Accumulator Room 4

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

FIRE AREA 77	ROOM NO.	DESCRIPTION
AV-118E		Unit 2 Reactor Bldg – Lower Containment
	2RO-1	Outside Crane Wall (0°–90°)
	2RO-4	Outside Crane Wall (270° – 360°)
	2RA1	Accumulator Room 1
	2RF1	Fan Room 1
AV-118F		Unit 2 Reactor Bldg – Lower Containment
	2RIR	Instrument Room
AV-118G		Unit 2 Reactor Bldg – Primary Containment
	2RU	Upper Containment
AV-118H		Unit 2 Reactor Bldg – Lower Containment
	2RI-2	Inside Crane Wall (90° – 180°)
	2RI-3	Inside Crane Wall (180° – 270°)
	2RA2	Accumulator Room 2
	2RF2	Fan Room 2
AV-118J		Unit 2 Reactor Bldg – Lower Containment
	2RI-2	Inside Crane Wall (90° – 180°)
	2RI-3	Inside Crane Wall (180° – 270°)
	2RA3	Accumulator Room 3
	2RF2	Fan Room 2
AV-118K		Unit 2 Reactor Bldg – Lower Containment
	2RI-1	Inside Crane Wall (0° – 90°)
	2RI-4	Inside Crane Wall (270° – 360°)
	2RA4	Accumulator Room 4
	2RF1	Fan Room 1

FIRE AREA 77	ROOM NO.	DESCRIPTION
AV-118L		Unit 2 Reactor Bldg – Lower Containment
	2RI-1	Inside Crane Wall (0° – 90°)
	2RI-4	Inside Crane (270° – 360°)
	2RA1	Accumulator Room 1
	2RF1	Fan Room 1

DUCT BANKS	ROOM NO.	DESCRIPTION
AV-097	DBIPS-A	Cable Chase from Auxiliary Building 713.0-A1B to IPS-A
AV-098	DBIPS-B	Cable Chase from Auxiliary Building 713.0-A1B to IPS-B

TABLE 3-3 - ANALYSIS VOLUME BY FIRE AREA LIST

NOTES:

The following notes are applicable to the entire AV or AVs under which they are listed. The lining up of a note with a particular room is only coincidental.

1. This AV contains both RHR power feeds (692.0-A1AN - Train A; 692.0-A1BN - Train B. Therefore, two separate analyses (AV-004A and AV-004B) are performed to address the use of either path depending on the location of the fire within this volume.

2. This AV is analyzed to address the "soft" interface between 692.0-A1C and 692.0-A1AN and 692.0-A1BN (i.e., to obtain 20 feet of separation on either side of Column Line U).

3. This AV is analyzed to address the "soft" interface between 713.0-A1C and 713.0-A1AN and 713.0-A1BN (i.e., to obtain 20 feet of separation on either side of Column Line U).

4. This AV is analyzed to address the "soft" interface between 737.0-A1CN and 737.0-A1AN and 737.0-A1BN (i.e., to obtain 20 feet of separation on either side of Column Line U).

5. This AV contains cables and/or equipment associated with the fifth vital battery. The fifth vital battery is credited as an "installed spare" that can be used during normal plant operation if one of the existing batteries is down for maintenance. There were an additional four analyses performed for this AV to address the various combinations where the fifth vital battery can be used. These AVs have been analyzed to address the effects of a fire on the 125V DC system if the fifth vital battery is in service in replacement of any one of the other four normally credited batteries.

