G. Recovery Actions Transition

233 Pages Attached

In accordance with the guidance provided in NEI 04-02, FAQ 07-0030, Revision 5, and RG 1.205, the following methodology was used to determine recovery actions required for compliance (i.e., determining the population of post-transition recovery actions). The methodology consisted of the following steps:

- Step 1: Define the primary control station(s) and determine which pre-transition OMAs are taken at primary control station(s) (Activities that occur in the Main Control Room are not considered pre-transition OMAs). Activities that take place at primary control station(s) or in the Main Control Room are not recovery actions, by definition.
- Step 2: Determine the population of recovery actions that are required to resolve VFDRs (to meet the risk acceptance criteria or maintain a sufficient level of defense-in-depth).
- Step 3: Evaluate the additional risk presented by the use of recovery actions required to demonstrate the availability of a success path
- Step 4: Evaluate the feasibility of the recovery actions
- Step 5: Evaluate the reliability of the recovery actions

An overview of these steps and the results of their implementation are provided below.

Step 1 - Clearly define the primary control station(s) and determine which pre-transition OMAs are taken at primary control station(s)

The first task in the process of determining the post-transition population of recovery actions was to apply the NFPA 805 definition of recovery action and the RG 1.205 definition of primary control station to determine those activities that are taken at primary control station(s).

Results of Step 1:

Based on the definition provided in RG 1.205, and the additional guidance provided in FAQ 07-0030, the following locations outside the CNS main control rooms are considered PCS(s):

CNS utilizes the following PCS for alternate shutdown safe and stable operations:

- Actions inside the SSF.
- Actions in the plant to transfer control from the main control room to the SSF.
- Actions inside the plant to transfer power and control to the SSF.

Table G-1 - Recovery Actions and Activities Occurring at the Primary Control Station(s) identify the activities that occur at the primary control station(s). Activities necessary to enable the primary control station(s) are also identified in Table G-1 as primary control station(s) activities. These activities do not require the treatment of additional risk.

Step 2 – Determine the population of recovery actions that are required to resolve VFDRs (to meet the risk or defense-in-depth criteria)

On a fire area basis all VFDRs were identified in the NEI 04-02 Table B-3 (See Attachment C). Each VFDR not brought into compliance with the deterministic approach was evaluated using the performance-based approach of NFPA 805 Section

4.2.4. The performance-based evaluations resulted in the need for recovery actions to meet the risk acceptance criteria or maintain a sufficient level of defense-in-depth).

Results of Step 2:

The final set of recovery actions are provided in Table G-1 - Recovery Actions and Activities Occurring at the Primary Control Station(s).

There are three categories of actions in CNS post-fire procedures. The first two are recovery actions required for NFPA 805 compliance. The first category of recovery actions are actions required for risk. These are actions the Fire PRA credited to reduce the risk numbers. The second category of recovery actions are actions required for defense-in-depth. These actions are credited as a result of the DID evaluations performed as part of the Fire Risk Evaluations. These first two categories of recovery actions are evaluated for feasibility against the criteria in NFPA 805 Section B.5.2(e), NEI 04-02, and FAQ-07-0030. The third category, while associated with VFDRs, are additional actions that screened out due to no or very low risk. These actions are not considered recovery actions for NFPA 805; therefore, feasibility is not evaluated against the criteria in NFPA 805 Section B.5.2(e), NEI 04-02, and FAQ-07-0030.

Step 3: Evaluate the Additional Risk of the Use of Recovery Actions

NFPA 805 Section 4.2.3.1 does not allow recovery actions when using the deterministic approach to meet the nuclear safety performance criteria. However, the use of recovery actions is allowed by NFPA 805 using a risk informed, performance-based, approach, provided that the additional risk presented by the recovery actions is evaluated in accordance with NFPA 805 Section 4.2.4.

Results of Step 3:

The set of recovery actions that are necessary to demonstrate the availability of a success path for the nuclear safety performance criteria (See Table G-1) were evaluated for additional risk using the process described in NEI 04-02, FAQ 07-0030, Revision 5, and RG 1.205 and compared against the guidelines of RG 1.174 and RG 1.205. The additional risk is provided in Attachment W.

All of the recovery actions were reviewed for adverse impact and dispositioned in Calculation entitled "NFPA 805 FPRA Application Calculation". None of the recovery actions were found to have an adverse impact on the Fire PRA.

Step 4: Evaluate the Feasibility of Recovery Actions

Recovery actions were evaluated against the feasibility criteria provided in the NEI 04-02, FAQ 07-0030, Revision 5, and RG 1.205. Note that since actions taken at the primary control station are not recovery actions their feasibility is evaluated in accordance with procedures for validation of off normal procedures.

Results of Step 4:

The feasibility criteria in FAQ 07-0030 were assessed for the recovery actions listed in Table G-1. The results of the assessment are included in the calculation entitled, "NFPA 805 Transition Recovery Action Feasibility Review."

Implementation items resulting from the feasibility evaluation are included in Table S-3 of Attachment S. These items include:

- Corrective Action to add equipment tags to the petcocks for the CA valves. These equipment numbers will be added to Fire Procedure, AP/0/A/5500/045.
- Corrective Action to revise steps to Fire Procedure, AP/0/A/5500/045 to add valve numbers (or descriptive nomenclature) as applicable to the individual steps for throttling the CA valves (valve to isolate air, bleed air).
- Corrective Action to revise steps to Fire Procedure, AP/0/A/5500/045 to include requiring operators to obtain a climbing harness prior to throttling the CA valves locally.
- Corrective Action to add steps to Fire Procedure AP/0/A/5500/045 to trip the NC pumps locally (if unable to trip from the control room).
- Corrective Action to add performance of recovery action drills to Operator training.

See Implementation Item 16 in Table S-3 of Attachment S.

Step 5: Evaluate the Reliability of Recovery Actions

The evaluation of the reliability of recovery actions depends upon its characterization.

- The reliability of recovery actions that were modeled specifically in the Fire PRA were addressed using Fire PRA methods (i.e., HRA).
- The reliability of recovery actions not modeled specifically in the Fire PRA are bounded by the treatment of additional risk associated with the applicable VFDR. In calculating the additional risk of the VFDR, the compliant case recovers the fire-induced failure(s) as if the variant condition no longer exists. The resulting delta risk between the variant and compliant condition bounds any additional risk for the recovery action even if that recovery action were modeled.

Results of Step 5:

The reliability of the specific recovery actions added to the Fire PRA are addressed in the calculation entitled, “NFPA 805 Transition Recovery Action Feasibility Review.” For the bounding reliability treatment see results in Attachment W.

