E-1F9915

DESIGN BASIS DOCUMENT FOR OFN RP-017, CONTROL ROOM EVACUATION

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1.0 Purpose

The purpose of this document is to provide a technical basis for procedure OFN RP-017, Control Room Evacuation (due to fire) and define the timing basis for each action step within OFN RP-017.

2.0 Scope and Assumptions

2.1 Scope

This document applies to procedure OFN RP-017.

2.2 Assumptions

The following assumptions are applied when developing the Wolf Creek strategy for shutting down and maintaining hot standby using procedure OFN RP-017.

2.2.1 Only fire-induced failures are postulated to occur and all equipment is in normal operating state at the time of the fire.

2.2.2 Response Not Obtained (RNO) actions are included as operator aids and exceeds the procedural guidance required by regulation. It is not expected that the RNO actions will be necessary unless the primary action is affected by the fire.

2.2.3 Before transfer of control is achieved by the alternative and dedicated shutdown system only a single spurious actuation is assumed to occur, except in the case of two redundant valves in a high/low pressure interface line. All potential spurious actuations are mitigated or prevented using procedure OFN RP-017 but timing is based on one spurious actuation occurring prior to transfer of control to the alternative and dedicated shutdown system, or two spurious actuations in the case of high/low pressure interface lines.

2.2.4 The Wolf Creek Fire Protection licensing basis, as described in USAR, Section 9.5.1, requires that a loss of off-site power be assumed in conjunction with a control room fire. However, a loss of offsite power may not be the most conservative assumption for every fire scenario. Therefore, the thermal hydraulic calculations were performed assuming off-site power is available and off-site power is not available to determine the most conservative outcome. The results of the thermal hydraulic calculation are presented in evaluation SA-08-006.

2.2.5 Automatic functions capable of mitigating spurious actuations are assumed to be defeated by damage to cables located in the area associated with the automatic function.

2.2.6 The reactor is tripped prior to evacuation of the control room. This is the only action assumed to work prior to evacuation. Tripping the reactor is considered to be t = 0 seconds for the purpose of timing subsequent steps.

2.2.7 Transfer of control to the alternative or dedicated shutdown system is assumed to occur when all isolation and transfer switches have been manipulated per procedure OFN RP-017. These switches are either located at the Auxiliary Shutdown Panel or at the local equipment.

3.0 Methodology

The methodology for completing this document is described in this section.

Each section and step within OFN RP-017 was reviewed and a technical basis for the section or step was documented.

Section 1.0 describes the purpose of E-1F9915. Section 2.0 identifies the scope. Section 4.0 lists the references used to compile E-1F9915.

Section 5.0 provides background information on OFN RP-017.

Section 6.0 is a summary of each PFSSD function and the major equipment associated with the function. In addition, Section 6.0 summarizes the timing requirement to ensure the function is satisfied per the times justified in Section 7.0.

Section 7.0 provides a technical review of each section in OFN RP-017. First, the front-end sections are discussed and a technical basis provided. These front-end sections include the Purpose, Symptoms or Entry Conditions, and References and Commitments.

Next, each Action/Expected Response and Response Not Obtained step within OFN RP-017 is tabulated in Table 7.1. The columns and the information provided in each column are described below.

- Step Number - The step number identified in OFN RP-017.
- Step Description - The Step wording taken verbatim from the procedure.
- PFSSD Function - This column describes the PFSSD function that is satisfied by performing the Step. Functions are as follows: R - Reactivity Control; M - Reactor Coolant Makeup and Inventory Control; D - Decay Heat Removal; P - Process Monitoring; S - Support. If the step does not satisfy a specific function, then N/A is placed in the column.
- Basis - This column provides useful information about the step and why it is included in the procedure.
- Required Time to Complete - This column describes the maximum time that the operator has to complete the step to ensure the function supported by the step is satisfied. Completion of a step after the time indicated does not necessarily mean unrecoverable conditions would be reached but it would be beyond that which has been analyzed. Further analysis would be needed to determine the impact of not meeting a time limit identified in this document.
- Timing Basis - This column describes the basis for the maximum allowed operator response time given in the previous column. The basis is derived from a number of calculations and evaluations as described in the column.
- Control Room Fire Impact - This column describes whether a fire in the control room could cause the component to spuriously operate after the Step and any identified pre-requisite Steps are complete. If yes, then further discussion is provided for why it is acceptable.
- Prerequisite Steps - This column identifies the Step(s) that are required to be completed prior to completing the Step. Prerequisites are steps that must be completed before the current step to prevent potential damage to equipment or prevent spurious operation of the equipment after the step is completed and the Operator moves on. A step that restores power to a component is not considered a prerequisite. These pre-requisites are listed to provide reasonable assurance that future procedure changes will not improperly re-order the steps.

4.0 References

4.1 Wolf Creek Documents

4.1.1 Procedure OFN RP-017, Control Room Evacuation

4.1.2 Wolf Creek Operating License NPF-42

4.1.3 Wolf Creek Safety Evaluation Report including Supplements 1 through 5

4.1.4 Wolf Creek Technical Requirements Manual (TRM), Revision 55

4.1.5 SNUPPS Letter SLNRC 84-0109 - Fire Protection Review

4.1.6 Memo from NRC to KG&E dated August 31, 1984 - Minutes of August 22, 1984 Meeting with Kansas Gas and Electric and Union Electric Company

4.1.7 Calculation XX-E-013, Rev. 4 - Post-Fire Safe Shutdown Analysis

4.1.8 Safety Analysis Evaluation SA-08-006, Rev. 3 - Retran-3D Post-Fire Safe Shutdown (PFSSD) Consequence Evaluation for a Postulated Control Room Fire

4.1.9 Calculation Change Notice AN-02-10-000-02 - EDG Room Temperature at Various Outside Air Temperatures for the NRC Triennial Fire Protection Inspection