FIGURE III-1
INTERACTION ANALYSIS FLOW CHART

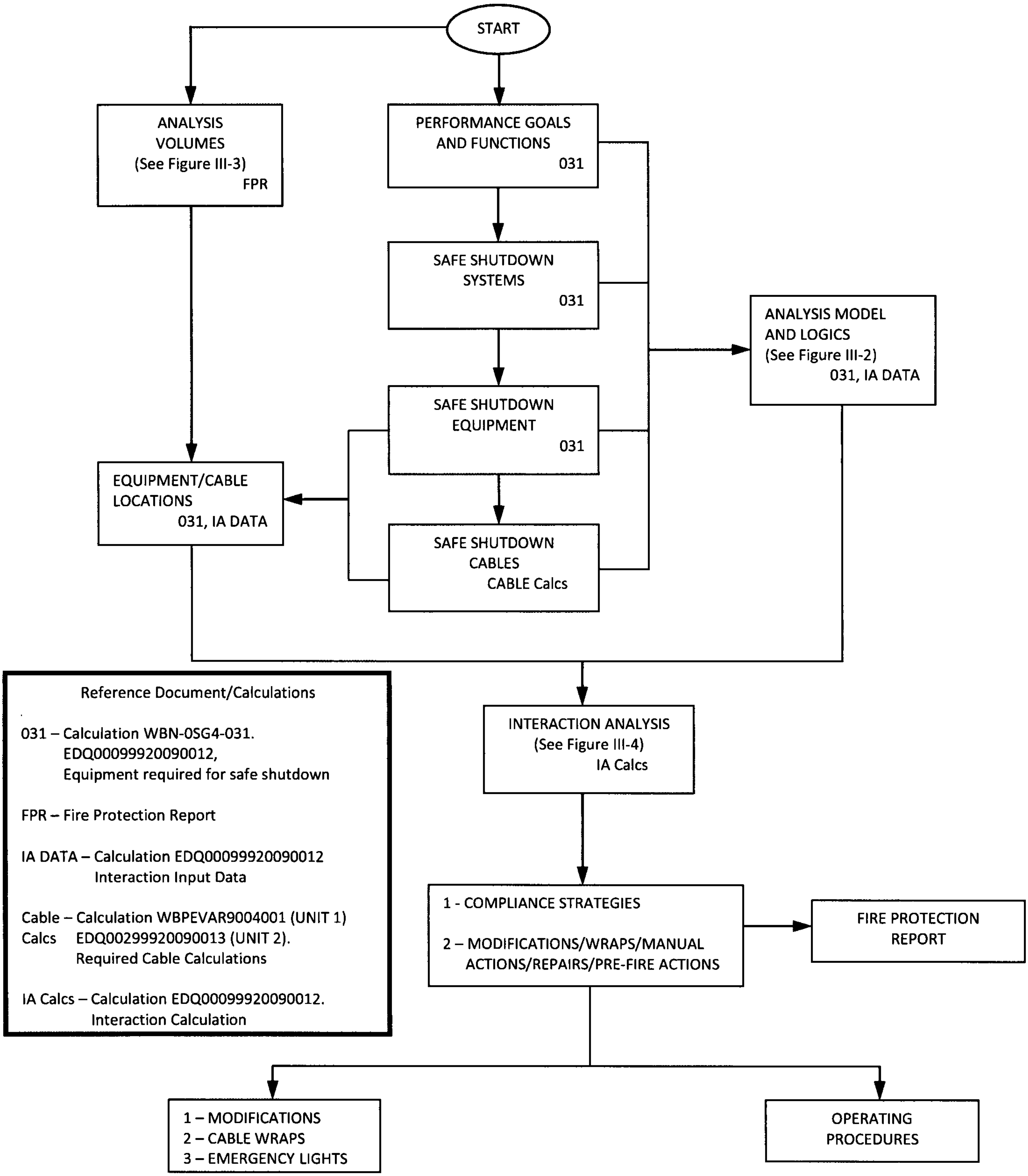
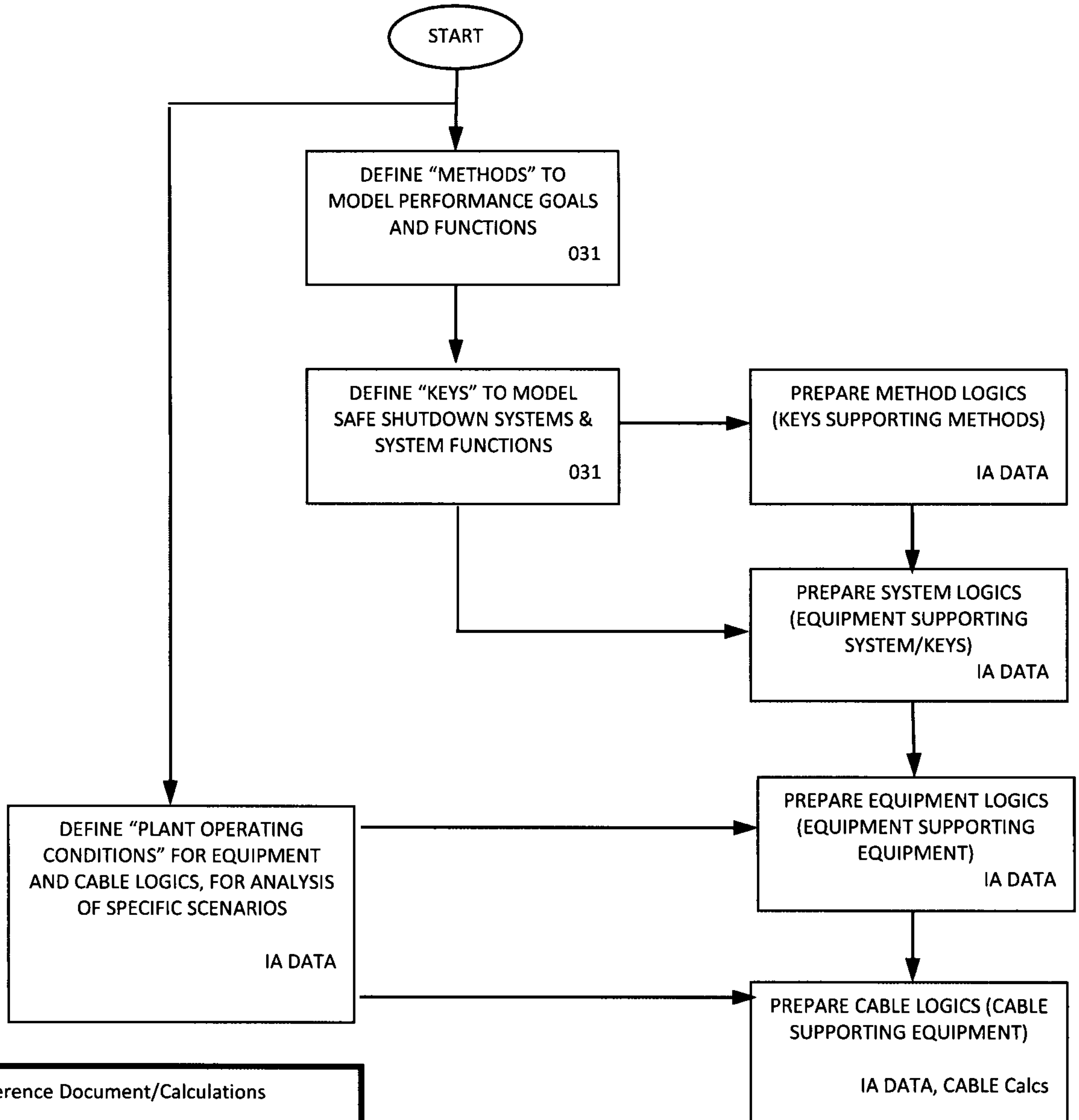