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
01(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
01(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
01(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; close valve per procedure OP/0/B/6100/013 .	None	PCS
01(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
01(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
01(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
01(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
01(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
01(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
01(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
01(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
01(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
01(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
01(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			procedure OP/0/B/6100/013.		
01(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
01(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
01(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
01(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
01(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
01(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
01(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
01(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
01(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
01(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
01(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
01(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
01(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
02(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
02(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
02(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
02(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
02(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
02(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
02(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
02(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
02(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
02(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
02(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	2-VFDR-02	PCS
02(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
02(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	2VFDR-03	PCS
02(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			procedure OP/0/B/6100/013.		
02(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	2VFDR-04	PCS
02(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	2VFDR-05	PCS
02(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
02(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
02(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	2VFDR-08	PCS
02(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	2VFDR-09	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
02(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	2VFDR-10	PCS
02(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
02(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	2VFDR-18	PCS
02(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	2VFDR-19	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
02(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	2VFDR-20	PCS
02(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
02(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
02(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
02(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
02(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
02(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
02(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
02(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
02(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
02(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
02(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
02(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
02(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
02(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
02(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2SA VA0005	2C S/G MAIN STEAM TO #2 CAPT	Start and stop CAPT #2 by depressing "ON" or "OFF" on the switch for 2SA-5 (S/G 2C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per procedure OP/0/B/6100/013.	2VFDR-21	PCS
02(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
02(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	2VFDR-23	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
02(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
02(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
03(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
03(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
03(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
03(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
03(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
03(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
03(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
03(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
03(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
03(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	3-VFDR-02	PCS
03(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
03(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	3-VFDR-03	PCS
03(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			procedure OP/0/B/6100/013.		
03(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	3-VFDR-04	PCS
03(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	3-VFDR-05	PCS
03(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
03(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
03(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	3-VFDR-07	PCS
03(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			OP/0/B/6100/013.		
03(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	3-VFDR-08	PCS
03(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	3-VFDR-09	PCS
03(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	3-VFDR-18	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
03(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	3-VFDR-19	PCS
03(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	3-VFDR-20	PCS
03(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
03(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
03(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; close valve per procedure OP/0/B/6100/013 .	None	PCS
03(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
03(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
03(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
03(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
03(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
03(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
03(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
03(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
03(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
03(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
03(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1SA VA0005	1C S/G MAIN STEAM SUPPLY TO CAPT	Start and stop CAPT #1 by depressing "ON" or "OFF" on the switch for 1SA-5 (S/G 1C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per	3-VFDR-37	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			procedure OP/0/B/6100/013.		
03(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
03(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	3-VFDR-38	PCS
03(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
03(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
04(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
04(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
04(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
04(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
04(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	4(U1)-VFDR-02	PCS
04(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	4(U1)-VFDR-03	PCS
04(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
04(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
04(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
04(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; close valve per procedure OP/0/B/6100/013 .	None	PCS
04(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
04(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
04(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
04(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1SA VA0005	1C S/G MAIN STEAM SUPPLY TO CAPT	Start and stop CAPT #1 by depressing "ON" or "OFF" on the switch for 1SA-5 (S/G 1C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
04(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
04(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	4(U1)-VFDR-31	PCS
04(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	4(U1)-VFDR-32	PCS
04(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
04(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
04(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
04(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
04(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
04(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	4(U2)-VFDR-02	PCS
04(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
04(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	4(U2)-VFDR-03	PCS
04(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
04(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
04(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
04(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
04(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
04(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
04(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
04(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
04(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	2SA VA0005	2C S/G MAIN STEAM TO #2 CAPT	Start and stop CAPT #2 by depressing "ON" or "OFF" on the switch for 2SA-5 (S/G 2C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
04(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
04(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
04(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	4(U2)-VFDR-40	PCS
04(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	4(U2)-VFDR-41	PCS
09(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
09(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
09(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
09(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
09(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
09(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
09(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
09(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
09(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
09(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
09(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
09(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
09(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; close valve per procedure OP/0/B/6100/013 .	None	PCS
09(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
09(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
09(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
09(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
09(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1SA VA0005	1C S/G MAIN STEAM SUPPLY TO CAPT	Start and stop CAPT #1 by depressing "ON" or "OFF" on the switch for 1SA-5 (S/G 1C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
09(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
09(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
09(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
09(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
09(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
09(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
09(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
09(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	9-VFDR-25	PCS
09(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
09(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	9-VFDR-27	PCS
09(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
09(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
09(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
09(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	9-VFDR-38	PCS
09(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	9-VFDR-39	PCS
09(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
09(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	9-VFDR-52	PCS
09(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	9-VFDR-54	PCS
09(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
09(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
09(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
09(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
09(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
09(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
09(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
09(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2SA VA0005	2C S/G MAIN STEAM TO #2 CAPT	Start and stop CAPT #2 by depressing "ON" or "OFF" on the switch for 2SA-5 (S/G 2C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
09(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
09(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
10(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
10(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
10(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
10(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
10(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	10-VFDR-01	PCS
10(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
10(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	10-VFDR-03	PCS
10(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
10(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
10(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	10-VFDR-08	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	10-VFDR-09	PCS
10(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	10-VFDR-18	PCS
10(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	10-VFDR-20	PCS
10(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
10(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
10(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
10(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
10(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
10(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1SA VA0005	1C S/G MAIN STEAM SUPPLY TO CAPT	Start and stop CAPT #1 by depressing "ON" or "OFF" on the switch for 1SA-5 (S/G 1C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
10(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			pump to the SSF.		
10(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
10(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
10(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
10(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
10(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
10(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
10(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
10(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
10(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
10(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	10-VFDR-36	PCS
10(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
10(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
10(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
10(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
10(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
10(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
10(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2SA VA0005	2C S/G MAIN STEAM TO #2 CAPT	Start and stop CAPT #2 by depressing "ON" or "OFF" on the switch for 2SA-5 (S/G 2C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			procedure OP/0/B/6100/013.		
10(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
10(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
10(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
11(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
11(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
11(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
11(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
11(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
11(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
11(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
11(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	11(U1)-VFDR-08	PCS
11(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
11(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
11(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
11(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
11(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
11(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
11(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
11(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
11(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
11(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
11(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
11(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
11(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
11(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
11(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
11(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	11(U2)-VFDR-09	PCS
11(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
11(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
11(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
11(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			OP/0/B/6100/013 .		
11(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
11(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
11(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
11(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
11(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
11(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
11(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per procedure OP/0/B/6100/013.		
11(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
11(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
11(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
11(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
16(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
16(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
16(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
16(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
16(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
16(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
16(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
16(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	16-VFDR-01	PCS
16(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
16(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
16(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
16(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
16(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1SA VA0005	1C S/G MAIN STEAM SUPPLY TO CAPT	Start and stop CAPT #1 by depressing "ON" or "OFF" on the switch for 1SA-5 (S/G 1C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
16(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
16(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
16(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
16(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
16(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
16(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
16(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
16(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
16(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	16-VFDR-07	PCS
16(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	16-VFDR-08	PCS
16(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	16-VFDR-09	PCS
16(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
16(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	16-VFDR-15	PCS
16(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	16-VFDR-16	PCS
16(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	16-VFDR-17	PCS
16(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	16-VFDR-18	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
16(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	16-VFDR-30	PCS
16(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	16-VFDR-32	PCS
16(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	16-VFDR-34	PCS
16(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
16(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
16(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
16(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
16(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
16(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
16(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
16(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
16(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
16(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
17(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
17(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
17(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
17(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
17(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	17-VFDR-02	PCS
17(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	17-VFDR-03	PCS
17(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	17-VFDR-04	PCS
17(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
17(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
17(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
17(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
17(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
17(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	17-VFDR-10	PCS
17(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	17-VFDR-11	PCS
17(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	17-VFDR-12	PCS
17(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	17-VFDR-13	PCS
17(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
17(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	17-VFDR-25	PCS
17(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	17-VFDR-27	PCS
17(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	17-VFDR-29	PCS
17(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
17(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
17(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
17(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
17(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
17(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
17(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
17(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
17(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
17(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
17(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
17(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
17(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			OP/0/B/6100/013.		
17(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
17(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
17(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
17(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
17(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
17(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
17(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
17(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
17(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
17(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
17(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
17(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
17(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
17(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
17(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
17(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
17(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2SA VA0005	2C S/G MAIN STEAM TO #2 CAPT	Start and stop CAPT #2 by depressing "ON" or "OFF" on the switch for 2SA-5 (S/G 2C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
17(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
17(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
17(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
18(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
18(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
18(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
18(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
18(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	18(U1)-VFDR-02	PCS
18(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
18(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
18(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
18(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	18(U1)-VFDR-08	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
18(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
18(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
18(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
18(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
18(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1SA VA0005	1C S/G MAIN STEAM SUPPLY TO CAPT	Start and stop CAPT #1 by depressing "ON" or "OFF" on the switch for 1SA-5 (S/G 1C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
18(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			pump to the SSF.		
18(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
18(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
18(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
18(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
18(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
18(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
18(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
18(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	18(U2)-VFDR-02	PCS
18(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
18(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
18(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	18(U2)-VFDR-08	PCS
18(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
18(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
18(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
18(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
18(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
18(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
18(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2SA VA0005	2C S/G MAIN STEAM TO #2 CAPT	Start and stop CAPT #2 by depressing "ON" or "OFF" on the switch for 2SA-5 (S/G 2C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			procedure OP/0/B/6100/013.		
18(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
18(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
18(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
18(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
21(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
21(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
21(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
21(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
21(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	21(U1)-VFDR-02	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	21(U1)-VFDR-03	PCS
21(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	21(U1)-VFDR-04	PCS
21(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
21(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
21(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	21(U1)-VFDR-10	PCS
21(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	21(U1)-VFDR-11	PCS
21(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	21(U1)-VFDR-12	PCS
21(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	21(U1)-VFDR-13	PCS
21(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	21(U1)-VFDR-23	PCS
21(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	21(U1)-VFDR-25	PCS
21(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	21(U1)-VFDR-27	PCS
21(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
21(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
21(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
21(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
21(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
21(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
21(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
21(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
21(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
21(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
21(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
21(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
21(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	21(U2)-VFDR-02	PCS
21(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	21(U2)-VFDR-03	PCS
21(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	21(U2)-VFDR-04	PCS
21(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
21(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	21(U2)-VFDR-10	PCS
21(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	21(U2)-VFDR-11	PCS
21(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	21(U2)-VFDR-12	PCS
21(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	21(U2)-VFDR-13	PCS
21(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
21(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
21(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	21(U2)-VFDR-23	PCS
21(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	21(U2)-VFDR-25	PCS
21(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	21(U2)-VFDR-27	PCS
21(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
21(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
21(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
21(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
21(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
21(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
21(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
21(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
22(U1)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
22(U1)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
22(U1)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
22(U1)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
22(U1)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U1)	1BB VA0008A	1D S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U1)	1BB VA0019A	1B S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U1)	1BB VA0056A	S/G 1A BLDWN CONT ISOL INSD	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U1)	1BB VA0060A	1C S/G BLOWDOWN INSIDE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U1)	1CA PUA	1A CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CA PUB	1B CA PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CA VA0036	CA PMP #1 FLOW TO S/G 1D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	22(U1)-VFDR-02	PCS
22(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	22(U1)-VFDR-03	PCS
22(U1)	1CA VA0064	CA PUMP #1 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CA VA0174	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U1)	1CA VA0175	RC TO CA SUCTION ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U1)	1CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U1)	1CA VA0185	1A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CA VA0186	1B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CA VA0187	1C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CA VA0188	1D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.		
22(U1)	1CF VA0087	1D S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CF VA0088	1C S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CF VA0089	1B S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1CF VA0090	1A S/G CF CONTAINMENT ISOL BYPASS CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U1)	1EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
22(U1)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
22(U1)	1ILE-PZRHTRA	PRESSURIZER HEATER GROUP 1A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1ILE-PZRHTRB	PRESSURIZER HEATER GROUP 1B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1ILE-PZRHTRC	PRESSURIZER HEATER GROUP 1C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1ILE-PZRHTRD	PRESSURIZER HEATER GROUP 1D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 1D (28, 55, and 56)	Operate SSS Pressurizer Heater Bank 1D per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U1)	1NC VA0032B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NC VA0034A	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NC VA0036B	UNIT 1 PZR PORV	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NC VA0250A	UNIT 1 REACTOR HEAD VENT BLOCK	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U1)	1NC VA0252B	UNIT 1 REACTOR HEAD VENT	Ensure the power disconnect breaker for 1NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NC VA0253A	RX HEAD VENT	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U1)	1ND VA0002A	ND PUMP 1A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
22(U1)	1ND VA0037A	ND PUMP 1B SUCT FRM LOOP C	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U1)	1NI VA0391	1A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NI VA0392	1B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NI VA0393	1C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NI VA0394	1D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NI VA0395	1A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NI VA0396	1B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NI VA0397	1C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U1)	1NI VA0398	1D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NM VA0003A	PZR LIQ SMPL LINE CONT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U1)	1NM VA0006A	PZR STEAM SAMPLE LINE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U1)	1NM VA0022A	1A HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U1)	1NM VA0025A	1C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U1)	1NV PUACC	1A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NV PUBCC	1B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NV PUSB	STANDBY MAKEUP PUMP	Start Unit 1 Standby Makeup pump per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NV VA0001A	NC LETDN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U1)	1NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
22(U1)	1NV VA0101A	NC PUMPS #1 SEAL BYP	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NV VA0122B	LOOP C TO EXS LETDN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NV VA0865A	STANDBY M/U PUMP SUCTION FROM XFR TUBE	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
22(U1)	1NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve open per procedure OP/0/B/6100/013 .	None	PCS
22(U1)	1NV VA0876	STANDBY MAKEUP TO CONT EQUIPMENT SUMP 1A	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1NV VA0877	STANDBY MAKEUP TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1SA VA0005	1C S/G MAIN STEAM SUPPLY TO CAPT	Start and stop CAPT #1 by depressing "ON" or "OFF" on the switch for 1SA-5 (S/G 1C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U1)	1SA VA0145	UNIT 1 CAPT STOP VALVE	Transfer 1EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #1 Trip and Throttle Valve to the SSF (SDSP1). Open breaker 1ELCP0250-F01B and close breaker 1ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1SM VA0001	1D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1SM VA0003	1C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1SM VA0005	1B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1SM VA0007	1A S/G MAIN STEAM ISOL VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1SV VA0001	S/G 1D PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1SV VA0007	S/G 1C PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
22(U1)	1SV VA0013	S/G 1B PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1SV VA0019	S/G 1A PORV MANUAL CTRL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1WL PUATS	TURBINE DRIVEN AUX FEEDWATER PUMP SUMP PUMP 1A	Transfer 1EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
22(U1)	1WL VA0847	FLOOR DRAIN SUMP D DISCH TO ND & NS SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
22(U1)	1WL VA0848	FLOOR DRAIN SUMP D DISCH TO TURBINE BLDG SUMP	Operate 1WL VA0847 and 1WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
22(U2)	0AD GE0001	STANDBY SHUTDOWN AUX GENERATOR	From SSS, start and load SSF Diesel Generator per procedure OP/0/B/6100/013.	None	PCS
22(U2)	0ETLMXSMXG	600 VAC SHARED MOTOR CONTROL CENTER	Trip and close breakers from the SSF console to transfer MCC from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
22(U2)	0ETMBCSDCS1	BATTERY CHARGER SDSC1	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U2)	0ETMBCSDCS2	BATTERY CHARGER SDSC2	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
22(U2)	0ETMBCSDCSS	BATTERY CHARGER SDSCS	Trip and close breakers from the SSF console to transfer battery charger from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
22(U2)	1ETLLXSLXG	600 VOLT SSF LOAD CENTER	Trip normal feed from 1ETA and close D/G breakers from the SSF console to transfer load center from normal to alternate power supply per OP/0/B/6100/013.	None	PCS
22(U2)	2BB VA0008A	S/G 2D BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U2)	2BB VA0019A	S/G 2B BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U2)	2BB VA0056A	S/G 2A BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U2)	2BB VA0060A	S/G 2C BLOWDOWN INSIDE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U2)	2CA PUA	2A AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CA PUB	2B AUX FEEDWATER PUMP	Pull all control power fuses and trip the CA Pumps per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U2)	2CA PUTD	TURBINE DRIVEN AUX FEEDWATER PUMP	Operate CAPT as required per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CA VA0036	CA PMP #2 FLOW TO S/G 2D	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	22(U2)-VFDR-02	PCS
22(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve open.	None	PCS
22(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	22(U2)-VFDR-03	PCS
22(U2)	2CA VA0064	CA PUMP #2 FLOW TO S/G 1A	Transfer the SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle to fail valve open per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CA VA0174	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U2)	2CA VA0175	RC TO CA SUCTION ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U2)	2CA VA0178	RC SUPPLY TO CA PUMPS ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U2)	2CA VA0185	2A S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CA VA0186	2B S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CA VA0187	2C S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CA VA0188	2D S/G CA NOZZLE TEMPERING ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CF VA0087	2D S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CF VA0088	2C S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2CF VA0089	2B S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U2)	2CF VA0090	2A S/G CF CONTAINMENT ISOL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2ENABXJNBX0008	THERMOCOUPLE REFERENCE JUNCTION BOX 2	Transfer the incore thermocouples indication to the SSF Control Console by disconnecting cable from ICS receptacle and connecting cable to SSF receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2ENCDTNSDT0013	NEUTRON FLUX DETECTOR ASSEMBLY TRAIN A	Transfer power to Train A Neutron Monitoring by disconnecting the power plug from "Normal 1E Operation" and connecting the power plug to "SSF NE Operation" per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2EPEMXEMXS	600 VAC ESSENTIAL MOTOR CONTROL CENTER	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control from the control room to the SSF.	None	PCS
22(U2)	2ILE-PZRHTRA	PRESSURIZER HEATER GROUP 2A	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2ILE-PZRHTRB	PRESSURIZER HEATER GROUP 2B	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2ILE-PZRHTRC	PRESSURIZER HEATER GROUP 2C	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2ILE-PZRHTRD	PRESSURIZER HEATER GROUP 2D	Ensure Pzr Heater Power Panel Feeder breaker is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U2)	2ILE-SSSPZRHTRD	SSS PRESSURIZER HEATER BANK 2D	Operate SSS Pressurizer Heater Bank 2D per procedure OP/0/B/6100-013.	None	PCS
22(U2)	2NC VA0027	PZR SPRAY CTRL FROM LOOP A	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NC VA0029	PZR SPRAY CTRL FROM LOOP B	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NC VA0032B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NC VA0034A	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NC VA0036B	PZR POWER OPERATED RELIEF VALVE	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NC VA0250A	REACTOR HEAD VENT BLOCK	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U2)	2NC VA0252B	REACTOR VESSEL HEAD VENT BLOCK	Ensure the power disconnect breaker for 2NC VA0252B is in the "OFF" position per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U2)	2NC VA0253A	REACTOR VESSEL HEAD VENT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U2)	2ND VA0002A	ND PUMP 2A SUCT FRM LOOP B	Transfer 1EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
22(U2)	2ND VA0037A	ND PUMP 2B SUCT FRM LOOP C	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
22(U2)	2NI VA0391	2A COLD LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NI VA0392	2B COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NI VA0393	2C COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NI VA0394	2D COLD LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NI VA0395	2A HOT LEG INJ CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U2)	2NI VA0396	2B HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NI VA0397	2C HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NI VA0398	2D HOT LEG INJECTION CHECK VALVE TEST ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NM VA0003A	PZR LIQUID SAMPLE LINE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U2)	2NM VA0006A	PZR STEAM SAMPLE LINE CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U2)	2NM VA0022A	HOT LEG A SMPL CONT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U2)	2NM VA0025A	2C HOT LEG SAMPLE CONTAINMENT ISOL	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to fail valve closed.	None	PCS
22(U2)	2NV PUACC	2A NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NV PUBCC	2B NV PUMP	Pull all control power fuses and trip the NV Pumps per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U2)	2NV PUSB	STANDBY MAKEUP PUMP	Start Unit 2 Standby Makeup pump per procedure OP/0/B/6100/013	None	PCS
22(U2)	2NV VA0001A	NC LETDOWN TO REGEN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NV VA0089A	NC PUMPS SEAL RETURN CONT ISOL	Transfer 2EMXS to alternate power to transfer control of valve to the SSF; ensure valve closed per procedure OP/0/B/6100/013 .	None	PCS
22(U2)	2NV VA0101A	NC PUMPS #1 SEAL BYPASS	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NV VA0122B	LOOP C TO EXCESS LETDOWN HX ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NV VA0865A	STDBY M/U PMP SUCT FRM XFR TUBE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U2)	2NV VA0872A	STDBY M/U PMP FILT OTLT	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF.	None	PCS
22(U2)	2NV VA0876	STANDBY M/U TO CONTAINMENT EQUIPMENT SUMP 2A ISOL	Ensure valve is closed per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2NV VA0877	STANDBY M/U TO NC PUMP SEAL INJECTION	Ensure valve is open per procedure OP/0/B/6100/013.	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
22(U2)	2SA VA0005	2C S/G MAIN STEAM TO #2 CAPT	Start and stop CAPT #2 by depressing "ON" or "OFF" on the switch for 2SA-5 (S/G 2C SM To CAPT) on the SSF Control Console panel per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2SA VA0145	CAPT #2 STOP VALVE	Transfer 2EMXS to alternate power per procedure OP/0/B/6100/013 to transfer control of valve to the SSF. Transfer power for CAPT #2 Trip and Throttle Valve to the SSF. Open breaker 2ELCP0250-F01B and close breaker 2ELCP0250-F01C per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2SM VA0001	2D S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2SM VA0003	2C S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2SM VA0005	2B S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2SM VA0007	2A S/G MAIN STEAM ISOL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2SV VA0001	2D S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle	None	PCS

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
			per procedure OP/0/B/6100/013.		
22(U2)	2SV VA0007	2C S/G PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2SV VA0013	S/G 2B PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2SV VA0019	S/G 2A PORV MANUAL CONTROL	Ensure significant solenoid isolation valves are closed by transferring their SSF disconnects from Plant Mode receptacle to the SSF Mode receptacle per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2WL PUATS	CAPT #2 SUMP PUMP 2A	Transfer 2EMXS to alternate power and place pump in 'Auto' per procedure OP/0/B/6100/013 to transfer control of pump to the SSF.	None	PCS
22(U2)	2WL VA0847	FLOOR DRAIN SUMP C DISCH TO ND / NS ROOMS SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
22(U2)	2WL VA0848	FLOOR DRAIN SUMP C DISCH TO TURBINE BUILDING SUMP	Operate 2WL VA0847 and 2WL VA0848 per procedure OP/0/B/6100/013.	None	PCS
09(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	9-VFDR-25	RISK
09(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	9-VFDR-27	RISK

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	10-VFDR-01	RISK
10(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	10-VFDR-03	RISK
16(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	16-VFDR-07	RISK
16(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	16-VFDR-09	RISK
17(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	17-VFDR-02	RISK
17(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	17-VFDR-04	RISK
21(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	21(U1)-VFDR-02	RISK
21(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	21(U1)-VFDR-04	RISK
21(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	21(U2)-VFDR-02	RISK
21(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	21(U2)-VFDR-04	RISK

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
01(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	None	DID
01(U1)	1CA VA0052	CA PMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	None	DID
01(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	None	DID
01(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	None	DID
02(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	2-VFDR-02	DID
02(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	2VFDR-03	DID
03(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	3-VFDR-02	DID
03(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	3-VFDR-03	DID
04(U1)	1CA VA0050A	CA PMP 1 DISCH TO S/G 1C ISOL	Manually throttle valve 1CA VA0050A per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	None	DID
04(U1)	1CA VA0054B	CA PMP 1 DISCH TO S/G 1B ISOL	Manually throttle valve 1CA VA0054B per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	None	DID

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
04(U2)	2CA VA0050A	CA PMP 2 DISCH TO S/G 2C ISOL	Manually throttle valve 2CA VA0050A per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	None	DID
04(U2)	2CA VA0054B	CAPT #2 DISCH TO 2B S/G ISOL	Manually throttle valve 2CA VA0054B per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	None	DID
09(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	None	DID
09(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	None	DID
09(U2)	2NC PUA	2A Reactor Coolant Pump	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	9-VFDR-47	DID
09(U2)	2NC PUB	2B Reactor Coolant Pump	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	9-VFDR-48	DID
09(U2)	2NC PUC	2C Reactor Coolant Pump	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	9-VFDR-49	DID
09(U2)	2NC PUD	2D Reactor Coolant Pump	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	9-VFDR-50	DID
10(U1)	1NC PUA	REACTOR COOLANT PUMP 1A	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	10-VFDR-13	DID
10(U1)	1NC PUB	REACTOR COOLANT PUMP 1B	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	10-VFDR-14	DID

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
10(U1)	1NC PUC	REACTOR COOLANT PUMP 1C	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	10-VFDR-15	DID
10(U1)	1NC PUD	REACTOR COOLANT PUMP 1D	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	10-VFDR-16	DID
10(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	None	DID
10(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	None	DID
11(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	None	DID
11(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	None	DID
11(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	None	DID
11(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	None	DID
16(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	None	DID
16(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	None	DID