4.1.10 Calculation EF-10, Rev. 2 - ESW System Flow Requirements

4.1.11 Drawing M-018-00155, Rev. 2 - Operation of Diesel Engine without Cooling Water

4.1.12 Drawing J-14001, Rev. 10 - Control Room Equipment Arrangement

4.1.13 Drawing E-13EF06A, Rev. 5 - Schematic Diagram ESW to Ultimate Heat Sink Isolation Valves

4.1.14 Drawing E-025-00007, Sheet 185, Rev. W15 - EFHV0038 Design Configuration Document

4.1.15 Document E-10NK, Rev. 6 - Class 1E 125 VDC System Description

4.1.16 Specification M-018, Rev. 14 - Standby Diesel Generator

4.1.17 PIR 2005-3314/CR2007-003037 - Issues involving NRC Information Notice 92-18

4.1.18 CR 00012368 – Timing Basis for Re-Establishing Room Cooling

4.1.19 CR 00016481 – Guidance for Control Room Re-Entry After Fire

4.1.20 CR 00019239 – Time to Close Valve BNHV8812A

4.1.21 CR 00019242 – Train B Emergency Diesel Generator Potential Failure to Start

4.1.22 CR 00020612 – Amphenol Connectors for MSIVs cannot be Removed by Hand

4.1.23 CR 00023410 – Issues with the Train B Emergency Diesel Generator Voltage Regulator

4.1.24 CR 00030350 – Post-Fire Safe Shutdown Concern with Train B Diesel Generator Field Flashing

4.1.25 CR 00030376 – Revise E-1F9915 to Document Time to Establish Diesel Engine Cooling

4.1.26 CR 2008-004708 – Determine Time to Establish Diesel Engine Cooling

4.1.27 CR 00041746 – Spurious Operation of Valve EFHV0060

4.1.28 Calculation KJ-M-017, Rev. 0 - Emergency Diesel Standby Generator (KKJ01B) Runtime Without ESW Flow

4.1.29 CR 00041746 - Potential for EFHV0060 to Open Due to Control Room Fire

4.1.30 CR 00044460 – Add OFN RP-017 Component Evaluation to E-1F9915

4.1.31 CR 00046634-02-03 – Add MSO Evaluation to E-1F9915

4.1.32 CR 00046642 – RCP Seal Return Valves

4.1.33 CR 00046702 – Auxiliary Shutdown Panel Controls for B Motor Driven Auxiliary Feedwater Pump

4.1.34 CR 00046707 – Review Reactor Trip Switch Circuits for Alternative Shutdown

4.1.35 CR 00072102 – Operator Time Sensitive Action in OFN RP-017 Not Met

4.2 Nuclear Regulatory Commission Documents

4.2.1 10 CFR 50.48 - Fire Protection

4.2.2 10 CFR 50, Appendix R - Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979

4.2.3 NRC Generic Letter 86-10 - Implementation of Fire Protection Requirements

4.2.4 NRC Information Notice 2005-14 - Fire Protection Findings on Loss of Seal Cooling to Westinghouse Reactor Coolant Pumps

4.2.5 Regulatory Guide 1.189, Rev. 2 – Fire Protection for Nuclear Power Plants

4.3 Other Documents

4.3.1 Westinghouse WCAP-16396-NP, Westinghouse Owners Group Reactor Coolant Pump Seal Performance for Appendix R Assessments.

4.3.2 Westinghouse Technical Bulletin TB-04-22, Rev. 1, Reactor Coolant Pump Seal Performance – Appendix R Compliance and Loss of All Seal Cooling.

4.3.3 NEI 00-01, Rev. 2 – Guidance for Post-Fire Safe Shutdown Circuit Analysis

4.3.4 Westinghouse Letter LTR-RAM-I-10-053 dated October 15, 2010. Subject: White Paper Westinghouse Reactor Coolant Pump Seal Behavior For Fire Scenarios, Revision 2.

4.3.5 Westinghouse WCAP-17541-P, Revision 0 – Implementation Guide for the Westinghouse Reactor Coolant Pump SHIELD® Passive Thermal Shutdown Seal, dated March 2012.

5.0 Background

The Control Room evacuation and plant shutdown procedure is documented in OFN RP-017 (power operation to hot standby) and OFN RP-017A (hot standby to cold shutdown). The original basis for procedure OFN RP-017 is SLNRC 84-0109, which documents a phased approach to shutting down the plant and maintaining it in a safe hot standby condition if control room evacuation is required following a fire. This phased approach was approved by the NRC in Supplement 5 of the Wolf Creek Safety Evaluation Report.

Although SLNRC 84-0109 formed the original licensing basis for hot shutdown from outside the control room at SNUPPS facilities, its basis is not clearly defined nor understood. Some of the step sequences and actions are questionable by today's operational and regulatory standards. Over the years, changes have been made to OFN RP-017, which were not in literal compliance with the letter. The changes were subsequently determined to not have an adverse impact on the health and safety of the public. However, because of the confusing nature of the letter, it was decided that a design basis document that clearly describes the basis for OFN RP-017 is needed.

License Amendment 214 approved superseding letter SLNRC 84-0109 with document E-1F9915 as the basis for alternative shutdown in the event of a fire in the control room. Therefore, letter SLNRC 84-0109 is considered historical and is no longer part of the approved fire protection program.

6.0 Summary of Timing Basis

This Section includes a summary of the major equipment credited in OFN RP-017 for satisfying each PFSSD function (Reactivity Control, Reactor Coolant Makeup and Inventory Control, Decay Heat Removal, Process Monitoring and Support). In addition, operator response timing, to ensure the function is satisfied prior to reaching unrecoverable conditions, is discussed.

6.1 Reactivity Control

Reactivity control is achieved by tripping the reactor prior to leaving the control room. Tripping the reactor is considered to be t = 0 seconds for the OFN RP-017 timeline. (Assumption 2.2.6)

The main steam isolation valves (MSIVs) and steam generator (SG) blowdown valves are isolated to prevent return to criticality due to uncontrolled cooldown. The MSIVs are assumed to remain open until action is taken outside the control room within 3 minutes to close them. Prior to evacuating the control room, operators attempt to close the MSIVs using the all-close hand switches, but this action is assumed to fail. In these cases, the steam dumps are assumed to operate properly to control temperature to 557°F, then the steam dumps are isolated within 7 minutes by de-energizing power to the valves, at which time the ARVs are used for temperature control. All components located downstream of the MSIVs are assumed to be unaffected by the fire.

Plant cooldown is controlled using SGs B and D atmospheric relief valves (ARVs) while SGs A and C ARVs are closed. Based on Calculation SA-08-006, a single SG ARV can remain open for 1 hour with no adverse impact on safe shutdown. Otherwise, all SG ARVs are assumed to function normally at time 0, controlling pressure less than 1184.7 psia. Steam generators B & D ARVs are assumed to close at 7 minutes then control as necessary at 561 degrees F after the operator takes manual control of the B & D ARVs from the auxiliary shutdown panel (ASP). Steam generators A & C ARVs are assumed to close at 7 minutes, then stay closed after the operator at the ASP closes them per procedure.

The MSIVs are assumed to remain open until operator action outside the control room closes them, despite operation of the control room all-close hand switches prior to evacuation. In all scenarios the MSIVs are assumed closed in 3 minutes when power is removed from MSFIS cabinet SA075A in Step C2.

The MSIV bypass valves are failed closed by pulling the control power fuse block in Step B12. This will fail power to the Train A solenoid valve and fail the bypass valves closed. The bypass lines are 2 inches in diameter. A failed open bypass line is bounded by a single failed open steam generator ARV, which has an 8 inch line on the discharge side of the ARV. Calculation SA-08-006 shows that a single ARV can remain open for at least 60 minutes with no adverse consequence. Therefore, the time allowed to isolate a failed open MSIV bypass line is 60 minutes.