FIGURE III-2
ANALYSIS MODEL AND LOGICS



Reference Document/Calculations

031 – Calculation WBN-0SG4-031.
EDQ00099920090012,
Equipment required for safe shutdown

FPR – Fire Protection Report

IA DATA – Calculation EDQ00099920090012
Interaction Input Data

Cable – Calculation WBPEVAR9004001 (UNIT 1)
Calcs EDQ00299920090013 (UNIT 2).
Required Cable Calculations

IA Calcs – Calculation EDQ00099920090012.
Interaction Calculation

FIGURE III-3
ANALYSIS VOLUMES

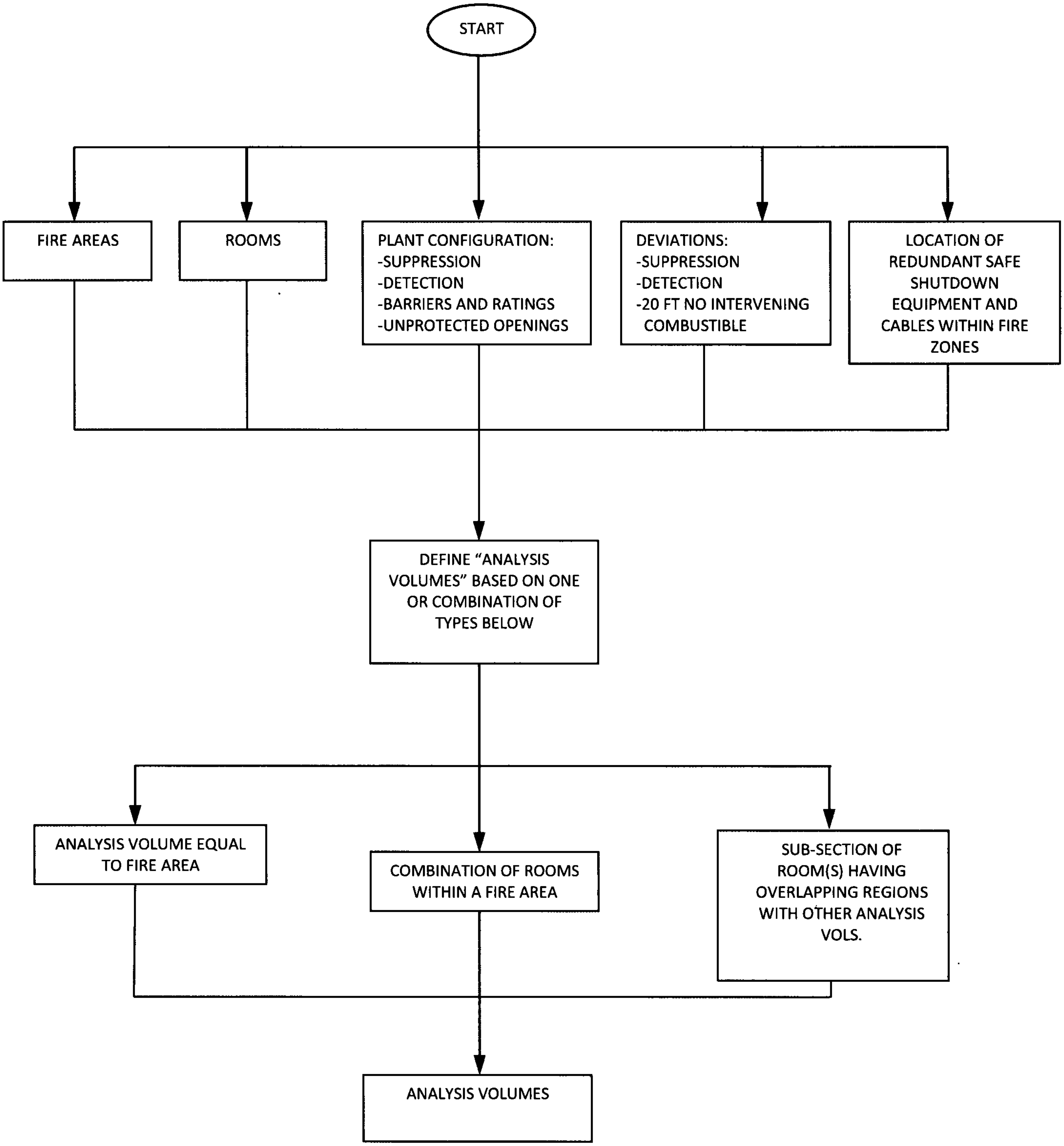
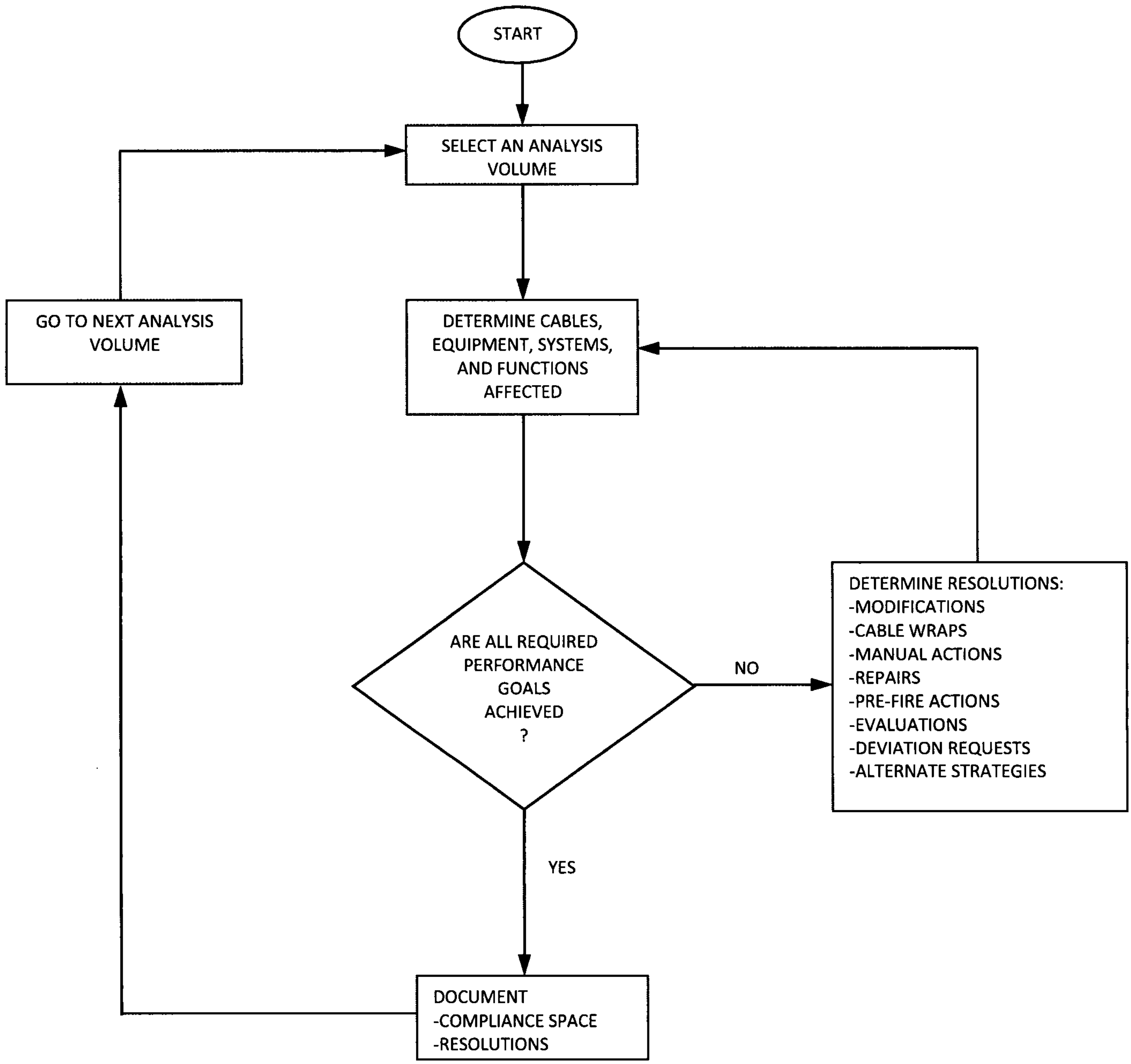
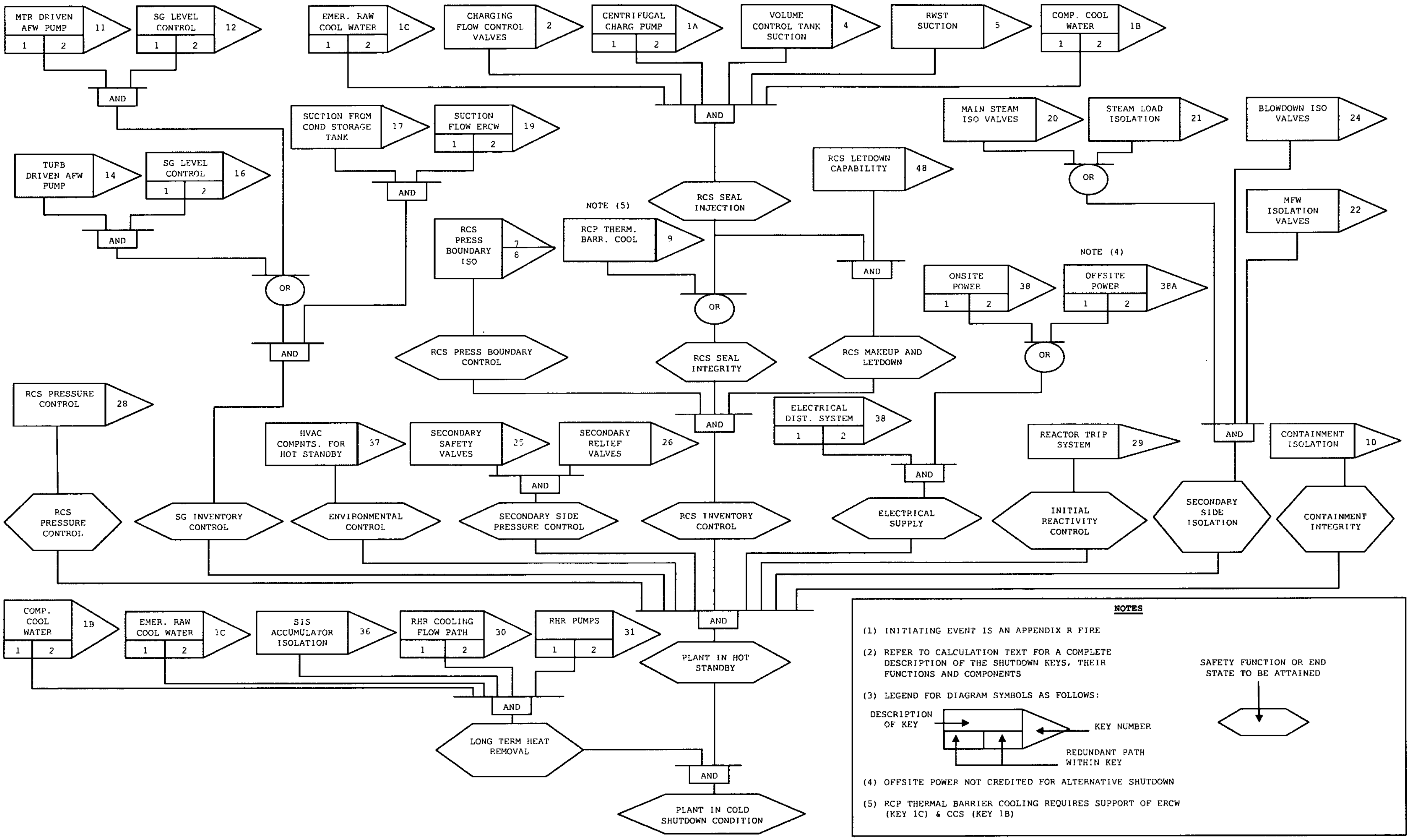