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
16(U2)	2NC PUA	REACTOR COOLANT PUMP 2A	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	16-VFDR-25	DID
16(U2)	2NC PUB	REACTOR COOLANT PUMP 2B	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	16-VFDR-26	DID
16(U2)	2NC PUC	REACTOR COOLANT PUMP 2C	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	16-VFDR-27	DID
16(U2)	2NC PUD	REACTOR COOLANT PUMP 2D	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	16-VFDR-28	DID
17(U1)	1NC PUA	REACTOR COOLANT PUMP 1A	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	17-VFDR-20	DID
17(U1)	1NC PUB	REACTOR COOLANT PUMP 1B	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	17-VFDR-21	DID
17(U1)	1NC PUC	REACTOR COOLANT PUMP 1C	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	17-VFDR-22	DID
17(U1)	1NC PUD	REACTOR COOLANT PUMP 1D	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	17-VFDR-23	DID
17(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	None	DID
17(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	None	DID

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
18(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	18(U1)-VFDR-02	DID
18(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	None	DID
18(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	18(U2)-VFDR-02	DID
18(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	None	DID
21(U1)	1NC PUA	REACTOR COOLANT PUMP 1A	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	21(U1)-VFDR-20	DID
21(U1)	1NC PUB	REACTOR COOLANT PUMP 1B	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	21(U1)-VFDR-21	DID
21(U1)	1NC PUC	REACTOR COOLANT PUMP 1C	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	21(U1)-VFDR-46	DID
21(U1)	1NC PUD	REACTOR COOLANT PUMP 1D	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	21(U1)-VFDR-47	DID
21(U2)	2NC PUA	REACTOR COOLANT PUMP 2A	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	21(U2)-VFDR-20	DID
21(U2)	2NC PUB	REACTOR COOLANT PUMP 2B	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	21(U2)-VFDR-21	DID

Table G-1 Recovery Actions and Activities Occurring at the Primary Control Station(s)

Fire Area	Component	Component Description	Actions	VFDR	PCS / RA (RISK/DID)
21(U2)	2NC PUC	REACTOR COOLANT PUMP 2C	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	21(U2)-VFDR-48	DID
21(U2)	2NC PUD	REACTOR COOLANT PUMP 2D	Trip the NC Pump (NC PUA, NC PUB, NC PUC, and NC PUD) breakers per procedure OP/0/B/6100/013.	21(U2)-VFDR-49	DID
22(U1)	1CA VA0048	CA PUMP #1 FLOW TO S/G 1C	Manually throttle valve 1CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 1C.	22(U1)-VFDR-02	DID
22(U1)	1CA VA0052	CA PUMP #1 FLOW TO S/G 1B	Manually throttle valve 1CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 1B.	22(U1)-VFDR-03	DID
22(U2)	2CA VA0048	CA PUMP #2 FLOW TO S/G 2C	Manually throttle valve 2CA VA0048 per procedure OP/0/B/6100/013 to throttle flow to S/G 2C.	22(U2)-VFDR-02	DID
22(U2)	2CA VA0052	CA PUMP #2 FLOW TO S/G 2B	Manually throttle valve 2CA VA0052 per procedure OP/0/B/6100/013 to throttle flow to S/G 2B.	22(U2)-VFDR-03	DID

H. NFPA 805 Frequently Asked Question Summary Table

2 Pages Attached

Note: The NFPA 805 FAQ process will continue through the transition of non-pilot NFPA 805 plants. Final closure of the FAQs will occur when RG 1.205 is revised to endorse a new revision of NEI 04-02 that incorporates the outstanding FAQs.

This table includes the approved FAQs that have not been incorporated into the current endorsed revision of NEI 04-02 and utilized in this submittal:

Table H-1 - NEI 04-02 FAQs Utilized in LAR Submittal

No.	Rev.	Title	FAQ Ref.	Closure Memo
06-0008	9	NFPA 805 Fire Protection Engineering Evaluations	ML090560170	ML073380976
06-0022	3	Acceptable Electrical Cable Construction Tests	ML090830220	ML091240278
07-0030	5	Establishing Recovery Actions	ML103090602	ML110070485
07-0032	2	Clarification of 10 CFR 50.48(c), 10 CFR 50.48(a) and GDC 3 clarification	ML081300697	ML081400292
07-0035	2	Bus Duct Counting Guidance for High Energy Arcing Faults	ML091610189	ML091620572
07-0038	3	Lessons learned on Multiple Spurious Operations	ML103090608	ML110140242
07-0039	2	Lessons Learned - NEI B-2 Table	ML091420138	ML091320068
07-0040	4	Non-Power Operations Clarification	ML082070249	ML082200528
08-0042	0	Fire Propagation from Electrical Cabinets	ML080230438 ML091460350	ML092110537
08-0043	1	Electrical Cabinet Fire Location	ML083540152 ML091470266	ML092120448
08-0044	0	Large Oil Fires	ML081200099 ML091540179	ML092110516
08-0047	1	Spurious Operation Probability	ML082770662	ML082950750
08-0048	0	Fire Ignition Frequency	ML081200291 ML092180383	ML092190457
08-0049	0	Cable Fires	ML081200309 ML091470242	ML092100274
08-0050	0	Non Suppression Probability	ML081200318 ML092510044	ML092190555
08-0051	0	Hot Short Duration	ML083400188 ML100820346	ML100900052
08-0052	0	Transient Fire Growth Rate and Control Room Non-Suppression	ML081500500 ML091590505	ML092120501
07-0054*	1	Demonstrating Compliance with Chapter 4 of NFPA 805	ML103510379	ML110140183

Table H-1 - NEI 04-02 FAQs Utilized in LAR Submittal				
No.	**Rev.**	**Title**	**FAQ Ref.**	**Closure Memo**
09-0056	2	Radioactive Release Transition	ML102810600	ML102920405
10-0059	5	NFPA 805 Monitoring	ML120410589	ML120750108
12-0062	1	UFSAR Content	ML121430035	ML121980557
12-0063	1	Fire Brigade Make-Up	ML121670141	ML121980572
12-0064	1	Hot work/transient fire frequency: influence factors	ML122550050	ML12346A488

* Note: The FAQ submittal number was 08-0054 but the NRC closure memo for the FAQ was listed as 07-0054. FAQ 07-0054 was used to be consistent with the Closure Memo.

I. Definition of Power Block

1 Page Attached

All structures within the CNS owner controlled area were reviewed to determine the potential impact on the nuclear safety criteria described in Section 1.5 of NFPA 805. This was accomplished by determining if the structure contained equipment that could affect power plant operation, or affect the ability to safely shutdown the plant in the event of a fire.

Structures required to meet the radioactive release criteria described in section 1.5 of NFPA 805 but not required to meet the nuclear safety criteria are not defined as "power block." Separate screening of structures was performed for the radioactive release review as discussed in Section 4.4 and Attachment E of the Transition Report.

For the purposes of establishing the structures included in the Fire Protection program in accordance with 10 CFR 50.48(c) and NFPA 805, plant structures listed in the following table are considered to be part of the power block.

Table I-1 – Power Block Definition

Power Block Structures	Fire Area(s)
Auxiliary Building	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 45, 46, 47, AB Roof
Unit 1 Reactor Building	RB1
Unit 2 Reactor Building	RB2
Unit 1 Turbine Building	TB1
Unit 2 Turbine Building	TB2
Unit 1 Doghouse	49, 51
Unit 2 Doghouse	48, 50
Unit 1 Diesel Generator Building	25, 26, 41, 42
Unit 2 Diesel Generator Building	27, 28, 43, 44
Nuclear Service Water Pump Structure	29, 30
Service Building	SRV
Standby Shutdown Facility	SSF
LPSW Intake Structure	ITS
Yard*	YRD

* The Yard fire area includes those structures/components that have equipment required to meet the nuclear safety performance criteria goals. These structures/components include the transformers (Main and Auxiliary), Hydrogen Storage Building, Condenser Circulating Water Pumps, and Refueling Water storage tanks.

J. Fire Modeling V&V

19 Pages Attached

This attachment documents the Verification and Validation (V&V) basis for the Fire PRA fire modeling applications at CNS. Plant specific fire modeling used to support the CNS Fire PRA consists of the following:

- The calculation of the main control room operator abandonment times [Calculation entitled, "CNS Fire Scenario Report"; and
- The use of generic fire modeling treatments as applicable to develop Zones of Influence (ZOI) [Hughes Associates, Generic Fire Modeling Treatments, Project Number 1SPH02902.030, Revision 0, January 15, 2008].

Main Control Room Abandonment Report

The goal of the main control room (MCR) abandonment evaluation provided as Appendix E to the calculation entitled "CNS Fire Scenario Report" is to compute the time operators would abandon the main control room for both Units 1 and 2 using the NUREG/CR-6850 [2005] abandonment criteria for control room fire scenarios. The abandonment times are assessed for various electronic equipment fires and for ordinary combustible fires as defined by the discretized heat release rate conditional probability distributions presented in NUREG/CR-6850 [2005]. The abandonment time in the main control room is estimated by calculating the time to reach threshold values for temperature and visibility as identified by NUREG/CR-6850 [2005]. The abandonment criterion for immersion temperature is based on NUREG-0700 [2002] which is more conservative than the associated NUREG/CR-6850 [2005] criteria and more consistent with an expectation that operators immersed in an elevated temperature environment will continue to perform their duties before making a successful exit.

The focus of the MCR abandonment evaluation is on the first twenty-five minutes after ignition because the non-suppression probability (NSP) decreases to 0.001 at twenty minutes [NUREG/CR-6850, 2005]. The abandonment calculations are performed using the zone fire model Consolidated Fire and Smoke Transport (CFAST), Version 6.1.1 [National Institute of Standards and Technology (NIST) Special Publication (SP) 1026, 2009 and NIST SP 1041, 2008].

The MCR area geometry and fire parameters for the simulations fall within the model limits listed in NIST SP 1026 [2009], and NIST SP 1041 [2008]. Specifically, the vent area to enclosure volume ratio is less than two and the aspect ratio of the enclosures is less than five (for the true geometry). The physical input dimensions are adjusted to account for obstructions and boundary heat losses and the resulting model geometry has a length to width aspect ratio greater than five. However, the input geometry conserves the boundary area, room volume, and enclosure height. Therefore, a corridor flow model is intentionally avoided because the true geometry has an aspect ratio that is within the model limitations.

The verification for the CFAST model (Version 6.0.5) is provided in NUREG 1824, Volume 5 [2007]. Supplemental verification for CFAST, Version 6.0.10 is provided as an attachment to the MCR abandonment evaluation as well as in NIST SP 1086 [2008].

The validation for the CFAST model application at CNS is provided by NUREG-1824, Volumes 1 and 5 [2007]. Overall, the application of CFAST, Version 6.1.1 at the CNS control room falls entirely within the NUREG-1824, Volume 1 [2007] V&V non-

dimensional parameter space or bounds baseline scenarios that would fall within the NUREG-1824, Volume 1 [2007] V&V non-dimensional parameter space for applicable parameter for all times up to the predicted abandonment time or would generate a conservative result relative to a baseline case that fell within the NUREG-1824, Volume 1 [2007] V&V parameter space and used the NUREG/CR-6850 [2005] abandonment criteria. The results after abandonment is predicted may be based on an application outside the NUREG-1824, Volume 1 [2007] V&V parameter space, but the results are not used in the Fire PRA.

The MCR abandonment report also provides benchmark and validation simulations for CFAST as applicable to the MCR area of CNS. In particular, the control room tests documented in NUREG/CR-4527, Volume 2 [1988], are used to provide additional validation basis for control room application of CFAST. Table J-1 provides a summary of the validation and verification basis for CFAST, Version 6.1.1 as applied in the MCR abandonment report.

Generic Fire Modeling Treatments Report

The generic fire modeling treatments, Revision 0 is used to establish ZOI for specific classes of ignition sources and serves as both a screening and final calculation of damage distances in the Fire PRA under NUREG/CR-6850 [2005], Sections 8 and 11. The generic fire modeling treatments document has two fundamental uses within the Fire PRA:

- Determine the ZOI inside which a particular ignition source is postulated to damage targets; and
- Determine the potential of the ignition sources to generate a hot gas layer within an enclosure that can either lead to full room burnout or invalidate the generic treatment ZOIs for a particular class of combustible materials.

The ZOI is determined using a collection of empirical and algebraic models and correlations. The potential for a hot gas layer having a specified temperature to form within an enclosure is determined using the zone model CFAST, Version 6.1.1 [NIST SP 1026, 2009 and NIST SP 1041, 2008].

Verification

The calculation development and review process in place at the time the Generic Fire Modeling Treatments was prepared included contributions from a calculation preparer, a calculation review, and a calculation approver. The responsibilities for each are as follows:

- The calculation preparer develops and prepares the calculation using appropriate methods.
- The calculation reviewer provides a detailed review of the report and supporting calculations, including spreadsheets and fire model input files. The reviewer provides comments to the preparer for resolution.
- Calculation approver provides a reasonableness review of the report and approves the document for release.

The calculation preparation occurred over a two year period ending in 2007. The review stage was conducted in 2007 at the completion of the preparation stage. The calculation was approved January 23, 2008. The approved document, the signature page, and an affidavit were transmitted to the Document Control Desk at the Nuclear Regulatory Commission in Washington, D. C. on January 23, 2008.

In the case of the empirical equations/correlations that form part of the basis of the "Generic Fire Modeling Treatments," a considerable amount of verification was performed during the preparation stage by the preparer. The empirical equations/correlations were solved using Excel® spreadsheets using either direct cell solutions (algebraic manipulation) or Visual Basic macros. All direct cell solutions were validated by the preparer through the use of alternate calculation. For simple equations, this entailed matching spreadsheet solution to the solution obtained using a hand calculator. For more complex solutions, the alternate calculation verification entailed either subdividing the problem into many sub-components and matching the solution using a hand calculator or matching the solution to a verified solution (i.e., the NUREG-1805 [2004] Solid Flame Heat Flux models). The verification of the Visual Basic macros also depended on the type of macro. In situations where the macro is used to perform multiple direct computations, the macro results were verified against the verified spreadsheet solutions that were verified through alternate calculation. In cases where the macro is used to find a root, the root was verified to be a zero by direct substitution into an alternate form of the solved equation.

The empirical equations/correlations were further verified by the reviewer using a Design Review method as indicated in the signature sheet. An independent reviewer was provided access to the draft report and all supporting calculation materials in late 2007. The reviewer conducted a detailed review of the implementation of the equations within the spreadsheets and the reporting of the equation result in the draft report. Comments and insights were provided to the preparer over the review period and were addressed to the satisfaction of the reviewer. Upon the completion of the review, a revised draft was prepared for review by the approver. The approver provided a higher level reasonableness check of the methods, approach, and the results. Comments and insights that were provided by the approver were addressed to the satisfaction of the reviewer and Revision 0 of the report was prepared and approved on January 23, 2008.

Validation

The empirical equations and correlations are drawn from a variety of sources that are documented in various chapters of the Society of Fire Protection Engineers *Handbook of Fire Protection Engineering,* peer reviewed journals (e.g., the *Fire Safety Journal*), or engineering textbooks. The empirical models primarily fall into three groups:

- Flame height;
- Plume temperatures; and
- Heat fluxes (at a target location).

Table J-2 of this attachment identifies the empirical models that are used either directly or indirectly in the "Generic Fire Modeling Treatments" report. The table also identifies

the original correlation source documentation and the correlation range in terms of non-dimensional parameters.