The main turbine trips in response to a reactor trip through an interlock from the reactor trip breakers that is unaffected by a fire in the control room. Therefore, steam loss through the turbine is prevented.
The Train B Chemical and Volume Control System (CVCS) is used to provide borated water to the RCS to maintain negative reactivity conditions. This is accomplished using the Train B centrifugal charging pump (CCP) taking suction from the borated refueling water storage tank (RWST) and injecting to the RCS through the boron injection tank (BIT). Calculation SA-08-006 assumes the Train B CVCS is lined up and injecting through the BIT within 28 minutes.

6.2 Reactor Coolant Makeup/Inventory Control

Reactor coolant makeup and inventory control is achieved by first isolating all potential RCS leakage and inventory reduction paths including pressurizer power operated relief valves (PORVs), normal letdown, excess letdown, reactor vessel head vents, reactor coolant pump seals, MSIVs, steam generator blowdown, steam generator ARVs, and residual heat removal (RHR) suction from the RCS. Leakage through the RHR system is not credible since the RHR pump suction valves are normally closed and de-energized. The reactor coolant pumps (RCPs) are stopped to prevent loss of inventory through the RCP seals.

Based on Calculation SA-08-006, pressurizer PORVs are assumed isolated within 3 minutes and normal letdown is assumed isolated within 7 minutes. Charging flow to the reactor coolant pump seals is assumed to be isolated within 10 minutes. The reactor coolant pumps are assumed to be stopped within 7 minutes. Steam generator ARVs and MSIVs are isolated as discussed in Section 6.1.

Letdown flow is assumed to be isolated within 7 minutes. In all scenarios where letdown is unaffected, initial flow is 120 gpm until isolated. The 120 gpm flow rate is based on normal letdown of 75 gpm plus an additional 45 gpm that could be flowing for Chemistry concerns (this rarely occurs). In the scenarios where letdown valves fail open, letdown flow goes to 195 gpm for 7 minutes, which is the maximum letdown flow. The automatic letdown isolation signal on low pressurizer water level (17%) is assumed to fail.

Pressurizer heater backup group B is cycled to maintain pressurizer pressure within 2000 to 2300 psig. In the loss of off-site power scenarios, Calculation SA-08-006 assumes pressurizer heaters fail to operate at time zero. At 11.5 minutes, backup group B is controlled at the ASP. In the non loss of off-site power scenarios, all three heater groups operate normally but power to backup group B is lost by procedure within 7 minutes. Power is restored within 11.5 minutes and control on backup group B is available from the ASP.

Calculation SA-08-006 assumes the pressurizer and auxiliary pressurizer spray valves operate normally except in those scenarios where the pressurizer spray is assumed to fail. In those scenarios, the pressurizer spray valves are assumed to open at time zero and pressurizer spray stops at 7 minutes when the RCPs are stopped. Auxiliary spray is assumed to operate at time zero and stops in 7 minutes when PK5117 is opened in Step D1.

The Train B CVCS is used for makeup and inventory control by taking suction from the RWST and injecting through the BIT. Calculation SA-08-006 assumes the Train B CVCS is lined up and injecting through the boron injection tank (BIT) within 28 minutes. Pressurizer overfill can occur if a spurious Safety Injection Signal (SIS) causes both CCPs to start and inject into the RCS through the BIT flowpath prior to establishing control of the BIT injection valves and normal charging flowpath. Calculation SA-08-006 shows that if one CCP is stopped within 10 minutes following a spurious SIS, pressurizer overfill will not occur. OFN RP-017 stops the Train B CCP within 10 minutes by opening breaker NB00201. The Train A CCP could continue to operate past the 10 minute time, but based on SA-08-006 this will not cause the pressurizer to overfill. At 28 minutes charging flow is controlled by isolating all injection paths and throttling the BIT outlet valve. Therefore, there is reasonable assurance that pressurizer overfill will not occur.

Valve EGHV0102 is normally closed and controls CCW flow to the RHR heat exchanger. If valve EGHV0102 spuriously opens sufficient flow may not be available to the PFSSD loads (CCP oil cooler and seal water heat exchanger). Per drawings M-11EG01 and M-11EG02 the total CCW flow with valve EGHV0102 open is approximately 14,000 gpm. Each CCW pump is rated at 11,025 gpm at 195 feet of head. Per drawing M-082-029, the discharge head at 14,000 gpm is 155 feet and the required net positive suction head (NPSH) is 31 feet. Minimum available NPSH for normal shutdown occurs at 4 hours per Calculation M-EG-05 and is equal to 37.5 feet. Therefore, with 14,000 gpm flowing, sufficient NPSH is available and there is reasonable assurance that the Train B CCP oil cooler and seal water heat exchanger will receive sufficient flow. However, as a precaution, EGHV0102 is closed in OFN RP-017 to prevent flow diversion during long term hot standby. This action should be completed within 28 minutes and prior to starting the B Train CCP to support CCP functionality.

A potential concern with inventory control is that a control room fire could cause the number 1 seal return valves (BBHV8141A, B, C and D) to close, which could cause excessive RCS leakage. OFN RP-017 isolates RCP seal cooling, contributing to this event. OFN RP-017 also trips the RCPs, which minimizes the impact of this event.

A white paper prepared by Westinghouse and distributed as letter number LTR-RAM-I-10-053 (Reference 4.3.4) summarizes RCP seal behavior for fire scenarios. This white paper is a compilation of several WCAPs and Technical Bulletins on the subject.

Table 1 in the letter is a scenario matrix that identifies the number 1 and number 2 RCP seal behavior and resultant leakage given RCPs running or not running and seal cooling available or not available. For the scenario postulated here (Number 1 seal return line isolated, RCPs not running and no seal cooling), the resultant leakage is 21 gpm per seal or 84 gpm total. This leakage is well within the makeup capability of the charging pump, which has a design flow rate of 150 gpm at 2800 psi and a runout flow of 550 gpm at 606 psi. Therefore, this condition does not pose a concern for PFSSD at Wolf Creek.

Wolf Creek has replaced the number one seal insert with the Westinghouse SHIELD® Passive Thermal Shutdown Seal (SDS) on all four reactor coolant pumps (RCPs). The SDS is designed to restrict reactor coolant system (RCS) leakage for plant events that result in a loss of all seal cooling (Reference 4.3.5). No credit is taken in the Wolf Creek post-fire safe shutdown analyses for the reduced leakage rates from the new seal following a loss of all seal cooling. The Wolf Creek analyses use the leakage rates from the previous seal design, which are conservative compared to the new seal design.