FIGURE III-4
INTERACTION ANALYSIS



PART III – SAFE SHUTDOWN CAPABILITIES
FIGURE III-5
SAFE SHUTDOWN LOGIC DIAGRAM



Enclosure 4

List of Supporting Calculations for Section 7.4, "Multiple High Impedance Faults," of Part III of the FPR

WBN Calculation Number	Calculation Title	FPR Part II Reference Number
WBNEEB-MS-TI02-0020	120V AC Class 1E Distribution Panel & Transformer Sizing	
WBNEEB-MS-TI07-0018	120V AC Protection, Coordination and Short Circuit Study	4.2.37
WBPEVAR9509001	Appendix R, Multiple High Impedance Fault Analysis	4.2.66
WBNEEB-MS-TI07-0005	125V DC Protection and Coordination Calculation	4.2.39
WBNEEB-MS-TI08-0008	480V 1E Protection and Coordination Calculation - Unit 1	4.2.40
EDQ00299920080004	480V 1E Protection and Coordination Calculation - Unit 2	
E318 & E319 Series	6.9kV Protection and Coordination Calculations - Unit 1	
EDQ00299920080016	6.9kV Protection and Coordination Calculation - Unit 2	
WBNEEB-MS-TI08-0015	Electrical Penetration Protection Study Voltage Level V4 and V5 - Unit 1	4.2.42
EDQ00299920080018	Electrical Penetration Protection Study Voltage Level V4 and V5 - Unit 2	
WBNEEB-MS-TI08-0028	Electrical Penetration Protection Study Voltage Level V3 - Unit 1	4.2.38
EDQ00299920080019	Electrical Penetration Protection Study Voltage Level V3 - Unit 2	

Enclosure 5

Commitment List

1. The problems impacting OMA 732 are being addressed under Problem Evaluation Report 558202 in TVA's Corrective Action Program. Once the required corrective actions are implemented, the Fire Protection Report (FPR) will be revised accordingly and an update to the report will be submitted to NRC by July 26, 2012.

2. TVA initiated Service Request (SR) 571113 on June 26, 2012, to capture the discrepancy between the installed louver door and the SSER statement in TVA's Corrective Action Program. TVA will provide an update for this issue along with the submittal of the FPR update for OMA 732 on July 26, 2012.

3. TVA intends to correct the organizational and building information as part of the FPR update for OMA 732 which will be provided by July 26, 2012.