Except for the cable tray ZOI calculation, the flame height calculation is used only as a means of placing a limit on the applicability of the ZOI tables which are based on the plume temperature and thermal radiation heat flux. The flame height calculation for axisymmetric source fires is robust and has considerable pedigree. The original documentation and basis of the flame height correlation is Heskestad [1981] as noted in Table J-2 of this attachment. Although there are earlier forms of the flame height equation, Heskestad provides a link between the flame height and plume centerline temperature calculation and identifies the range over which the plume equations are applicable. Because the flame height and plume centerline temperature equations are linked, the plume centerline range cited by Heskestad applies to the flame height calculation as well. The plume centerline temperature equations, and thus the flame height correlation, is applicable over the following range as noted in Table J-2 [Heskestad, 1981; Heskestad, 1984]:

$$5 \lesssim \log_{10}\left[\left(\frac{c_p T_\infty}{g\rho_\infty\left(\Delta H_c/r\right)^3}\right)\frac{\dot{Q}^2}{D^5}\right] \lesssim 5 \qquad \text{(J-1)}$$

where c_p is the heat capacity of ambient air (kJ/kg-K [Btu/lb-°R]), T_∞ is the ambient temperature (K [°R]), g is the acceleration of gravity (m/s² [ft/s²]), ρ_∞ is the ambient air density (kg/m³ [lb/ft]), $\dot{Q}$ is the fire heat release rate (kW [Btu/s), r is the stoichiometric fuel to air mass ratio, D is the fire diameter (m [ft]), and ΔH_c is the heat of combustion of the fuel (kJ/kg [Btu/lb]). Application of Equation (1) depends on the fuel as well as a non-dimensional form of the fire heat release rate (fire Froude Number). In practice, the heat of combustion to air fuel ratio for most fuels will fall between 2,900 – 3,200 kJ/kg (1,250 – 1,380 Btu/lb), and for typical ambient conditions the $\frac{\dot{Q}^2}{D^5}$ ratio for which the plume equations have validation basis is between 7 – 700 $kW^{2/5}/m$ (4 – 9 $Btu^{2/5}/ft$) [Heskestad, 1984]. For fire sizes on the order of 25 kW (24 Btu/s) or greater, this means that the plume centerline equation is valid for heat release rates of 100 kW/m² (8.81 Btu/s-ft²) to well over 3,000 kW/m² (264 Btu/s-ft²). For weaker fires (heat release rates less than 100 kW/m² (8.81 Btu/s-ft²), the tendency of the model is clearly to over-predict the temperature and flame height; thus for applications outside the range but below the lower limit the result will be conservative. The concern is therefore entirely on the upper range of the empirical model. The tables in the "Generic Fire Modeling Treatments" are specifically developed with transient, lubricant spill fires, and electrical panel fires with a heat release rate per unit area within the validation range. When the heat release rate per unit area falls outside the applicable range, the table entry is not provided and it is noted that the source heat release rate per unit area is greater than the applicable range for the correlations. This applies to the flame height and the plume temperature for axisymmetric source fires.

The flame height and plume centerline temperature for line type fires (fires having a large aspect ratio) are applied only to cable tray fires. The correlation used has pedigree and has existed in its general form since at least Yokoi [1960]. Most recently, Yuan et al. [1996] provided a basis for the empirical constant using experimental data

with source fires having a width of 0.015 m – 0.05 m (0.05 – 0.15 ft) and a length of 0.2 – 0.5 m (0.7 – 1.5 ft) [Yuan et al., 1996]. When normalized, the applicable height to heat release rate per unit length range ($\frac{Z}{\dot{Q}}$) for the correlations based on the experiments of Yuan et al. [1996] is between 0.002 and 0.6. This range includes the flame height as well as the elevation at which the temperature is between 204 – 329°C (400 – 625°F), the temperature at which cable targets are considered to be damaged under steady state exposure conditions. Yuan et al. [1996] also provide a tabular comparison of the empirical constant against seven preceding line fire test series, which include a broader range of physical fire sizes and dimensions. The Yuan et al. [1996] constant is greater than the other seven and thus the temperatures and flame heights are more conservatively predicted using the Yuan et al. [1996] data. The application of the Yuan et al. [1996] correlation in the "Generic Fire Modeling Treatments" falls within the normalized applicability range reported by Yuan et al. [1996].

Four flame heat flux models are used in the "Generic Fire Modeling Treatments" as described in Table J-2 of this attachment: the Point Source Model, the (simple) Method of Shokri and Beyler, the Method of Mudan and Croce, and the Shokri and Beyler Method. The former two are simple algebraic models using the heat release rate, separation distance, and the fire diameter. The latter two are considered detailed radiant models that account for the emissivity of the fire and the shape of the flame. Due to limitations in the target placement, the (Simple) Method of Shokri and Beyler are shown to be inapplicable for calculating the ZOI dimensions. Similarly, for the fuels considered, it is shown that the Method of Mudan and Croce produce a net heat flux that exceeds the fire size. The ZOIs are therefore determined using the Point Source Model and the Method of Shokri and Beyler. The method that produces the largest ZOI dimension is used for each fuel and fire size bin.

The Point Source Model and the Method of Shokri and Beyler have been shown in the NUREG-1824 verification and validation study to provide reasonably accurate predictions when the target separation to fire diameter ($\frac{R}{D_f}$) ratio is between 2.2 and 5.7 [NUREG-1824, Volume 1, 2007]. Furthermore, the fire size ranges considered in the "Generic Fire Modeling Treatments" report are between about 25 – 12,000 kW (24 – 11,400 Btu/s) and the heat release rates per unit area range between about 100 – 3,000 kW/m² (8.1 – 264 Btu/s-ft²) for all fuels and fire size bins. Using this information, the following table may be assembled for the applicable target heat flux range, based on the NUREG-1824, Volume 1 [2007] verification and validation range:

Fire Size (kW [Btu/s])	Heat Release Rate Per Unit Area (kW/m² [Btu/s-ft²])	Fire Diameter (m [ft])	Point Source Model Heat Flux Range (kW/m² [Btu/s-ft²])	Shokri and Beyler Heat Flux Range (kW/m² [Btu/s-ft²])
25 (24)	100 (8.8)	0.56 (1.9)	0.07 – 0.45 (0.006 – 0.04)	0.36 – 3.8 (0.03 – 0.4)
25 (24)	3,000 (264)	0.1 (0.3)	2 – 13.6 (0.2 – 1.2)	2.84 – 10 (0.3 – 0.9)
12,000 (11,400)	100 (8.8)	12.4 (41)	0.07 – 0.45 (0.006 – 0.04)	0.55 – 5 (0.05 – 0.4)
12,000 (11,400)	3,000 (264)	2.3 (7.4)	2 – 13.6 (0.2 – 1.2)	0.45 – 4.6 (0.04 – 0.4)

The threshold heat fluxes that define the steady state ZOI dimensions range from 5.7 – 11.4 kW/m² (0.5 – 1 Btu/s-ft²). Fuels that identify the most conservative value over a range of heat release rates per unit area (transient and electrical panels) will thus include at least one point within the validation range (i.e., 5.7 kW/m² [0.5 Btu/s-ft²]). Since the algorithm searches for the most adverse value, the result will be at least as conservative as the value obtained within the model validation and verification range.

There are combinations of fuels and source strength ranges that do not produce heat fluxes that fall within the validation range. This is especially true for the higher target heat flux values (11.4 kW/m² [1 Btu/s-ft²] and higher) combined with the lower transient fuel package heat release per unit area range (200 – 1,000 kW/m² [17.6 – 88.1 Btu/s-ft²]). This is addressed through an extended Verification and Validation range of the heat flux models provide by the SFPE [SFPE, 1999]. As noted in Table J-2 of this attachment, the SFPE assessed the predictive capabilities of the Point Source Model and the Method of Shokri and Beyler against available pool fire data. The pool diameters ranged from 1 – 80 m (3.3 – 262 ft). The conclusion was that the Point Source Model was conservative, but not necessarily bounding, when the predicted heat flux is less than 5 kW/m² (0.44 Btu/s-ft²) and the empirical constant (radiant fraction) is 0.21. The method is bounding when a safety factor of two is applied to the predicted heat flux. The application in the "Generic Fire Modeling Treatments" uses an empirical constant (radiant fraction) of 0.35, indicating the application is essentially bounding. Similarly, it was concluded that that Method of Shokri and Beyler is conservative when the predicted heat flux is greater than 5 kW/m² (0.44 Btu/s) and the method is bounding when a safety factor of two is applied to the predicted heat flux. The implementation in the "Generic Fire Modeling Treatments" is conservative, though not bounding. Although the SFPE considered fire diameters greater than about 1 m (3.3 ft), smaller diameter pool fires are not optically thick and have a lower emissive power [SFPE Handbook of Fire Protection Engineering, Section 3–1, 2008]. Thus, the use of the methods for smaller fires is conservative though outside the SFPE validation range.

The use of the heat flux models largely falls within the NUREG-1824, Volume 1 [2007] verification and validation parameter space range; however there are cases where this is not so. However, for larger diameter fires, the SFPE provides comprehensive validation against full scale test data of the methods applied. The application in the "Generic Fire Modeling Treatments" report fall within the validation range or are more conservative because the solution algorithm identifies the most adverse solution among the methods. Smaller fires may fall outside the validation range of both studies, but

such fires have a lower emissive power and are conservatively treated using the methods designed for high emissive power source fires.

A number of other empirical models that appear in the generic fire modeling treatments are applied within the stated range of the models or the data for which the models were developed. For example, the cable heat release rate per unit area model is based on cables that have a small scale heat release rate that ranges between 100 – 1,000 kW/m² (8.8 – 88.1 Btu/s-ft²). The solution tables are provided for this range. The unconfined spill fire model (heat release rate reduction factor) is based on observations of pool fires having a diameter between 1 – 10 m (3.3 – 33 ft). The diameter range for which ZOI data is provided is 0.7 – 5 m (2.2 – 17 ft). The lower range value is less of a concern due the reduction in the optical thickness of the fire when the diameter falls below 1 m (3.3 ft). The upper range is maintained in the ZOI solutions. The offset distance for flame extensions outside a burning panel have an upper observational limit of about 1,000 kW (950 Btu/s), though it is applied in a normalized form (extension to panel height ratio). The ratio is applied as determined from the test data.

The CFAST applications in the "Generic Fire Modeling Treatments" report consist of simple geometries with a single natural vent path connected to an ambient boundary condition. The simulations are used to determine the time after the start of the fire that the hot gas layer temperature reaches a predetermined critical temperature. No consideration for the hot gas layer depth is made; if the hot gas layer temperature reaches the critical temperature at any time, then this time is the sole output parameter used in the "Generic Fire Modeling Treatments" report. The enclosure geometry is specified as a function of the volume in such a way as to minimize the heat losses to the boundary. Three vent configurations are evaluated for each volume-room geometry-vent fraction; the most adverse result among the three vent configurations is used.

The room geometry and fire parameters for the "Generic Fire Modeling Treatments" simulations fall within the model limits listed in NIST SP 1026 [2009], and NIST SP 1041 [2008]. Specifically, the vent area to enclosure volume ratio is less than two and the aspect ratios of the enclosures are less than five.

The non-dimensional parameters that affect the model results as documented in NUREG-1824, Volumes 1 and 5 and NUREG-1934 [2011] include the model geometry, the global equivalence ratio, the fire Froude Number, and the flame length ratio. The non-dimensional parameters that relate to target exposure conditions (heat flux) and sprinkler actuation (ceiling jet) are not applicable to this calculation because these output parameters are not used. The non-dimensional geometry parameters (length to height and width to height are equal to 2 for the actual MCR geometry and fall within the NUREG-1824 validation range (0.6 – 5.7). As previously noted, CFAST does not use a fire diameter; therefore, it is possible to specify a fire that falls within the range of fire Froude numbers considered in the NUREG-1824 validation documentation. The source fires considered are consistent with those described in NUREG/CR-6850 [2005] and thus those that are the subject of the NUREG-1824 validation effort. The global equivalence ratio does exceed the ratio validated in NUREG-1824, Volume 1, in some cases by a significant margin. Large fires in very small volumes with low ventilation could effectively result in equivalence ratios that even exceed the maximum values observed in fully developed fires (3 – 5) [SFPE Handbook of Fire Protection

Engineering, Section 2–5, 2008; SFPE Handbook of Fire Protection Engineering, Section 3–4, 2008]. However, the limiting oxygen index used in the model is zero, which forces the combustion process to use all available oxygen within the enclosure and the heat release rate to decrease to a value set by the natural ventilation oxygen inflow. The maximum temperature over the course of the fire occurs at some time prior to the oxygen being consumed in the enclosure, thus the global equivalence ratio for the data reported is based on a condition where it is less than unity and within the validation basis of NUREG-1824, Volume 1 [2007]. Further, for a given volume and fire size, an optimum ventilation condition will occur over the vent range considered. Because of potential variations in a ventilation condition, the Fire PRA uses the most adverse time over the reported range and effectively performs an optimization on this parameter.

Finally, the flame length ratio is not always met, especially for large fires postulated in small enclosures. Because sprinkler actuation and thermal radiation to targets are not computed with the CFAST model, this parameter is not an applicable metric. Rather, the plume entrainment below the hot gas layer controls the layer decent time and the concentration of soot products in the layer. This aspect of the model is not affected by the flame height to ceiling height ratio. Consequently, the application of CFAST at the CNS control room falls entirely within the NUREG-1824, Volume 1 [2007] V&V parameter space.

Additional verification V&V studies are contained in NIST SP 1086 [2008] and Tatem et al. [2004]. These studies have a broader parameter V&V space than NUREG-1824, Volume 1 [2005] and NIST SP 1086 [2008] is based in part on the methods of American Society for Testing and Materials (ASTM) E1355 [2004]. Tatem et al. [2008] provides a Navy specific V&V study, which includes an assessment of CFAST, Version 3.1.7 predictions in multiple enclosures and multiple elevation configurations. These additional V&V studies extend the range of the V&V parameter space to include configurations and conditions applicable to the MCR abandonment sensitivity analysis (Appendix B of the "Generic Fire Modeling Treatments" report).

Appendix B of the "Generic Fire Modeling Treatments" report provides an in depth analysis of the parameters used as input and Table B–2 indicates the basis for the input parameter selection. The parameters are either selected as absolutely bounding over the credible range or establish an application limit (e.g., elevated temperature environment and boundary thermal properties).

A summary of the validation basis for both the CFAST and the empirical models is provided in Tables J-1 and J-2 of this attachment. Based on the information in the tables and the preceding discussion, it is shown that that the empirical fire model applications in the "Generic Fire Modeling Treatments" either fall within the original correlation bounds or they are outside the bounds but used in a way that is demonstrably conservative. Likewise, CFAST is used within the model limitations described in the User's Guide [NIST SP 1041, 2008] and the Technical Reference Guide [NIST SP 1026, 2009]. The results as reported in the "Generic Fire Modeling Treatments" document are based on conditions that meet the NUREG-1824, Volumes 1 and 5 V&V space, although there are input specifications that fall outside this range. The use of the "Generic Fire Modeling Treatments" in the Fire PRA performs an optimization over the ventilation fraction and necessarily is based on a condition that

falls within the NUREG-1824, Volumes 1 and 5 V&V space for the global equivalence ratio.