6.3 Decay Heat Removal

Hot standby decay heat removal is achieved using Train B motor driven auxiliary feedwater pump (MDAFP), taking suction from the condensate storage tank (CST), to supply feedwater to steam generator D and the turbine driven auxiliary feedwater pump (TDAFP), taking suction from the condensate storage tank (CST), to supply feedwater to steam generator B.

Calculation SA-08-006 assumes the Train B MDAFP is lined up and supplying steam generator D within 15 minutes and the TDAFP is lined up and supplying steam generator B within 35 minutes. Steam generators B and D atmospheric relief valves are used to control reactor coolant system (RCS) temperature. When the Train B MDAFP is started in 15 minutes, valve ALV0032 may still be open. Therefore, approximately 250 gpm will flow from the B MDAFP to the A SG due to failed open valve ALHV0007 until valve ALV0032 is manually closed in Step E6 in 35 minutes. Therefore, the B MDAFP could be injecting into the A SG for 20 minutes. SA-08-006, Rev. 3 (Scenario 1A) shows that the A SG reaches 100% WR indication in about 1800 seconds (30 minutes), which occurs prior to closing valve ALV0032. This has no adverse impact since the A SG is not used as a heat sink in OFN RP-017 and steam for the TDAFP turbine is not supplied by the A SG. The MSIVs are closed in 3 minutes, which is prior to the A SG reaching 100% WR, so water will not enter the TDAFP turbine. Steam generators A and C atmospheric relief valves are isolated. See Section 6.1 for discussion about steam generator ARVs.

The reactor is tripped at t = 0s when operators actuate the reactor trip push buttons prior to evacuating the control room. The reactor trip causes a low T_{avg} signal within 5 seconds and initiates a feedwater isolation signal, which stops main feedwater flow and prevents steam generator overfill from main feedwater.

To prevent steam generator overfill in cases where the fire causes a spurious auxiliary feedwater actuation signal (AFAS), the Train A MDAFP is stopped by operator action within 15 minutes. The TDAFP is taken to minimum output within 15 minutes and remains there until valves in the AFW discharge line are closed, which takes 35 minutes. At that point, the TDAFP is started to supply SG B.

Main steam isolation valves are required to be closed for decay heat removal to control cooldown. See Section 6.1 for discussion about MSIVs.

Calculation SA-08-006 assumes the steam generator blowdown valves remain closed in all scenarios. The calculation focused on steam generator overfill as a bounding worse-case scenario because an overfilled steam generator could affect operation of the turbine driven auxiliary feedwater pump, which is required to be functional in the event of a control room fire. Open blowdown valves help the SG overfill cases, which would cause the results to be non-conservative. Therefore, modeling of spurious open SG blowdown was not performed in the current revision of SA-08-006. Failed open blowdown valves are modeled in Calculation WCNOC-CP-002 where it was determined that the blowdown valves can fail open for at least 5.5 hours (the modeled duration) with no adverse impact on PFSSD.

Cold shutdown decay heat removal is not included in OFN RP-017.

6.4 Process Monitoring

Process monitoring ensures RCS variables are within specified limits. The ASP contains all the required process monitoring instruments to verify reactivity conditions, pressurizer level, pressurizer pressure, RCS temperature and steam generator level. Source range indicator SENI0061X indicates reactivity level. Pressurizer level is verified using BBLI0460B. Pressurizer pressure is verified using reactor vessel pressure instrument BBPI0406X. RCS temperature is verified using RCS loop 2 cold leg temperature indicator BBTI0423X and loop 4 hot leg temperature indicator BBTI0443A. Steam generator level is verified using steam generators B and D narrow range level indicators AELI0502A and AELI0504A, respectively. These process monitors are unaffected by a fire in the control room.

6.5 Support

The post fire safe shutdown support function provides the necessary cooling, ventilation and electrical power required by the reactivity control, reactor makeup, decay heat removal and process monitoring functions. The support function supports all the other post fire safe shutdown functions and includes component cooling water (CCW), essential service water (ESW), room cooling and ventilation, control room isolation and electrical power distribution.

Component cooling water is required for OFN RP-017 to supply cooling to the Train B charging pump oil cooler and the seal water heat exchanger. Both of these components support centrifugal charging pump (CCP) operability. Therefore, CCW is required to be operable prior to the need for charging. Based on Calculation SA-08-006, charging needs to be lined up and injecting within 28 minutes.

Essential service water is required to provide cooling to the CCW heat exchanger, emergency diesel engine coolers and various room coolers. In addition, ESW is a backup source of auxiliary feedwater. One potential concern with ESW is that in extreme cold weather the ESW trash racks and intake screens could freeze, preventing proper flow of ESW to essential equipment. Warming lines have been installed to prevent freezing, and are placed in service during winter lineup per SYS EF-205. Procedure SYS EF-205 requires the warming lines to be placed in service when lake temperature is 40°F. OFN RP-017 does not have any actions to operate the warming lines or verify operation of the lines. This is acceptable because the warming line valves are manually operated and are not subject to spurious operation. If the fire occurs in these extreme cold temperatures, winter lineup of the warming lines would have already taken place prior to the fire. Therefore, no operator actions would be required as a part of OFN RP-017 to line up or verify lineup of the warming lines.

Emergency diesel engine cooling is required to maintain the engine jacket water temperature below the trip setpoint of 195°F. The engine is started in Step C6 when the offsite power feeder breakers are opened, which provides an automatic start signal to the engine. Step C8.d closes the Train B emergency diesel generator (EDG) output breaker and step C9 starts the ESW pump. The combined generator loading of the non-shed loads and the ESW pump is 3,615.9 kW per calculation KJ-M-017, which is 58.3% of the EDG rating of 6,201 kW. Check valve EFV0471 will prevent flow diversion to the service water system, so as soon as the ESW pump is started in Step C9, EDG cooling will be provided.

Table 1 in Calculation KJ-M-017 identifies the allowable time to establish EDG cooling given various values of unloaded times from 1 minute to 5 minutes in 30 second increments. The table shows that, as the time to complete steps C6 through C8.d increases, the time to complete Step C9 decreases. For example, if step C8.d is completed in 2.5 minutes after step C6, operators have 3.49 minutes to complete Step C9 and start the ESW pump. However, if the operator takes 3.5 minutes to complete Step C8.d after Step C6 is completed, then they only have 3.17 minutes to complete Step C9 and start the ESW pump. Table 1 from Calculation KJ-M-017 follows.

Time Unloaded (Minutes)	Allowable Time Loaded (Minutes)
1	3.96
1.5	3.80
2	3.65
2.5	3.49
3	3.33
3.5	3.17
4	3.01
4.5	2.85
5	2.69

Room coolers and ventilation fans are used to maintain a suitable environment for the equipment within the room to ensure long term operation of the equipment. Room coolers credited in the event of a control room fire are as follows:

1. Train B Class 1E Electrical Equipment Room A/C Unit (SGK05B)
2. Train B Electrical Penetration Room Cooler (SGL15B)
3. Train B Component Cooling Water Pump Room Cooler (SGL11B)
4. Train B Auxiliary Feedwater Pump Room Cooler (SGF02B)
5. Train B Centrifugal Charging Pump Room Cooler (SGL12B)
6. Train B Containment Coolers (SGN01B and SGN01D)
7. Train B ESW Pump Room Supply Fan (CGD01B) and Dampers (GDTZ11A and GDTZ11C)

Procedure SYS GK-200 provides instructions to compensate for loss of a Class 1E Electrical Equipment A/C Unit (SGK05A or SGK05B) and temporarily maintain the operability of equipment in the Class 1E Electrical Component Rooms on the 2000' and 2016' elevations of the Control Building. The procedure requires that within 1 hour several doors on the 2000 and 2016 elevation of the Control Building are open and fans are placed in service on the 2000 elevation. Fans on the 2016 elevation must be put in service within 3 hours. These times are based on Calculation GK-06-W in order to maintain both trains functional. OFN RP-017 does not attempt to maintain Train A functional. The doors between rooms will be maintained closed to provide maximum cooling to the Train B equipment. Since Calculation GK-06-W shows 60 minutes is acceptable to initiate compensatory measures for loss of one train of Class 1E electrical equipment room cooling, there is reasonable assurance that restoration of SGK05B in 60 minutes in the event of a control room fire will maintain the Train B electrical equipment functional.

The timing basis for establishing electrical penetration room cooling is documented in CR 012638. Based on the evaluation in this CR, 1 hour is reasonable for the maximum time to restore cooling to the electrical penetration rooms. This time is based on the Wolf Creek Technical Requirements Manual (TRM), TR

3.7.22-1 which states that operators have 8 hours to restore room temperatures to within allowable limits given in Table TR 3.7.22-1. (Note that the TRM revision in effect when the CR was evaluated (Revision 35) required equipment to be declared inoperable if temperatures were not restored within 4 hours. The current revision of the TRM (55) does not require equipment to be declared inoperable). For conservatism, 1-hour is used as the timing basis in E-1F9915. The allowable temperature limit for the electrical penetration rooms is 101 degrees F per Table TR 3.7.22-1. Based on operator timing, the electrical penetration room cooler is started within 13 minutes. Therefore, the time to restore electrical penetration room cooling is well within the 1-hour limit established in E-1F9915.

The pump room coolers (SGL11B, SGF02B and SGL12B) automatically start when the pump starts. Procedure OFN RP-017 lines up power and ESW flow to the pump room coolers prior to starting the pumps. Therefore, pump room cooling will be provided as soon as each pump starts.

The containment coolers maintain containment temperature within acceptable limits but are not directly required for safe shutdown after a fire in the control room. There are no post-fire safe shutdown components in containment that will adversely impact the ability to achieve safe shutdown if the coolers are not started. Therefore, the timing for this step is not critical and, therefore, no time limit has been established.

The timing basis for establishing ESW pump room ventilation is documented in CR 012638. Based on the evaluation in CR 012638, 1 hour should be used as the maximum time to restore cooling to the ESW pump room. This time is based on the Wolf Creek Technical Requirements Manual (TRM), TR 3.7.22-1 which states that operators have 8 hours to restore room temperatures to within allowable limits given in Table TR 3.7.22-1. (Note that the TRM revision in effect when the CR was evaluated (Revision 35) required equipment to be declared inoperable if temperatures were not restored within 4 hours. The current revision of the TRM (55) does not require equipment to be declared inoperable). For conservatism, 1-hour is used as the timing basis in E-1F9915. The allowable temperature limit for the ESW pump rooms is 119 degrees F per Table TR 3.7.22-1. Based on operator timing, the ESW pump room supply fan is started approximately 12 to 15 minutes after the ESW pump is started. DCP 13800 moved the Train B ESW pump room temperature controls from the control room (RP053B) to the Train B ESF switchgear room (RP147B). This ensures proper temperature control within the room by allowing the supply and recirculation dampers to modulate based on room temperature. A control room fire will not affect the operation of these dampers.

7.0 Section-by-Section Review

7.1 OFN RP-017, Section 1.0 - Purpose

7.1.1 OFN RP-017, Section 1.1

1.1 To provide operator actions for evacuating the Control Room due to fire, establishing plant control from the Auxiliary Shutdown Panel (ASP), and reactor shutdown to Hot Standby conditions.

Basis – 10 CFR 50, Appendix R, Section III.L.3 requires procedures to be in effect to implement the alternative and dedicated shutdown capability for any fire area utilizing the provisions in Appendix R, Section III.G.3. Wolf Creek took no exception to this requirement in the Appendix R comparison documented in the USAR, Table 9.5E. Letter SLNRC 84-0109 (August 23, 1984), Section 2.0 Response Plan Summary states, in part, “Procedures will be developed to implement this plan at Callaway and Wolf Creek.” The Wolf Creek SER, Supplement 5, Page 9-12 states, in part, “(1) The applicant will revise the procedures for a fire in the control room in accordance with the SNUPPS letter of August 23, 1984 …”. Subsequently, License Amendment 214 approved superseding letter SLNRC 84-0109 with document E-1F9915 as the basis for alternative shutdown in the event of a fire in the control room. Therefore, Wolf Creek is committed to maintain in effect procedure OFN RP-017 to achieve hot standby conditions. Cold shutdown is achieved from outside the control room using OFN RP-017A.

7.1.2 OFN RP-017, Section 1.2

1.2 This procedure should only be used when the Control Room is uninhabitable and damage to controls or Control Room equipment has occurred or is imminent.

Basis - This statement emphasizes that control room evacuation should only take place when control from the control room is lost or will be lost. Shutting down from outside the control room is not desired and evacuation should only be done when the plant cannot be controlled from inside the control room.

7.1.3 OFN RP-017, Section 1.3

1.3 Since the Control Room is uninhabitable, this procedure includes actions to:

- *Prevent subsequent fire/physical damage to Control Room circuits from adversely affecting systems needed to maintain Hot Standby*
- *Transfer critical Train B controls to the ASP*
- *Maintain the plant in Hot Standby from the ASP*

Basis - This step identifies the objectives for OFN RP-017. It clearly states that the procedure is only intended to maintain hot standby from outside the control room using Train B components. Cold shutdown is achieved using procedure OFN RP-017A.

7.2 OFN RP-017, Section 2.0 - Symptoms or Entry Conditions

Section 2.0 provides conditions in which operators may deem entering OFN RP-017 to be necessary. These entry conditions are not licensing commitments but rather guidance for operators to use when determining the need to enter OFN RP-017. The decision is a judgment call made by operating staff with the final decision made by the Shift Manager. Step 1 in the procedure provides additional conditions to be considered prior to evacuating the control room. There are no NRC criteria for establishing the point at which operators evacuate the control room. Therefore, there is no licensing basis for when control room evacuation takes place.