Table J-1 V & V Basis for Fire Models / Model Correlations Used in Fire PRA

Calculation	Application	V & V Basis	Discussion
Main CR Abandonment.	Calculation of operator abandonment times in the Main Control Room.	NUREG-1824, Volume 5 NIST SP 1026 NIST SP 1041 NIST SP 1086 NUREG/CR-4527, Volume 2 Tatem et al. [2004]	The abandonment time in the MCR is determined by computing the time for the visibility and temperature to reach thresholds as specified in NUREG/CR-6850 [2005]. CFAST verification is provided by NUREG SP 1086 and Appendix D of the MCR abandonment calculation. Validation is provided by NUREG-1824, Volumes 1 and 5 [2007]. Specifically, the application of CFAST, Version 6.1.1 in the CNS control room falls entirely within the NUREG-1824, Volume 1 [2007] V&V parameter space or bounds baseline scenarios that would fall within the NUREG-1824, Volume 1 [2007] V&V parameter space for applicable parameter for all times up to the predicted abandonment time or would generate a conservative result relative to a baseline case that fell within the NUREG-1824, Volume 1 [2007] V&V parameter space and used the NUREG/CR-6850 [2005] abandonment criteria. Additional validation for control room applications is provided in Appendix D of the MCR abandonment calculation using the NUREG/CR-4527, Volume 2 Control Room test results.
Generic Fire Modeling Treatments, Revision 0.	Definition of zones of influence about specific classes of ignition sources. Scenario screening for the multi-compartment analysis.	NUREG, Volume 5 NIST SP 1026 NIST SP 1041 NIST SP 1086 Table J-2	Table J-2 provides a summary of the validation basis for the empirical models used in the "Generic Fire Modeling Treatments" report. The "Generic Fire Modeling Treatments" report uses CFAST, version 6.0.10.61027 in a simple geometry that minimizes the boundary heat losses given a volume. For the volume postulated, the configuration produces the most adverse result regardless of the actual dimensions used. The application falls within the model limits as specified in NIST SP 1026 [2008] and NIST SP 1041 [2008]. Except for the global equivalence ratio, the non-dimensional parameters fall within the V&V space of NUREG-1824 Volumes 1 and 5 [2007]. Although equivalence ratios are considered over a much larger range than addressed by the NUREG-1824, Volume 1 [2007] validation tests, the results are based on a single time point based on an equivalence ratio that is close to unity or lower and thus may fall directly within the NUREG-1824, Volume 1 [2007] V&V parameter

Table J-1 V & V Basis for Fire Models / Model Correlations Used in Fire PRA

Calculation	Application	V & V Basis	Discussion
			space. Additional validation results that consider higher the predictive capability under higher equivalence ratios are provided in NIST SP 1086 [2008].

Table J-2 V & V Basis for Fire Models / Model Correlations Used: Generic Treatment Correlations

Correlation	Location in the "Generic Fire Modeling Treatments Report"	Original Reference	Application	Original Correlation Range	Subsequent Validation and Verification	Limits in Treatments
Flame Height	Page 18	Heskestad [1981]	Provides a limit on the use of the Zone of Influence (ZOI)	$-5 \lesssim \log_{10}\left[\left(\frac{c_p T_\infty}{g\rho_\infty \left(\Delta H_c/r\right)^3}\right)\frac{\dot{Q}^2}{D^5}\right] \lesssim 5$ In practice, wood and hydrocarbon fuels, momentum or buoyancy dominated, with diameters between 0.05 – 10 m (0.16 – 33 ft).	Directly NUREG-1824, Volume 3 [2007] Indirectly NUREG-1824, Volume 5 [2007] (Correlation used in CFAST)	$\frac{4\dot{m}\Delta H_c}{\pi D^2}$ < 3000
Point Source Model	Page 19	Modak [1976]	Lateral extent of ZOI – comparison to other methods	Isotropic flame radiation. Compared with data for 0.37 m (1.2 ft) diameter PMMA pool fire and a target located at an $\frac{R_o}{R}$ ratio of 10.	NUREG-1824, Volume 3 [2007]; SFPE [1999]	Predicted heat flux at target is less than 5 kW/m² (0.4 4 Btu/s-ft²) per SFPE [1999].
Method of Shokri and Beyler	Page 19	Shokri et al. [1989]	Lateral extent of ZOI – comparison to other methods	Pool aspect ratio less than 2.5. Hydrocarbon fuel in pools with a diameter between 1 – 30 m (3.3 – 98 ft). Vertical target, ground level.	SFPE [1999]	Ground based vertical target.
Method of Mudan (and Croce)	Page 20	Mudan [1984]	Lateral extent of ZOI – comparison to other methods	Round pools; Hydrocarbon fuel in pools with a diameter between 0.5 – 80 m (1.64 – 262 ft).	SFPE [1999]	Total energy emitted by thermal radiation less than total heat released.
Method of Shokri and Beyler	Page 20	Shokri et al. [1989]	Lateral extent of ZOI	Round pools; Hydrocarbon fuel in pools with a diameter between 1 – 50 m (3.3 – 164 ft).	SFPE [1999] NUREG-1824, Volume 3 [2007]	Predicted heat flux at target is greater than 5 kW/m² (0.44 Btu/s-ft²) per SFPE [1999]. Shown to produce most conservative heat flux over range of scenarios considered among all methods considered.

Table J-2 V & V Basis for Fire Models / Model Correlations Used: Generic Treatment Correlations

Correlation	Location in the "Generic Fire Modeling Treatments Report"	Original Reference	Application	Original Correlation Range	Subsequent Validation and Verification	Limits in Treatments
Plume heat fluxes	Page 22	Wakamutsu et al. [2003]	Vertical extent of ZOI	Fires with an aspect ratio of about 1 and having a plan area less than 1 m^2 (0.09 ft^2).	Wakamatsu et al. [2003] (larger fires) SFPE Handbook of Fire Protection Engineering, Section 2–14 [2008]	Area source fires with aspect ratio ~ 1. Used with plume centerline temperature correlation; most severe of the two is used as basis for the ZOI dimension. This is not a constraint in the fire model analysis for the cases evaluated.
Plume centerline temperature	Page 23	Yokoi [1960]; Beyler [1986]	Vertical extent of ZOI	Alcohol lamp assumed to effectively be a fire with a diameter ~0.1 m (0.33 ft).	NUREG-1824, Volume 3 [2007]; SFPE Handbook of Fire Protection Engineering, Section 2–1 [2008]	Area source fires with aspect ratio ~ 1. Used with plume flux correlation; most severe of the two is used as basis for the ZOI dimension.
Hydrocarbon spill fire size	Page 51	SFPE Handbook of Fire Protection Engineering, Section 2–15 [2002]	Determine heat release rate for unconfined hydrocarbon spill fires.	Hydrocarbon spill fires on concrete surfaces ranging from ~1 to ~10 m (3.3 – 33 ft) in diameter.	None. Based on limited number of observations.	None. Transition from unconfined spill fire to deep pool burning assumed to be abrupt.
Flame extension	Page 100	SFPE Handbook of Fire Protection Engineering, Section 2–14 [2002]	Determine the fire offset for open panel fires.	Corner fires ranging from ~10 to ~1,000 kW (9.5 – 948 Btu/s). Fires included gas burners and hydrocarbon pans.	None. Based on limited number of observations.	None. Offset is assumed equal to the depth of the ceiling jet from the experiments.

Table J-2 V & V Basis for Fire Models / Model Correlations Used: Generic Treatment Correlations

Correlation	Location in the "Generic Fire Modeling Treatments Report"	Original Reference	Application	Original Correlation Range	Subsequent Validation and Verification	Limits in Treatments
Line source flame height	Page 101	Delichatsios [1984]	Determine the vertical extent of the ZOI	Theoretical development.	SFPE Handbook of Fire Protection Engineering, Section 2–14 [2008]	None. Transition to area source assumed for aspect plan ratios less than four. Maximum of area and line source predictions used in this region.
Corner flame height	Page 108	SFPE Handbook of Fire Protection Engineering, Section 2–14 [2002]	Determine the vertical extent of the ZOI	Corner fires ranging from ~10 to ~1,000 kW (9.5 – 948 Btu/s). Fires included gas burners and hydrocarbon pans.	None. Correlation form is consistent with other methods; comparison to dataset from SFPE Handbook, Section 2–14 [2002] provides basis.	None.
Air mass flow through opening	Page 140	Kawagoe [1958]	Compare mechanical ventilation and natural ventilation	Small scale, ⅓ scale, and full scale single rooms with concrete and steel boundaries. Vent sizes and thus opening factor varied. Wood crib fuels.	Drysdale [1999]; SFPE [2004]	None. SFPE [2004] spaces with a wide range of opening factors.
Line fire flame height	Page 210	Yuan et al. [1996]	Provides a limit on the use of the Zone of Influence (ZOI); Extent of ZOI for cable tray fires.	$0.002 < \frac{Z}{\dot{Q}'} < 0.6$ In practice, from the base to several times the flame height based on 0.015 – 0.05 m (0.05 – 0.16 ft) wide gas burners.	None. Correlation form is consistent with other methods; comparison to dataset from Yuan et al. [1996] provides basis.	None.

Table J-2 V & V Basis for Fire Models / Model Correlations Used: Generic Treatment Correlations

Correlation	Location in the "Generic Fire Modeling Treatments Report"	Original Reference	Application	Original Correlation Range	Subsequent Validation and Verification	Limits in Treatments
Cable heat release rate per unit area	Page 210	Lee [1985]	Provides assurance that the method used is bounding	Cables with heat release rates per unit area ranging from about 100 – 1,000 kW/m² (8.8 – 88 Btu/s-ft²).	None.	Correlation predicts a lower heat release rate than assumed in the Treatments and is based on test data.
Line fire plume centerline temperature	Page 212	Yuan et al. [1996]	Provides a limit on the use of the Zone of Influence (ZOI); Extent of ZOI for cable tray fires.	$0.002 < \frac{Z}{\dot{Q}'} < 0.6$ In practice, from the base to several times the flame height based on 0.015 – 0.05 m (0.05 – 0.16 ft) wide gas burners.	None. Correlation form is consistent with other methods; comparison to dataset from Yuan et al. [1996] provides basis.	None.
Ventilation limited fire size	Page 283	Babrauskas [1980]	Assessing the significance of vent position on the hot gas layer temperature	Ventilation factors between 0.06 – 7.51. Fire sizes between 11 – 2,800 kW (10 – 2,654 Btu/s) Wood, plastic, and natural gas fuels.	SFPE [2004]	None. Provides depth in the analysis of the selected vent positions. The global equivalence ratio provides an alternate measure of the applicability of the analysis and for reported output is within the validation range of CFAST.

References

1. ASTM E1355, "ASTM Standard Guide for Evaluating the Predictive Capability of Deterministic fire Models," American Society for Testing and Materials, West Conshohocken, PA, 2004.
2. Babrauskas, V., "Estimating Room Flashover Potential," Fire Technology, No. 16, Vol. 2, pp. 94 –104, 1980.
3. Beyler, C. L., "Fire Plumes and Ceiling Jets," *Fire Safety Journal*, Volume 11, Number 1, Elsevier Sequoia S. A., Lausanne, Switzerland, 1986.
4. Delicatsios, M. A., "Flame Heights in Turbulent Wall Fires with Significant Flame Radiation," *Combustion Science and Technology,* 39, pp. 195–214. 1984.
5. Drysdale, D. D., *Fire Dynamics*, 2nd Edition, John Wiley and Sons, New York, New York, 1999.
6. Heskestad, G., "Peak Gas Velocities and Flame Heights of Buoyancy-Controlled Turbulent Diffusion Flames," Eighteenth Symposium on Combustion, The Combustion Institute, Pittsburg, PA, pp. 951–960, 1981.
7. Heskestad. G., "Engineering Relations for Fire Plumes," *Fire Safety Journal*, 7:25–32, 1984.
8. Hughes Associates, Generic Fire Modeling Treatments, Project Number 1SPH02902.030, Revision 0, January 15, 2008.
9. Hunt, S. P., "Maximum Fire Size in Closed Vented Electrical Panels," Fire Protection Information Forum, September, 2009.
10. EPRI, "Evaluation of Heat Release Rates in Vertical Cabinet Fires," Electric Power Research Institute, Palo Alto, CA, 2011.
11. Kawagoe, K., "Fire Behaviour in Rooms," Report Number 27, Building Research Institute, Tokyo, Japan, 1958.
12. Lee, B. T., "Heat Release Rate Characteristics of Some Combustible Fuel sources in Nuclear Power Plants," NBSIR 85-3196, NIST, Gaithersburg, MD, 1985.
13. Mangs, J. and Keski-Rahkonen, O., "Full Scale Fire Experiments on Electronic Cabinets," Technical Research Centre of Finland (VTT) Publications 186, Technical Research Centre of Finland, Espoo, 1994.
14. Mangs, J. and Keski-Rahkonen, O., "Full Scale Fire Experiments on Electronic Cabinets II," VTT Publications 269, Technical Research Centre of Finland, Espoo, 1996.
15. Mangs, J., Paananen, J., and Keski-Rahkonen, O., "Calorimetric Fire Experiments on Electronic Cabinets," *Fire Safety Journal*, **38**, pp. 165 – 186, 2003.
16. Melis, S., Rigollet, L., Such, J.M., Casselman, C., "Modelling of Electrical Cabinet Fires Based on the CARMELA Experimental Program," *Eurosafe Forum*, 2004.
17. Modak, A. T., "Thermal Radiation from Pool Fires," Technical Report 22361–5 RC–B–67, Factory Mutual Research, Norwood, MA, August, 1976.

18. Mudan, K. S., “Thermal Radiation Hazards from Hydrocarbon Pool Fires,” Prog. Energy Combustion Sci., Vol. 10, 1984.

19. NIST Special Publication 1026, “CFAST – Consolidated Model of Fire Growth and Smoke Transport (Version 6) Technical Reference Guide,” Jones, W. W., Peacock, R. D., Forney, G. P., and Reneke, P. A., National Institute of Standards and Technology, Gaithersburg, MD, April, 2009.

20. NIST Special Publication 1041,“CFAST – Consolidated Model of Fire Growth and Smoke Transport (Version 6) User’s Guide,” Peacock, R. D., Jones, W. W., Reneke, P. A., and Forney, G. P., National Institute of Standards and Technology, Gaithersburg, MD, December, 2008.

21. NIST Special Publication 1086, “CFAST – Consolidated Model of Fire Growth and Smoke Transport (Version 6) Software Development and Model Evaluation Guide,” Peacock, R. D., McGrattan, K., Klein, B., Jones, W. W., and Reneke, P. A., National Institute of Standards and Technology, Gaithersburg, MD, December, 2008.

22. NUREG-0700, “Human-System Interface Design Review Guidelines,” NUREG-0700, Rev. 2, Nuclear Regulatory Commission, Washington, DC, 2002.

23. NUREG-1805, “Fire Dynamics Tools (FDT[S]),” Iqbal, N. and Salley, M. H., NUREG-1805, Final Report, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D. C., October, 2004.

24. NUREG-1824, Volume 3, “Verification & Validation of Selected Fire Models for Nuclear Power Plant Applications, Volume 3: Fire Dynamics Tools (FDTS),” NUREG-1824 / EPRI 1011999, Salley, M. H. and Kassawara, R. P., NUREG-1824, Final Report, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D. C., May, 2007.

25. NUREG-1824, Volume 1, “Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications Volume 1: Main Report,” NUREG-1824 / EPRI 1011999, Salley, M. H. and Kassawara, R. P., NUREG–1824, Final Report, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D. C., May, 2007.

26. NUREG-1824, Volume 5, “Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications Volume 5: Consolidated Fire Growth and Transport Model,” NUREG 1824 / EPRI 1011999, Salley, M. H. and Kassawara, R. P., NUREG–1824, Final Report, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D. C., May, 2007.

27. NUREG–1934, “Nuclear Power Plant Fire Modeling Applications Guide (NPP FIRE MAG),” Draft Report for Public Comment, NUREG-1934 / EPRI 1023259, Nuclear Regulatory Commission, Rockville, MD, 2011.

28. NUREG/CR–4527, Volume 1, “An Experimental Investigation of Internally Ignited Fires in Nuclear Power Plant Control Cabinets Part I: Cabinet Effects Tests,” NUREG/CR–4527 / SAND86-0336, Volume 1, Chavez, J. M., Nuclear Regulatory Commission, Washington, DC, 1987.

29. NUREG/CR–4527, Volume 2, “An Experimental Investigation of Internally Ignited Fires in Nuclear Power Plant Control Cabinets Part II: Room Effects Tests,”

NUREG/CR–4527 / SAND86-0336, Volume 2, Chavez, J. M. and Nowlen, S. P., Nuclear Regulatory Commission, Washington, DC, November, 1988.