7.3 OFN RP-017, Section 3.0 - References and Commitments

7.3.1 OFN RP-017, Section 3.1 - References

a. Nuclear Safety Engineering Surveillance Report No. 1991-005

Basis - This surveillance report, designated SSR 91-005, was performed by Wolf Creek Nuclear Safety department and was issued on 4/26/1991. The purpose of the surveillance was to determine the adequacy of 10CFR50.59 screenings on Operations procedures. OFN 00-017, Control Room Evacuation, Revision 13 was chosen for review. The review concluded that the 50.59 screenings were appropriate but made 12 recommendations for improvement of the procedure. Most of the recommendations were incorporated into revision 14 of OFN 00-017 and some were not with justification. The changes made to OFN 00-017 as a result of this surveillance that are still in effect today in OFN RP-017 are listed below:

1. NK4101 is no longer opened to remove control power from Train A bus NB01 breakers. The observer stated that by opening the switch, the Train A AFW pump would not be able to be controlled from the ASP. Operations removed the step due to there being no requirement to open the switch. Train A equipment is not required for OFN RP-017. However, it may be practical to open NK4101 to support Step C15 (Stopping the Train A Containment Spray Pump).

2. Fuse #46 in panel RP209 is pulled to fail close the MSIV bypass valves. The observer noted that opening the breaker would remove power from other equipment and felt that this is not a good idea. He also noted that Callaway pulls fuses to close the MSIV bypass valves. Step B12 pulls fuse #46 in RP209.
3. NK4411 is used to isolate steam generator blowdown. This differs from SLNRC 84-0109, which says to use the switches in the Radwaste Control Room. Use of NK4411 will achieve the desired result faster than sending an operator to the Radwaste Control Room. See Step C27.
4. As a result of recommendation 12, an attachment was added to give operators instruction to protect Train A equipment after all other critical steps are completed. Attachment F provides guidance based on this recommendation.

b. USAR 7.4.6, Safe Shutdown From Outside The Control Room

Basis – USAR Section 7.4.6 describes the capability of Wolf Creek to shutdown from outside the control room using the Auxiliary Shutdown Panel (ASP), switchgear and motor control centers. The mitigating actions for a fire in the control room use Train B ASP and equipment. Train B was selected because instrumentation and controls for the turbine driven auxiliary feedwater pump are located on the Train B ASP.

c. USAR Appendix 9.5B, Fire Hazards Analyses

Basis – The Fire Hazards Analysis is now located in document E-1F9905, which is incorporated into the USAR, Appendix 9.5B by reference.

d. PIR 1997-2819, EDG Master Transfer Switch In Auto With Fire In The Control Room

Basis – PIR 1997-2819 identified a concern where OFN RP-017 did not previously require placing master transfer Switch KJHS0109 in Local/Manual position. The initiator stated that if the switch were left in Auto position, a control room fire could affect the circuits and shut down the diesel generator. After review of the circuits, OFN RP-017 was revised to require operators to place KJHS0109 in Local/Manual. Step C.8.a proceduralizes this action. Also see PIR 2006-000860 discussion below.

e. PIR 1997-2453, Enter OFN RP-013 At 2 mR/hr Submersion Dose Rate

Basis – PIR 1997-2453 identified a concern where OFN RP-017 previously required evacuation of the control room if radiation reached certain levels. As a result, OFN RP-017 was revised to allow Health Physics and Shift Supervisor discretion on whether to evacuate. PIR 1997-3376 was also written to evaluate the need to evacuate the control room at all for radiation levels. OFN RP-017 was revised to remove the specific radiation levels and allow the Shift Supervisor to enter OFN RP-013 at his discretion.

f. OP 1988-0190, Replacing BG HV-8105 with local valves within the NCP room

Basis – This is an inter-office correspondence that requested a procedure change to OFN 00-017 (now OFN RP-017) to reduce the time to complete certain actions. The procedure required an operator to first open BGFCV0121 locally in the positive displacement pump (PDP) room (now the normal charging pump (NCP) room) on the 1974 elevation then the same operator had to ascend to the north pipe penetration room on the 2000 elevation to locally close BGHV8105. The memo requested that instead of closing BGHV8105, valves BG8402B and BGV0017 be manually closed or verified closed. These valves are located in the NCP room along with BGFCV0121. The change was made as requested and OFN RP-017 uses BG8402B and BGV0017.

g. PIR 1999-109, Removing control power prior to rotating ESF bus #2 isolate switch

Basis – This PIR identified 3 issues where OFN RP-017, Revision 11 was not consistent with the original response strategy for control room fires documented in SLNRC 84-0109 (Superseded by E-1F9915). These issues are discussed below:

Issue 1 – Note 10 in SLNRC 84-0109 states that FCHV0312 and ABHV0005 will not be opened until it is verified that ALHV0036 is open. There are two loop steam supply valves to the turbine driven auxiliary feedwater pump (TDAFP) (ABHV0005 (loop 2) and ABHV0006 (loop 3)). SLNRC 84-0109 only credited ABHV0005 to provide a steam supply to the TDAFP. OFN RP-017, Rev. 11 Step A9 required the operator at the ASP to open steam supply valve ABHV0006 using ABHIS0006B prior to verifying that suction valve ALHV0036 is open. However, OFN RP-017, Rev. 11 Steps A6 and A8 had the same operator at the ASP close the turbine trip and throttle valve (FCHV0312) using FCHIS0312B and the turbine governor valve (FCHV0313) using FCHS0313 and FCHIK0313. Step A7 required the operator at the ASP to isolate ABHV0005 using ABHIS0005B. The requirement in SLNRC 84-0109 has been met in that FCHV0312 and ABHV0005 are maintained closed until ALHV0036 is opened. However, ABHV0006 was added to the procedure at some later time. Since FCHV0312 is maintained closed, the TDAFP will not operate even with ABHV0006 open.

Issue 2 – This issue involves performing steps in the procedure in a different sequence than what was approved in SLNRC 84-0109. Note 2 in SLNRC 84-0109 states that DC power should be tripped after Action 9 [assure MCC and load center breakers are closed] in room 3302 so that breakers can be electrically tripped by hand to the desired position. OFN RP-017, Rev 11 had operators' open the control power breakers to the NB02 bus and then rotate switch NBHS0014 to the isolate position. By opening the control power breaker before rotating NBHS0014, relay 195 will not energize and the control room will not be isolated.

Revision 18 of OFN RP-017 deleted NBHS0014 from the procedure. The hand switch would not have completely isolated the control room from the control circuit on the affected components. Also, a control room fire could have opened the control power fuse due to a hot short, thereby isolating control power prior to operation of the hand switch.