30. NUREG/CR–6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities Volume 2 Detailed Methodology," EPRI 1008239 Final Report, NUREG/CR–6850 / EPRI 1023259, Nuclear Regulatory Commission, Rockville, MD, September, 2005.
31. NUREG/CR–7010, "Cable Heat Release, Ignition, and Spread in Tray Installations During Fire (CHRISTIFIRE) Volume 1: Horizontal Trays," Draft Report for Comment, McGrattan, K., Office of Nuclear Regulatory Research, Nuclear Regulatory Commission, Washington, DC, October, 2010.
32. NUREG-6850 Supplement 1 (2010), "Fire Probabilistic Risk Assessment Methods Enhancements," Electric Power Research Institute (EPRI) 1019259, NUREG/CR-6850 Supplement 1, Nuclear Regulatory Commission, Washington, DC, September, 2010.
33. Hughes Associates Report, "Evaluation of Units 1 and 2 Control Room Abandonment Times at the Catawba Nuclear Station," Revision 0, Hughes Associates, Inc., Baltimore, MD, June 26, 2013.
34. SFPE Handbook of Fire Protection Engineering, Section 2–1, "Fire Plumes, Flame Height, and Air Entrainment," Heskestad, G., *The SFPE Handbook of Fire Protection Engineering*, 4th Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2008.
35. SFPE Handbook of Fire Protection Engineering, Section 2–5, "Effect of Combustion Conditions on Species Production," Gottuk, D. and Lattimer, B. Y., *The SFPE Handbook of Fire Protection Engineering*, 4th Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2008.
36. SFPE Handbook of Fire Protection Engineering, Section 2–6, "Toxicity Assessment of Combustion Products," Purser, D. A., *The SFPE Handbook of Fire Protection Engineering*, 3rd Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2002.
37. SFPE Handbook of Fire Protection Engineering, Section 2–14, "Heat Fluxes from Fires to Surfaces," Lattimer, B. Y., *The SFPE Handbook of Fire Protection Engineering*, 4th Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2008.
38. SFPE Handbook of Fire Protection Engineering, Section 2–14, "Heat Fluxes from Fires to Surfaces," Lattimer, B. Y., *The SFPE Handbook of Fire Protection Engineering*, 3rd Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2002.
39. SFPE Handbook of Fire Protection Engineering, Section 2–15, "Liquid Fuel Fires," Gottuk, D. and White, D., *The SFPE Handbook of Fire Protection Engineering*, 3rd Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2002.
40. SFPE Handbook of Fire Protection Engineering, Section 3–1, "Heat Release Rates," Babrauskas, V., *The SFPE Handbook of Fire Protection Engineering*, 4th

Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2008.

41. SFPE Handbook of Fire Protection Engineering, Section 3–4, "Generation of Heat and Gaseous, Liquid, and Solid Products in Fires," Tewarson, A., *The SFPE Handbook of Fire Protection Engineering*, 4^{th} Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2008.

42. Shokri, M and Beyler, C. L., "Radiation from Large Pool Fires," SFPE Journal of Fire Protection Engineering, Vol. 1, No. 4, pp. 141–150, 1989.

43. Society of Fire Protection Engineers, "The SFPE Engineering Guide for Assessing Flame Radiation to External Targets from Pool Fires," Society of Fire Protection Engineers, National Fire Protection Association, Quincy, Mass., June, 1999.

44. Society of Fire Protection Engineers, "Fire Exposures to Structural Elements," Engineering Guide, National Fire Protection Association, Quincy, Mass., May, 2004.

45. Tatem, P.A., Budnick, E.K., Hunt, S.P., Trelles, J., Scheffey, J.L., White, D.A., Bailey, J., Hoover, J., Williams, F.W., "Verification and Validation Final Report for Fire and Smoke Spread Modeling and Simulation Support of T-AKE Test and Evaluation," NRL/MR/6180—04-8746, Naval Research Laboratory, Washington, D.C., 2004.

46. Wakamatsu, T., Hasemi, Y., Kagiya, K., and Kamikawa, D., "Heating Mechanism of Unprotected Steel Beam Installed Beneath Ceiling and Exposed to a Localized Fire: Verification Using the Real-scale Experiment and Effects of the Smoke Layer," Proceedings of the Seventh International Symposium on Fire Safety Science, International Association for Fire Safety Science, London, UK, 2003.

47. Yokoi, S., "Study on the Prevention of Fire Spread Caused by Hot Upward Current," Report Number 34, Building Research Institute, Tokyo, Japan, 1960.

48. Yuan, L. and Cox, F., "An Experimental Study of Some Line Fires," Fire Safety Journal, 27, 1996.

K. Existing Licensing Action Transition

32 Pages Attached

Licensing Action 01. Commitment to utilize metallic sheathed MI cable as a radiant energy shield in containment per Section III.G.2 of Appendix R to 10 CFR 50

Required Post-Transition Yes

Licensing Basis

In the April 9, 1984 letter to the NRC, Duke committed to utilize metallic sheathed MI cable as a radiant energy shield in containment where incore thermocouple cabling is not separated by more than 20 feet free of intervening combustible materials.

This is acceptable based on the following:

o Meets criteria of BTP CMEB Section 9.5-1, C.7.a - redundant shutdown-related systems within the annulus should be protected by separation of a noncombustible radiant energy shield (one of three possible compliance methods).

o Mineral insulation is a radiant energy shield.

The 07/01/1984 Supplement 3 to the Safety Evaluation Report captured the commitment(s) from the above correspondence. On this basis, the staff concluded that the commitment to utilize metallic sheathed MI cable was acceptable.

The bases for acceptability remains valid.

Fire Areas

ID	Description
RB1	Unit 1 Reactor Building
RB2	Unit 2 Reactor Building

References

Document ID

1984-04-09 Letter [Page 7 of 11] - H.B. Tucker Letter to Denton

Evaluation

The letter states in part:"15. Metallic sheathed MI cable is used for incore thermocouple cabling. In some cases, inside the Reactor Building there is less than 20 feet separation between radiant cables. Mineral insulation is a radiant energy heat shield."

Document ID

1984-07-01 NRC Safety Evaluation Report [Page 9-16] - Supplement 3

Evaluation

The SER states:"By letter dated April 9, 1984, the applicant committed to utilize metallic sheathed MI cable as a radiant energy shield in containment where incore thermocouple cabling is not separated by more than 20 feet free of intervening combustible materials. This conforms with Section III.G.2 of 10 CFR 50 of Appendix R and is, therefore, acceptable."

Licensing Action 02. Deviation from Item C.5.a(5) of BTP CMEB 9.5-1 regarding unlabeled fire doors

Required Post-Transition Yes

Licensing Basis

In letters dated July 29 and December 15, 1982, CNS identified a number of door openings that were provided with unlabeled doors. In the February 1, 1983 Safety Evaluation Report, the NRC found the unrated hollow metal doors with grills to be an equivalent level of protection due to:

- Area is normally attended
- The fire load on both sides of the doors is low.
- The doors are of substantial metal construction.

Therefore, the NRC concluded that the doors will be able to prevent the spread of fire until the fire is extinguished by the station fire brigade. The hollow metal doors with grills are in barriers no longer required to be 3-hour rated. This portion of the licensing action is not required for transition. The remaining licensing action discussing the unlabeled doors in the following paragraphs is still required for transition.

Several other doors serving as pressure doors and bullet/missile resistant doors have been fabricated in accordance with Underwriters Laboratories (UL) approved procedures for 3-hour fire rated doors. Manufacturers have certified that construction is in accordance with UL methods and requirements. Certificates are available for each fire boundary door. Pressure door material is more substantial than tested components.

Therefore, the NRC found that these doors will provide an equivalent level of fire protection to labeled fire doors.

The bases for acceptability remains valid.

References

Document ID

1982-07-29 Letter [Pages 2 and 3] - W.O Parker Letter to Denton

Evaluation

The letter states in part "Pressure doors have not been tested in accordance with ASTM E-152 "Standard for Fire Tests of Door Assemblies," however, manufacturers have certified that construction is in accordance with UL methods and requirements. Certificates are available for each fire boundary door. Pressure door material is more substantial than tested components.

Hollow metal doors in operator's room and interface office (fire area 35) are not rated. This area, adjacent to the control room, is normally attended. Combustible loading is light on each side of the wall. Detectors are provided in each room as well as the control room. Although walls are three hour fire rated the rooms are separated (fire areas) in the Fire Hazards Analysis from the control room for discussion purposes. Therefore, non-fire-rated doors are acceptable.

Three hollow metal doors have louvered grills for radiological purposes. These doors AX100, AX312 and AX391 are installed in concrete walls with a concrete shield wall in a labyrinth arrangement for shielding. These arrangements are acceptable since there is a lack of continuity of combustibles in each adjoining area. Other hollow metal doors are three hour fire rated with either labels attached or manufacturer's certification."

Document ID

1982-12-15 Letter [Attachment 6 pages 2 through 11] - H.B. Tucker Letter to Denton

Licensing Action 02. Deviation from Item C.5.a(5) of BTP CMEB 9.5-1 regarding unlabeled fire doors

Evaluation

The letter states "Unlabeled composite steel doors and hollow metal doors equipped with grills which are located within committed fire boundary walls are indicated in the following summaries.

The four hollow metal committed fire boundary doors equipped with grills for radiological purposes are shown on the drawings listed below.

Drawing No.	Door No.	Elevation	Location
CN-1200-1.1	AX100	522+0	FF-56
CN-1200-8.2	AX312	560+0	MM-51
CN-1200-8.3	AX391	560+4	MM-63
CN-1200-9.1	AX526B	577+0	PP-58

The drawings listed below show locations of composite steel low yield pressure doors, pressure doors, bullet resistant doors, and missile resistant doors located in committed fire boundary walls. There are a total of 29 composite steel committed fire boundary doors.

Drawing No.	Door No.	Elevation	Location	MFR/Document Number
CN-1200-5.1	AX248	543+0	QQ-57	Overly/CNM 1182.04-10
CN-1200-8.1	AX417	560+0	QQ-57	Overly/CNM 1182.04-10
CN-1200-8.4	S102A	554+0	AA-54	R V Harty/CNM 1182.00-5
CN-1200-8.5	AX415	560+0	DD-45	Overly/CNM 1182.04-4
	AX416	560+0	DD-69	Overly/CNM 1182.04-4
CN-1200-9.1	AX525	577+0	QQ-55	Overly/CNM 1182.04-16
	AX525B	577+0	QQ-56	Overly/CNM 1182.04-10
	AX526D	577+0	QQ-58	Overly/CNM 1182.04-13
CN-1200-9.2	AX525	577+0	QQ-55	Overly/CNM 1182.04-16
CN-1200-9.3	AX526D	577+0	QQ-58	Overly/CNM 1182.04-13
CN-1200-9.4	S303A	574+0	AA-54	R V Harty/CNM 1182.00-5
	S304A	574+0	AA-60	Mosler/CNM 1182.00-49
CN-1200-10.1	AX630	594+0	QQ-58	Overly/CNM 1182.04-10
	AX632	594+0	QQ-57	Overly/CNM 1182.04-29
CN-1200-10.2	AX635E	594+0	QQ-53	Overly/CNM 1182.04-29
	AX635F	594+0	QQ-54	Overly/CNM 1182.00-81
CN-1200-10.3	AX630	594+0	QQ-58	Overly/CNM 1182.04-10
	AX635	594+0	QQ-61	Overly/CNM 1182.04-29
CN-1200-10.4	S400	594+0	AA-55	Overly/CNM 1182.04-7
	S406	594+0	AA-59	Overly/CNM 1182.04-7
	AX657F	594+0	DD-60	Overly/CNM 1182.00-97
	AX657G	594+0	DD-57	Overly/CNM 1182.00-97
	AX657H	594+0	DD-54	Overly/CNM 1182.00-97
	AX657J	594+0	CC-53	Overly/CNM 1182.00-97
CN-1200-10.5	AX655	594+0	DD-62	Overly/CNM 1182.04-1
	AX658B	594+0	DD-52	Overly/CNM 1182.04-1
CN-1200-11.2	AX700B	605+10	KK-50	Mosler/CNM 1182.00-44
	AX720	605+10	JJ-51	Overly/CNM 1182.04-04
CN-1200-11.3	AX602	594+0	UU-52	R V Harty/CNM 1182.00-5
CN-1200-12.1	AX635	594+0	QQ-61	Overly/CNM 1182.04-29
CN-1200-12.2	AX714B	605+10	KK-64	Mosler/CNM 1182.00-43
	AX721	605+10	JJ-63	Overly/CNM 1182.04-4
CN-1200-12.3	AX627	594+0	UU-62	R V Harty/CNM 1182.00-5
CN-1200-13.1	AX630	594+0	QQ-58	Overly/CNM 1182.04-10
	AX632	594+0	QQ-57	Overly/CNM 1182.04-29

Licensing Action 02. Deviation from Item C.5.a(5) of BTP CMEB 9.5-1 regarding unlabeled fire doors

Evaluation

	AX635E	594+0	QQ-53	Overly/CNM 1182.04-29
	AX635F	594+0	QQ-54	Overly/CNM 1182.00-81
CN-1200-13.4	AX602	594+0	QQ-52	R V Harty/CNM 1182.00-5

Also attached are eight vendor letters certifying door construction. These are typical letters covering composite steel doors or hollow metal doors.

From Overly Manufacturing Company dated 5-1-80:

We hereby certify that door Mark Nos. AX415, AX416, AX720 and AX721 for Catawba Nuclear Station have been fabricated in strict accordance with Underwriters' Laboratories approved procedures for Class "A" 3-hour fire doors. The doors will not bear the physical label because the gasketing required to satisfy the leakage rates is not covered by U. L. procedures for labeled fire doors.

From Overly Manufacturing Company dated 4-18-80:

We hereby certify that door MK. Nos. AX630, AX5258, AX248 and AX417 for Catawba Nuclear Station have been fabricated in accordance with Underwriters Laboratories approved procedures for Class "A" 3-hour fire doors. The doors will not bear the physical label because the material thicknesses required to satisfy the pressure loadings exceed those permitted by U.L. procedures.

From Mosler dated 10-29-79:

Subject: U.L. Certification

This is to certify that door and frame No. AX-700B have been designed and manufactured to meet the requirements of U.L. 10-B - Three-hr. Label Construction.

From R. V. Harty Company:

UL "A" Label Construction Certificate

R. V. Harty Company hereby certifies that door number AX627 has been constructed in accordance with the practices and specifications typical for UL "A" label doors.

From Overly Manufacturing Company dated 7-24-80:

We hereby certify that door Mark No's. AX632, AX635, AX635E, AX660, and AX661 are designed to meet or exceed the requirements of U. L. 752 Class IV (High Power Rifle) bullet resisting rating.

We certify that the doors are fabricated of fire resistant materials but cannot bear an Underwriters label because of certain features of construction which are not Incorporated in U. L. procedures for "A" 3-hour fire doors.

From Williamsburg Steel Products Company dated 6-15-81:

Gentlemen:

This is to certify that the doors we furnished for the above job, under the following tags, have been fabricated in accordance with the requirements of the Underwriters Laboratories for "A" labeled doors.

All component parts used in the manufacture of these doors meet Underwriters specifications.

The tag numbers are:

S101C, AX393B, AX517, AX355A, S101F, AX394, AX518, S101G, AX394B, AX533C, S301B, AX394C, AX535, S301C, AX395, AX536, S407, AX396, AX657F, AX352C, AX515, AX657G, AX353, AX516A, AX657H, AX353B, AX516K, AX657J, AX355B, AX516M, AX353C

Licensing Action 02. Deviation from Item C.5.a(5) of BTP CMEB 9.5-1 regarding unlabeled fire doors

Evaluation

From Williamsburg Steel Products Company dated 12-1-80:

Gentlemen:

This is to certify that the two doors we have furnished for the above job, tags X665B and X800C have been fabricated in accordance with the requirements for Underwriter "A" labelled doors.

All component parts used in the manufacture of these doors meet Underwriter's Specifications for "A" labels.

Our records disclose that these doors bore the "A" label when they left our plant.

The above certification may probably be acceptable to the owners, in lieu of returning the doors to our plant for factory inspection and re-labeling.

From J. Mac Rob Company, inc. dated 6-17-81:

This is to certify that the following numbered doors for above subject were constructed in accord with Underwriters Laboratories procedure:

S101C, S101F, S101G, S301B, S301C, S407, AX352C, AX353, AX353B, AX355B, AX393B, AX394, AX394B, AX394C, AX395, AX396, AX515, AX516A, AX516K, AX516M, AX517, AX518, AX533C, AX535, AX536, AX657F, AX657G, AX657H, AX657J, AX353C, AX355A."

Document ID

1983-02-01 NRC Safety Evaluation Report [Pages 9-36 and 9-37] - NRC Safety Evaluation Report

Evaluation

"Door openings in fire-rated barriers are, for the most part, equipped with labeled fire doors. By letters dated July 29 and December 15, 1982, the applicant identified a number of door openings that were provided with unlabeled doors. Non-fire-rated, hollow metal doors are located in the operator's room and interface office (Fire Area 35). Several hollow metal doors with louvered grills for radiological purposes are located in the station. The fire load on both sides of these doors is low. The doors are of substantial metal construction. Therefore, they will be able to prevent the spread of fire until the fire is extinguished by the station fire brigade.

Pressure doors as well as bullet- and missile-resistant doors are located in some fire boundaries. These doors have been fabricated in accordance with Underwriters Laboratories (UL) approved procedures for 3-hour-fire-rated doors. Certificates from the manufacturers are on file that verify the construction of the doors. They are not labeled because modifications necessary to satisfy leakage rates, bullet resistance, and pressure loadings are not incorporated in UL procedures. However, it is the staff's opinion that these doors will provide an equivalent level of fire protection to labeled fire doors. The staff finds use of unlabeled fire doors in the above referenced areas to be an acceptable deviation from Item C.5.a(5) of BTP CMEB 9.5-1."

Chapter 3 References

Reference

3.11.3 Fire Barrier Penetrations.

Licensing Action	03. Deviation from Item C.5.b and C.5.c of SRP 9.5-1 regarding unprotected structural steel supporting protected cables in the AFW pump room .
Required Post-Transition	No
Licensing Basis	During the April 15-19, 1985 NRC Region II inspection at Catawba Units 1 and 2 it was identified that the structural steel which supports protected cables in the auxiliary feedwater pump room area was not fire protected with a 1-hour fire resistive material. Duke responded to an inspection report in a May 31, 1985 letter to the NRC, which referenced an April 26, 1985 memo to file evaluation of the potential fire severity in these particular fire areas. Both the letter and memo to file concluded the maximum potential fire load in the auxiliary feedwater pump room area is very low. It was determined to not be possible for sufficient heat to be developed for the duration needed to result in failure of any unprotected cable tray supports and concluded that addition of fire resistive material to the subject cable tray supports was not necessary. In the February 1, 1986 Supplement 5 to the Safety Evaluation Report the deviation from SRP 9.5-1, C.5.b and C.5.c was approved and the NRC staff concluded that the supports for the protected tray in the auxiliary feedwater pump room do not require additional protection and the staff considers this issue closed. This deviation is no longer required. The NFPA 805 transition compliance strategy is in accordance with Section 4.2.4, and uses a performance based approach that evaluates fire protection systems and features requirements. The cable tray protection is no longer required for compliance.

Licensing Action	04. Deviation from Item C.5.b of BTP CMEB 9.5-1 regarding partial coverage sprinkler system
Required Post-Transition	No
Licensing Basis	In the July 1983 version to the response to Branch Technical Position APCSB (CMEB) 9.5-1, Duke deviated from the staff's fire protection guidelines in that automatic sprinklers are not provided throughout fire areas 2, 3, 39, and 40. In the 07/01/1984 Supplement 3 to the Safety Evaluation Report the deviation from BTP CMEB Section 9.5-1, C.5.b was approved. This deviation is no longer required. The NFPA 805 transition compliance strategy is in accordance with Section 4.2.4, and uses a performance based approach that evaluates fire protection systems and features requirements.

Licensing Action	05. Deviation from Item C.5.b of BTP CMEB 9.5-1 related to fire areas containing safe shutdown related equipment without having automatic suppression
Required Post-Transition	No
Licensing Basis	The Fire Hazards Analysis (FHA) identifies fire areas containing safe-shutdown-related equipment that are not protected by an automatic sprinkler system. In the 02/01/1983 Safety Evaluation Report the deviation from BTP CMEB, Section 9.5-1, Item C.5.b was approved based on each of the fire areas below having 3 hour fire barriers and the shutdown system is available to achieve safe shutdown. Cables in these areas are of galvalized steel interlocked armor design. These fire areas may also have manual hose stations and automatic detection. The bases for acceptability remains valid. This deviation is no longer required. The NFPA 805 transition compliance strategy is in accordance with Section 4.2.4, and uses a performance based approach that evaluates fire protection systems and features requirements.

Licensing Action	06. Deviation from Item C.6.a of BTP CMEB 9.5-1 related to unsupervised water flow alarms.
Required Post-Transition	No
Licensing Basis	In a letter dated February 10, 1984, Duke Energy identified that Sprinkler system waterflow signaling and valve position signaling circuits were not electrically supervised. The NRC Safety Evaluation Report dated July 1, 1984 concluded that the unsupervised water flow alarm circuits were an acceptable deviation. This deviation is no longer required because NFPA 805 Chapter 3 contains an equivalent requirement.

Licensing Action	07. Deviation from Item C.6.c of BTP CMEB 9.5-1 related to standpipe protection in the annulus and pipe tunnel.

Required Post-Transition Yes

Licensing Basis

During the site audit, the NRC observed that manual firefighting capability was deficient throughout the various elevations of the annulus. In addition, the existing hose stations in Fire Area 1 are not capable of reaching all areas of the pipe tunnel.

By letter dated January 17 and February 10, 1984, CNS committed to install an automatic sprinkler system having branch lines on elevations 561 feet, 604 feet and 664 feet. In addition to the automatic sprinklers, CNS committed to install additional line-type heat detectors on six levels of the annulus, located at every other level. CNS also committed to provide additional fire hose, stored in the fire brigade equipment storage area for use in fighting a fire in the pipe tunnel. On the basis of this commitment, the NRC concluded that the fire protection provided for the annulus and pipe tunnel provides an acceptable deviation from Section C.6.c of BTP CMEB 9.5-1.

The bases for acceptability remains valid.

Fire Areas

ID	Description
01 (U1)	ND & NS Pump Room El 522 (Common)
01 (U2)	ND & NS Pump Room El 522 (Common)
RB1	Unit 1 Reactor Building
RB2	Unit 2 Reactor Building

References

Document ID

1984-01-17 Letter - H.B. Tucker Letter to Denton

Evaluation

"On November 1-4, 1983 Mr. Dennis Kubicki of your staff and Mr. Jim Behn of Gage-Babcock conducted a fire protection site audit at Catawba.

One of the topics discussed was sprinklers in the Reactor Building Annulus. The Annulus Sprinkler System will be manually activated, designed for light hazard occupancy with a minimum of five heads operating and with 1000 gpm reserved for hose streams. Standard in-rack sprinkler heads (with 5 inch diameter water spray shields) will be utilized."

Document ID

1984-02-10 Letter [Page 4] - H.B. Tucker Letter to Denton

Evaluation

The letter states, "A fixed fire suppression system will be installed in the annulus utilizing three elevations of sprinkler branch lines, on a manually actuated light hazard system, designed for the most hydraulically remote five heads operating, using 212 deg. F rated heads with 5 inch water shields. A minimum of 500 GPM will be reserved for hose streams. Line type heat detection will be installed parallel to sprinkler branch lines in lieu of spot type detectors for the annulus.

In order to provide protection to the pipe tunnel adjacent to Fire Area 1 (Elevation 522 feet), additional 1 1/2 inch hose will be stored in the fire brigade locker. Hydraulic calculations verify that water supply is adequate to utilize 1 1/2 inch hose supplied from standpipe connections in Fire Area 1. The Station Prefire Plan will include appropriate instructions."

Licensing Action 07. Deviation from Item C.6.c of BTP CMEB 9.5-1 related to standpipe protection in the annulus and pipe tunnel.

Document ID

1984-07-01 NRC Safety Evaluation Report [Page 9-14] - Supplement 3

Evaluation

The SER states, "During the site audit, the staff observed that manual firefighting capability was deficient throughout the various elevations of the annulus. In addition, the existing hose stations in Fire Area 1 are not capable of reaching all areas of the pipe tunnel.

By letter dated January 17 and February 10, 1984, the applicant committed to install an automatic sprinkler system having branch lines on elevations 561 feet, 604 feet and 664 feet. In addition to the automatic sprinklers, the applicant has committed to install additional line-type heat detectors on six levels of the annulus, located at every other level. The applicant also committed to provide additional fire hose, stored in the fire brigade equipment storage area for use in fighting a fire in the pipe tunnel. On the basis of this commitment, the staff concludes that the fire protection provided for the annulus and pipe tunnel provides an acceptable deviation from Section C.6.c of BTP CMEB 9.5-1."

Licensing Action 08. Deviation from Item C.6.c(1) of BTP CMEB 9.5-1 regarding unlisted water supply valves.

Required Post-Transition Yes

Licensing Basis Several isolation, vent, check, or drain RF (interior fire protection system) valves located within nuclear safety-related areas, particularly within the reactor buildings, are not UL listed or Factory Mutual (FM) approved. Of the 38 RF valves located within each reactor building, 14 valves are not UL listed. The evaluation determined that the NRC found this to be an acceptable based on the following:

- These unlisted valves are constructed of stainless steel or carbon steel bodies.
- All valves pertaining to this calculation are designed to specifications outlined in ANSI/ASTM B31.1.
- Valves provide an equivalent level of protection as the UL-listed valves.

The bases for acceptability remains valid.

Fire Areas

ID	Description
Unit 1	Zone Generic
Unit 2	Zone Generic

References

Document ID

1982-07-29 Letter [Pages 3 and 4] - W.O Parker Letter to Denton

Evaluation

The letter states, "12. Statement "We will require the applicant to comply with NFPA 13 in accordance with BTP CMEB 9.5-1, Item C.6.c(1)."

Response: Fixed sprinkler systems will comply with NFPA 13-1980 "Installation of Sprinkler Systems." An exception is to requirement on section 3.14.1 "All valves.... shall be listed indicating valves....".

Several isolation, vent, check, or drain RF (Interior Fire Protection System) valves located within nuclear safety related areas particularly within the Reactor Buildings, are not UL listed or FM approved. Of the 38 RF valves located within each Reactor Building, 14 valves are not UL listed. These unlisted valves are constructed of stainless steel or carbon steel bodies and were chosen in place of UL listed carbon steel valves because of the superior strength of the stainless steel or carbon steel components. While the RF system is not seismically qualified except at pressure boundaries (such as Reactor Building RF penetrations), these valves aid in reducing the number of pipe supports needed to prevent pipe interaction during or following a seismic event.

The sprinkler isolation valve and hose connection supply piping for each unit's Auxiliary Feedwater Pump Room are also unlisted. These valves are seismically qualified and were utilized such that piping within these areas could be seismically designed and a pressure boundary maintained. Suitable UL listed valves were not available.

The 4 RF valves (3 motor operated, 1 vent) located within the Auxiliary Building for the three RF supply pipes to the Reactor Building are also unlisted. These valves required seismic qualification to maintain the Reactor pressure boundary. Suitable seismically qualified UL listed valves were not available.

The two Auxiliary Building RY (Exterior Fire Protection) supply lines from the underground loop are each provided with an electric motor operated valve. These valves are seismically designed and therefore unlisted.

All valves mentioned are designed to specifications outlined in ANSI/ASTM B31.1 and are considered equivalent or superior to UL listed valves.

RF butterfly valves located within the Auxiliary Building have been modified to accept chain operators. This modification involves removal of the hand crank on each valve and substituting a wheel and chain assembly. This modification is necessary for accessibility."

Licensing Action 08. Deviation from Item C.6.c(1) of BTP CMEB 9.5-1 regarding unlisted water supply valves.

Document ID

1983-02-01 NRC Safety Evaluation Report [Pages 9-41 and 9-42] - NRC Safety Evaluation Report

Evaluation

The SER states, "Several isolation, vent, check, or drain RF (interior fire protection system) valves located within nuclear safety-related areas, particularly within the reactor buildings, are not UL listed or Factory Mutual (FM) approved. Of the 38 RF valves located within each reactor building, 14 valves are not UL listed. These unlisted valves are constructed of stainless steel or carbon steel bodies.

The sprinkler isolation valve and hose connection supply piping for each unit's auxiliary feedwater pump room also are unlisted. These valves are seismically qualified and were utilized so that piping within these areas could be seismically designed and a pressure boundary maintained.

The four RF valves (three motor operated, one vent) located within the auxiliary building for the three RF supply pipes to the reactor building also are unlisted. These valves required seismic qualification to maintain the reactor pressure boundary. Suitable seismically qualified UL-listed valves were not available.

The two auxiliary building RY (exterior fire protection) supply lines from the underground loop are each provided with an electric motor-operated valve. These valves are seismically designed and, therefore, unlisted.

All valves mentioned are designed to specifications outlined in ANSI/ASTM B31.1. The staff concludes that these valves will provide the same level of protection as the UL-listed valves and is, therefore, an acceptable deviation from Item C.6.c(1) of BTP CMEB 9.5-1."

Chapter 3 References

Reference

3.9.5 [Fire Suppression System Shutoff Controls]

Licensing Action	09. Deviation from Item C.6.c(1) of BTP CMEB 9.5-1 related to seismic design of standpipe systems.

Required Post-Transition Yes

Licensing Basis

Duke Energy did not identify seismic design of standpipe systems, which is recommended in BTP CMEB 9.5-1, Item C.6.c(1) for CNS. For plants with construction permits issued before July 30, 1976, the guidelines contained in Appendix A to BTP ASB 9.5-I have no requirement for seismic design of standpipe systems. Therefore, the NRC found that this is an acceptable deviation from the guidelines of CMEB 9.5-1, Item C.6.c(1).

The bases for acceptability is still valid.

Fire Areas

ID	Description
Unit 1	Zone Generic
Unit 2	Zone Generic

References

Document ID

1983-02-01 NRC Safety Evaluation Report [Page 9-42] - NRC Safety Evaluation Report

Evaluation

The applicant has not identified seismic design of standpipe systems, which is recommended in BTP CMEB 9.5-1, Item C.6.c(1). For plants with construction permits issued before July 30, 1976, the guidelines contained in Appendix A to BTP ASB 9.5-1 have no requirement for seismic design of standpipe systems. Therefore, this is an acceptable deviation from the guidelines of CMEB 9.5-1, Item C.6.c(1).

Chapter 3 References

Reference

3.6.4 [Standpipe and Hose Station Earthquake Provisions]

Licensing Action	10. Deviation from Section C.3.b of BTP CMEB 9.5-1 regarding composition of the Fire Brigade
Required Post-Transition	No
Licensing Basis	In a letter dated March 14, 1984, CNS requested approval for a deviation from Section C.3.b of BTP CMEB 9.5-1 that at least two fire brigade members should have training in or knowledge of plant safety related systems. The purpose of the deviation was to allow two Nuclear Equipment Operators (NEOs) to be assigned as technical assistants to the fire brigade, in lieu of having two brigade members who have system knowledge. This deviation was approved in SSER #3 dated July 1984. This deviation is no longer required because NFPA 805 Chapter 3 contains an equivalent requirement.