The current revision of OFN RP-017 requires operators to remove control power from the NB02 bus and not use NBHS0014. Isolating control power will prevent spurious operation of any of the breakers associated with NB02. The possibility still exists for the NB02 breakers to close prior to isolating control power. Therefore, to ensure the NB02 bus loads are shed, each pump breaker, except for the ESW pump, is verified open prior to opening the NB02 feeder breakers to simulate a LOSP and start EDG-B. Verifying each of these breakers is open also ensures the diesel will not fail to start due to overload.

On the basis of the above discussion, the concern raised in Issue 2 of this PIR is no longer valid. The use of NBHS0014 would never have fully isolated the control room and, therefore, its use was never required. Isolation of control power to NB02 ensures spurious operation of the breakers will not occur. All revisions of OFN RP-017 (OFN 00-017) required isolation of control power to NB02 in Phase A. The intent of SLNRC 84-0109 is met since isolation of control power effectively prevents spurious operation due to cable failures in the control room.

Issue 3 – The third issue involves the closure of the MSIVs using a portable air supply versus an electrical source, as delineated in SLNRC 84-0109. The MSIVs are closed prior to leaving the control room using ABHS0079 or ABHS0080. However, their closure cannot be guaranteed due to possible fire damage. Therefore, OFN RP-017 has steps to close the valves if they failed to close in response to the fast close signal.

SLNRC 84-0109, Note 6 states that the MSIVs will be closed with a portable 125 VDC source. Wires to the valves will then be cut to leave the valves in the closed position. Prior to revision 27, OFN RP-017 used a portable air source to close the MSIVs. This change was made in MA 93-0181 with insufficient documentation for the change. The PIR evaluation provides adequate justification for the change and RCMS 1985-118 documents the change in commitment. Since the use of air versus power to close the MSIVs is a more reliable and safe method, it met the intent of SLNRC 84-0109 and was therefore acceptable.

The MSIVs were replaced in refuel outage 16 (DCPs 09952 and 11608) with solenoid actuated system medium operated valves. These valves do not require an accumulator or external air supply so the portable air source and associated air hoses and fittings are not required. The new MSIVs are held open by six normally energized solenoid valves, three associated with Train A and three associated with Train B. Either train of solenoid valves can operate the associated valve, independent of the opposite train solenoids which provides for diversity and electrical independence. De-energizing either train of solenoids will cause the MSIVs to close. Step C2 has an operator open switch NK5119 to de-energize SA075A and fail the MSIVs closed. Furthermore, Amphenol connectors, 3 per MSIV per train, have been provided near each MSIV to provide a way for operators to disconnect power to the solenoids and close the MSIVs. These methods for closing the MSIVs are utilized in the current version of OFN RP-017.

h. *PIR 1999-107, Concerns with meeting required time frame*

Basis – This PIR was written to document whether changes made in revision 12 of OFN RP-017 meet the commitments made in SLNRC 84-0109. The PIR concluded that commitments were met and no changes were required.

i. *PIR 1999-3648 Procedure not matching plant labels*

Basis – This PIR addressed labeling inconsistencies between OFN RP-017 and the plant labels. The procedure was revised to match plant labeling.

j. *PIR 2002-1956, Failure to properly track and implement actions specified within Regulatory Correspondence SLNRC 84-0109 as referenced in USAR Appendix 9.5B.*

Basis – This PIR identifies concerns with OFN RP-017, Rev. 16 not meeting commitments in SLNRC 84-0109. The evaluation shows a step-by-step comparison of OFN RP-017, Rev. 16 with SLNRC 84-0109 and provides justification for any deviations. The PIR evaluation found that the deviations would not have prevented the safe shutdown of the plant. The deviations were historical with no documented evaluation in some cases. In many cases, the deviations were a result of alternative methods to produce the desired result. The alternative methods were determined to be faster and/or safer than that specified by SLNRC 84-0109. Note that the contents of USAR Appendix 9.5B are now contained in E-1F9905.

k. *PIR 2003-3479, Revisions to procedures need fire protection review*

Basis – This PIR identified problems associated with emergency lighting for equipment required to implement OFN RP-017. Changes have been made to the procedure over the years with no consideration given to emergency lighting requirements. As components were added or deleted from the procedure, consideration was not always given to emergency lighting requirements. As a result of the PIR, a number of emergency lighting changes were made to ensure each OFN RP-017 action has sufficient lighting in accordance with Wolf Creek commitments.

l. *Westinghouse Tech Bulletin TB-04-22, Reactor Coolant Pump Seal Performance - App R Compliance and Loss of All Seal Cooling and WCAP 10541, Reactor Coolant Pump Seal Performance Following A Loss of All AC Power, NRC IN 2005-14, FP Findings on Loss of Seal Cooling to Westinghouse RCPs.*

Basis – These documents describe industry positions on reactor coolant pump seal cooling. Because of the uncertainty of where the NRC may go in the future with RCP seal cooling issues, Wolf Creek decided to deviate from SLNRC 84-0109 and not restore seal cooling in response to a control room fire. Rather, Wolf Creek will use a natural circulation cooldown and provide RCS makeup and boration through the Boron Injection Tank (BIT) flow path, rather than the seal injection flow path. Revision 22 of OFN RP-017 made this change. The use of natural circulation to cooldown will not adversely impact the ability to achieve and maintain safe shutdown.

m/n. *PIR 2005-3314 (later converted to PIR 2007-003037 in PILOT), Failure to Address NRC Information Notice 92-18.*

Basis - This PIR was written to address URI 2005008-06, which was given to Wolf Creek during the Fall, 2005, NRC Triennial Fire Protection Inspection. Wolf Creek has responded to this issue by modifying the control circuit on 36 motor operated valves so a hot short from a fire in the control room will not bypass the valve protective features and prevent operation of the valve.

NRC IN 92-18 identified a concern where a control room fire could cause the spurious operation of motor operated valves due to hot shorts that bypass the valve protective features. The hot short, if sustained, could cause valve damage in a manner that prevents the valve from being manually operated to its desired position. Therefore, the ability to achieve safe shutdown after a control room fire could be compromised.

Wolf Creek initially responded to the IN by crediting the modifications that were done prior to startup in which the NRC required the installation of a number of isolation switches. However, these modifications did not address the concerns raised in IN 92-18. In April 1999 the NRC conducted an inspection at Callaway and questioned their response to IN 92-18, which was the same response given by Wolf Creek. As a result, Wolf Creek initiated PIR 1999-1245 to take another look at the issue. The PIR was closed in March 2001 with no actions taken due to the ongoing industry discussions with the NRC on the issue of hot shorts, as well as a moratorium placed on circuit inspections by the NRC. The PIR closure statement said that a new PIR will be generated when the industry initiative to address the issue is completed.

The NEI and EPRI conducted testing in 2001 to gain a better understanding of the issue of hot shorts causing spurious actuations. The testing found that under certain fire conditions, spurious actuations could occur due to hot shorts. In January 2005 the NRC resumed inspections of fire-induced safe shutdown circuits. However, the IN 92-18 issue remained unresolved at Wolf Creek and, until PIR 2005-3314 was written, a new PIR was not written as stated in PIR 1999-1245.

o. *PIR 2007-003003, Potential Loss of Field Flashing on Train B Emergency Diesel Generator*

Basis - This PIR (originally PIR 2005-3333) was written to identify a condition where field flashing could be lost on the Train B EDG due to a fire in the control room. Since Train B is the protected train in the event of a control room fire, this could have an adverse impact on the ability to achieve safe shutdown. Change Package 12097 was prepared and implemented to modify the control circuit and add control room isolation switch (KJHS0110) and redundant fuses on the circuit to ensure the availability of field flashing.

p. *PIR 2006-000860, Potential Loss of Train B Emergency Diesel Generator during Control Room Fire*

Basis - This PIR was written after it was discovered that a control room fire could cause a hot short in the EDG shutdown circuit that could stop the EDG during the event. Since Train B is the protected train in the event of a control room fire, this could have an adverse impact on the ability to achieve safe shutdown. The control room portion of the circuit was only partially isolated by hand switch KJHS0109, which left it vulnerable to a control room fire. Change Package 12097 was prepared and implemented to modify the circuit to provide full isolation from the control room.

q. *PIR 1998-3012, VCT Outlet Valve Did Not Have Redundant Control Power Fusing. LER 98-004-00, Verifying BG LCV 112C Closed*

Basis – This PIR identifies a concern where OFN RP-017 directed operators to close BGLCV0112C using local hand switch BGHS0112C. However, because the control power circuitry does not contain redundant fusing, control power could be lost, resulting in failure of the valve to close.

Prior to revision 27, OFN RP-017 had operators try the hand switch then open the breaker once sufficient time has passed for the valve to close. Another operator then followed up and verified the valve was closed and manually closed it if it was not closed.

DCP 12131 was implemented to add a redundant fuse to the circuit so that operation of BGHS0112C will close the valve. Therefore, the actions to open the breaker and manually close the valve have been removed from OFN RP-017.

r. *E-1F9915, Design Basis Document for OFN RP-017, Control Room Evacuation*

This document describes the basis for OFN RP-017.

s. *Engineering Disposition, PFSSD Issue With Voltage Regulator (CR 00023410)*

Basis – This CR identifies a concern where a fire in the control room could have affected the Train B EDG voltage regulator and could have energized the unit parallel relay, placing the EDG in droop mode of operation. The control circuitry was found to not have sufficient isolation capability to ensure the Train B EDG will be available in the event of a control room fire. A temporary modification (TMO 10-004-NE) was implemented and OFN RP-017 was revised to address the issue. The temporary modification was changed to a permanent modification in DCP 13095.

The modification installed jumper in panel NE0106 to bypass the control room circuitry for the null meter and the Auto/Manual voltage regulator selector switch. This ensures a control room fire will not damage the voltage regulator.

The procedure change added Step C7 to remove the break glass cover from the emergency start pushbutton (KJ HS-101D) to energize the ESA and ESB relays to de-energize the UPR relay. This action will also energize relay 90 VEP which disables the control room auto/manual raise/lower voltage control switches and ensures a control room fire will not cause a hot short that sends a raise or lower signal to the voltage regulator.

t. *Calculation SA-08-006, Rev. 3, Retran 3D Post-Fire Safe Shutdown (PFSSD) Consequence Evaluation for a Postulated Control Room Fire.*

Basis – This calculation demonstrates the thermal-hydraulic performance of the plant during a postulated control room fire that causes spurious operation of equipment. The results of the calculation are used to determine the maximum allowed time to mitigate a spurious operation. These times are utilized throughout Table 7.1.

u. *DCP 13898, EFHV060 Isolation Switch*

Basis –This DCP modified the control circuit for valve EFHV0060 to address NRC Information Notice 92-18 and add an ISO/CLOSE switch to provide operators the ability to close the valve and prevent flow imbalance in the Train B ESW system.

v. *DCP 13513, EDG Train B Field Flashing Issue*

Basis –This DCP added several redundant fuses and isolation switch contacts in the Train B EDG control circuit to ensure operation of the EDG following a control room fire. The DCP also modified the NB0211 control circuit to ensure a fire in the control room will not spuriously close the output breaker out of synch or when the EDG is not operating.

w. *DCP 13800, Train B EDG and ESW Ventilation Issues due to Fire in the Control Room*

Basis –This DCP modified the control circuit for the Train B EDG and Train B ESW ventilation controls to ensure proper operation of these systems following a control room fire.

7.3.2 OFN RP-017, Section 3.2 - Commitments

a. *Letter SLNRC 84-0109 superseded by E-1F9915 as the licensing basis document for OFN RP-017 , Fire Protection Review RCMS #1985-118 [Entire Procedure]*

Basis – SLNRC 84-0109 provides the original licensing basis for response to a control room fire and shutdown from outside the control room. The letter assigned 6 phases to the time critical actions within the letter. Procedure OFN RP-017 no longer uses phases. The timing is now based on thermal hydraulic calculations, which provide more realistic time response criteria to the potential spurious operations that could occur in the event of a fire in the control room. Therefore, all mention of phases has been removed from the procedure. The new timing requirements are described in Table 7.1.

License Amendment 214 approved E-1F9915 as licensing basis document for alternative shutdown following a control room fire in lieu of letter SLNRC 84-0109.

b. *SLNRC 84-0109 change to commitment RCMS #1988-201*

Basis – See 3.1.f above.

c. *PIR 2005-3209, and LER 2005-006, Unanalyzed Condition Related To Loss Of RCP Seal Cooling During A Postulated Appendix R Fire Event. (Removes steps from procedure for RCP seal restoration)*

Basis – An Apparent Violation (AV) issued by the NRC during the 2005 Triennial Fire Protection Inspection identified a concern where Revision 21 of OFN RP-017 may not have been able to restore seal cooling prior to seal damage occurring. The current procedure does not restore seal cooling in response to a control room fire. Rather, the RCPs are stopped, the seal injection flow path is isolated, RCP thermal barrier is isolated from the CCW system, RCS makeup and boration is accomplished through the BIT flow path and natural circulation cooldown is used. The thermal hydraulic calculations show that stable hot standby conditions are achieved using OFN RP-017.

7.4 Step-by-Step Review

Table 7.1 provides a detailed evaluation for each Step in OFN RP-017 per the Methodology in Section 3.0.

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