Licensing Action	11. Deviation from Section C.5.a of BTP CMEB 9.5-1 non-fire-rated hatchway covers
Required Post-Transition	No
Licensing Basis	In the July 1983 revision to the response to Branch Technical Position APCSB (CMEB) 9.5-1, and in a letter dated October 5, 1983, Duke Energy described a number of features of the fire protection program that deviate from fire protection guidelines. In a November 4, 1983 revised response to Branch Technical Position APCSB (CMEB) 9.5-1, Duke Energy provided reasonable assurance that fire will not propagate up through the hatchway, while the cover is in place, until the fire is extinguished by automatic or manual protection systems. In Supplemental Safety Evaluation Report #3 dated July, 1984, the NRC found the non-fire-rated hatchway covers to be an acceptable deviation to BTP 9.5-1, Section C.5.a. The deviation is no longer required because the subject licensing action has been demonstrated adequate for the hazard in CNC-1435.00-00-0035.

Licensing Action	12. Deviation from Section C.5.a of BTP CMEB 9.5-1 regarding protection of HVAC penetrations of fire barriers

Required Post-Transition Yes

Licensing Basis

In some fire rated walls and floor/ceiling assemblies, openings were provided for HVAC duct access which are larger than the ducts themselves. To support fire damper sleeves in this opening a steel plate was used to form a rigid frame, to which a layer of fireproofing was applied. The remainder of the opening was protected by a fire rated silicone foam. While the composite design has not been tested by an independent laboratory, the individual components have been tested. The testing was found to be acceptable based on the following:

- The fireproofing and foam sealant has successfully passed the acceptance criteria of ASTM E-119 individually as documented in the U.L. Building Materials Directory, 1983.

The bases for acceptability remains valid.

Fire Areas

ID	Description
Unit 1	Zone Generic
Unit 2	Zone Generic

References

Document ID

1984-04-09 Letter [Pages 5 and 6] - H.B. Tucker Letter to Denton

Evaluation

13. HVAC Wall/Floor Penetrations. In certain wall/floor openings of committed concrete fire barriers, HVAC ducts penetrate which are smaller in size than the openings themselves. This condition has resulted from the necessity of designing and constructing certain barriers prior to establishing actual duct sizes.

To support fire damper sleeves in these openings, minimum 1/2" x 7" steel plate was used, forming 3 rigid frame. A minimum thickness of 1 1/2 inches of Pyrocrete was applied to all surfaces at these plates and the remainder of each opening was sealed with RTV Silicone Foam. Cable trays, conduit, or process piping may occasionally be routed through the unused area of such a barrier opening.

To support existing HVAC design, a similar approach was used to install fire dampers in large ducts. In the few cases where ducts or transfer air openings exceeded the maximum available listed damper size, pyrocreted steel plate was used to form mullions between listed dampers, This approach results in a rigid protected frame, forming a separate opening for each listed damper assembly. Attachment 5 contains five copies each of drawings CN-1201-4.5 and CN-1201-4.6. These drawings show typical details of these mullion designs.

Formal acceptance of the use of protected steel plating as described above is requested.

Document ID

1984-07-01 NRC Safety Evaluation Report [Page 9-11] - Supplement 3

Evaluation

In some fire rated walls and floor/ceiling assemblies, openings were provided for HVAC duct access which are larger than the ducts themselves. To support fire damper sleeves in these openings, minimum ½ inch by 7-inch steel plate was used to form a rigid frame. To provide a degree of fire resistance to the frame to assure that the assembly will not collapse under a fire exposure, a minimum thickness of 1 1/2 inches of a U.L. listed catalyzed magnesium oxychloride fireproofing was applied. The remainder of the opening was protected by a fire rated silicone foam. While this composite design of fire proofing and foam sealant has not been tested by an independent laboratory, they have successfully passed the acceptance criteria of ASTM E-119 individually as documented in the U.L. Building Materials Directory, 1983. Based on these tests, and the staff's independent evaluation of the proposed design, the staff concludes that it provides reasonable assurance that under an anticipated fire exposure the integrity of the barrier will not be affected. Therefore, the staff has concluded that the design represents an acceptable deviation from Section C.5.a of BTP CMEB 9.5-1

Licensing Action	12. Deviation from Section C.5.a of BTP CMEB 9.5-1 regarding protection of HVAC penetrations of fire barriers
	Evaluation
Chapter 3 References	**Reference** 3.11.4 Through Penetration Fire Stops. (a)

Licensing Action 13. Deviation from Section C.5.a of BTP CMEB 9.5-1 regarding unprotected structural steel over the turbine driven auxiliary feedwater pump pit.

Required Post-Transition Yes

Licensing Basis

The NRC's fire protection site audit was conducted between November 1 and November 4, 1983. As a result of the audit, the NRC identified concerns pertaining to various commitments and the degree of compliance with Branch Technical Position APCSB (CMEB) 9.5-1. By letter dated May 11, 1984, Duke Energy requested a deviation regarding the unprotected structural steel over the turbine driven auxiliary feedwater pump pit.

The NRC approved the deviation based on the following information:

- Limited quantities of material consisting of armor interlock cable, grease, sealite conduit, and lubricating oil. Because of the limited quantity and distribution of these materials, an uncontrolled fire would not be expected to develop sufficient duration and temperature to threaten the heavy steel members.
- A high pressure carbon dioxide system protects each pit providing additional assurance of barrier integrity.
- Photoelectric type smoke detectors are also installed in each pit providing early warning to the Control Room through the EFA system.

Therefore, the NRC concluded that the absence of a fire resistive coating on the structural steel members is an acceptable deviation from Section C.5.a of BTP CMEB 9.5-1.

The bases for acceptability remains valid.

Fire Areas

ID	Description
39	Unit 2 Turbine Driven CA Pump Pit El 543
40	Unit 1 Turbine Driven CA Pump Pit El 543

References

Document ID

1984-05-11 Letter - H.B. Tucker Letter to Denton

Evaluation

The letter states, "Section 9.5.1 of the Catawba Safety Evaluation Report discusses Open Item 14, Fire Protection Program. The following information is provided to supplement previous submittals on fire protection.

1. The 17' x 17' cover-of each Turbine Driven Auxiliary Feedwater Pump Pit is made up of seven removable 12" thick concrete slab sections and RTV silicone foam. These covers are supported by W16 x 64 horizontal structural steel members. No fire resistive coating has been applied to this steel based on the minimal insitu and potential transient combustible loading.

Combustible materials consist of armor interlock cable, grease, sealite conduit, and lubricating oil. Due to the limited quantity and distribution of these materials, an uncontrolled fire could not be expected to develop sufficient duration and temperature to threaten the heavy steel members. A high pressure carbon dioxide system protects each pit providing additional assurance of barrier integrity. Photoelectric type smoke detectors are also installed in each pit providing early warning to the Control Room through the EFA system.

Considering these factors, application of a fire resistive coating to the structural members is not beneficial and an exception is requested."

Document ID

1984-07-01 NRC Safety Evaluation Report [Pages 9-16 and 9-17] - Supplement 3

Licensing Action	13. Deviation from Section C.5.a of BTP CMEB 9.5-1 regarding unprotected structural steel over the turbine driven auxiliary feedwater pump pit.

Evaluation

The SER states, "The 17' x17' cover of each turbine driven auxiliary feedwater pump pit is made up of seven removable 12" thick concrete slab sections and RTV silicone foam. These covers are supported by W16 x 64 horizontal structural steel members. No fire resistive coating has been applied to this steel based on the minimal in situ and potential transient combustible loading.

Combustible materials consist of armor interlock cable, grease, sealite conduit, and lubricating oil. Because of the limited quantity and distribution of these materials, an uncontrolled fire could not be expected to develop sufficient duration and temperature to threaten the heavy steel members. A high pressure carbon dioxide system protects each pit providing additional assurance of barrier integrity. Photoelectric type smoke detectors are also installed in each pit providing early warning to the Control Room through the EFA system.

Therefore, the staff has concluded that the absence of a fire resistive coating on the structural members is an acceptable deviation from Section C.5.a of BTP CMEB 9.5-1."

Chapter 3 References

Reference

3.11.2 Fire Barriers.

Licensing Action	14. Deviation from Section C.6.a of BTP CMEB 9.5-1 regarding absence of certain fire detectors in safety related areas

Required Post-Transition No

Licensing Basis

In a September 14, 1982 letter, CNS provided a listing of all rooms in the plant and the type of detection provided. A number of these rooms did not contain fire detectors.

The NRC Safety Evaluations dated February 1, 1983 and July 1, 1984 concluded that the absence of detection in these locations is an acceptable deviation from Section C.6.a of BTP CMEB 9.5-1.

This deviation is no longer required. The NFPA 805 transition compliance strategy is in accordance with Section 4.2.4, and uses a performance based approach that evaluates fire protection systems and features requirements.

Licensing Action	15. Deviation from Section C.6.a of BTP CMEB 9.5-1 regarding the absence of certain fire rated seals in penetrations of exterior walls and roofs.
Required Post-Transition	No
Licensing Basis	In a letter dated April 9, 1984, CNS requested a deviation from Section C.6.a of BTP CMEB 9.5-1 because penetrations in the exterior walls and roofs of the Auxiliary Building, Diesel Generator Buildings, Reactor Buildings and Nuclear Service Water Pump Structure are sealed only to maintain a pressure boundary or for weatherization purposes. During the site audit, the staff found no significant, unprotected fire hazards which present a potential fire hazard to the exterior surfaces of these structures. The NRC concluded that the penetration of these exterior walls and roof do not require closure with fire rated sealant and that this is an acceptable deviation from Section C.6.a of BTP CMEB 9.5-1 This deviation is no longer required because NFPA 805 Chapter 3 contains an equivalent requirement.

Licensing Action	16. Deviation from Section C.7.c of BTP CMEB 9.5-1 regarding no fixed fire suppression in the Cable Spreading Room.
Required Post-Transition	No
Licensing Basis	The purpose of the evaluation was to document the acceptability of the lack of fixed fire suppression system for cable spreading rooms. The evaluation determined that the NRC found this to be an acceptable deviation to BTP 9.5-1, Section C.7.c. This deviation is no longer required. The NFPA 805 transition compliance strategy is in accordance with Section 4.2.4, and uses a performance based approach that evaluates fire protection systems and features requirements.

Licensing Action	17. Installation of Standby Shutdown System per NRC SER Requirement
Required Post-Transition	Yes

Licensing Basis

The capability of the dedicated standby shutdown system (SSS) for achieving hot shutdown was not specifically detailed in the February 1, 1983 Safety Evaluation Report. The NRC staff requires that this system comply with the guidelines contained in BTP CMEB Section 9.5-1, C.5.c. Duke addressed the additional details pertaining to the capability of the SSS in the June 29 and November 13, 1984 letters to the NRC. The December 1, 1984 Supplement 4 to the Safety Evaluation Report captured the commitments and clarifications of the above correspondence. On the basis of the above, the staff concluded that the SSS capability of the Catawba Nuclear Station complies with the guidelines of BTP CMEB Section 9.5-1, C.5.c, and is, therefore, acceptable.

The bases for acceptability remains valid.

Fire Areas

ID	Description
Unit 1	Zone Generic
Unit 2	Zone Generic

References

Document ID

1981-10-23 Letter [Introduction, Page 1] - W.O Parker Letter to Denton

Evaluation

The letter states, "Duke Power Company is installing a Standby Shutdown System (SSS) at Catawba Nuclear Station to provide an additional means of achieving and maintaining the unit in a hot standby condition."

Document ID

1983-02-01 NRC Safety Evaluation Report [Pages 9-37 and 9-46] - NRC Safety Evaluation Report

Evaluation

The SER states: "The applicant commits to install a dedicated standby shutdown capability to provide a means of bringing the unit to a safe hot shutdown condition that is completely independent of loss of the station's normal redundant safe shutdown capability. A description has not been provided to verify the capability of the dedicated standby shutdown system for achieving hot and cold shutdown. The staff will require that the standby shutdown system comply with the guidelines contained in BTP CMEB 9.5-1, Item C.5.c. The staff will report the resolution of this matter in a supplement to the SER."

In Section 9.5.1.9, Conclusions:

"The following Items remain open:

(2) Description of standby shutdown system (section 9.5.1.5)"

Document ID

1983-07-05 Letter [Attachment 3] - H.B. Tucker Letter to Denton

Licensing Action 17. Installation of Standby Shutdown System per NRC SER Requirement

Evaluation

The July 5, 1983 letter discussed the following:

- Review of cable separation in Unit 1 Reactor Building where the assumptions, procedures and results of the detailed evaluation for Unit 1 Catawba Appendix R study were documented.
- Discussion of Associated Circuits indicating that CNS meets Appendix R in regard to associated cables, since none of the cables fail into the category of associated cables.
- Information to support CNS Safe Shutdown System concluding that the design of the SSS meets the Appendix R criteria providing an assured shutdown capability exists for a fire in any given fire area.

Document ID

1984-06-01 NRC Safety Evaluation Report [Page 9-3] - Supplement 2

Evaluation

The Standby Shutdown System is not specifically discussed; however in section 9.5.1.9, Conclusions the following is stated:

"One of the following items remaining open:

(2) Description of Standby Shutdown System (Section 9.5.1.5)"

Document ID

1984-06-28 Letter - Duke Letter to NRC

Evaluation

This letter states, "

I. PURPOSE

This document summarizes the evaluation which assured means of achieving and maintaining cold shutdown were not encumbered as a result of a fire or assured the fire damage was limited so that the necessary systems could be made operable and cold shutdown achieved.

II.

APPROACH

The minimum equipment required for cold shutdown, in addition to the equipment required for hot standby, was identified. Credit was taken for manual operation of the motor operated valves, via handwhecls, and the replacement of transmitters with direct reading pressure gauges. Therefore, the additional cold shutdown components requiring electrical power are the following:

Residual Heat Removal Pumps

Component Cooling Water Pumps

Nuclear Service Water Pumps

Centrifugal Charging Pumps

Licensing Action 17. Installation of Standby Shutdown System per NRC SER Requirement

Evaluation

Pressurizer PORVs

A. Pumps and Valves

Only one pump of each group is required to operate and only one of the Pressurizer PORVs is required to operate, thus the fire areas were examined to determine the extent of possible fire damage to these functions. Our analysis identified thb redundant functions that were located within the same fire area and were not protected by fire detection and automatic fire suppression systems. Only the power cables for the pumps were examined, Since the pumps could be manually controlled at the respective switchgear.

B. Instrumentation

In addition to the instrumentation required for hot standby, the following parameters need to be monitored for cold shutdown.

Main Steamline Pressure

Refueling Water Storage Tank Level

Containment Pressure

If these loops are inoperable, due to a fire, pressure gauges could be temporarily installed as part of damage control measures.

III.

RESULTS

A. Pumps and Valves

1. Pressurizer PORVs

Both trains of the Pressurizer PORVs are located within Inner Containment; however, with a fire within Inner Containment depressurization can be achieved using four wt. % boric acid or refueling water via a flow path from the Centrifugal Charging pumps using the Auxiliary Spray valve to the pressurizer. Therefore damage control procedures are not required.

Outside Containment, the cables for the redundant Pressurizer PORVs are either separated by fire areas; or, have fire detection and automatic fire suppression systems. Thus, damage control measures are not required.

2. Residual Heat Removal Pumps

The power cables for both Residual Heat Removal pumps are routed thru the same fire area and they are not protected by an automatic fire suppression system. Thus damage control procedures will be available to replace one of these power cables.

3. Component Cooling Water Pumps

All four of the Component Cooling Water pumps have their power cables routed thru the same fire area and these cables are not protected by an automatic fire suppression system. Therefore, damage control procedures will be available to replace one of the Train A power cables.

4. Nuclear Service Water and Centrifugal Charging Pumps

The power cables associated with the redundant trains for each pump are separated by fire areas; thus, damage control measures are not required.

B. Power

Licensing Action 17. Installation of Standby Shutdown System per NRC SER Requirement

Evaluation

The 4KV cables from the Train A & B Diesel Generators to their respective switchgear are routed in separate fire areas. Likewise, the power cables to the power panel boards, feeding the Pressurizer PORVs, are separated by fire areas; therefore, damage control procedures are not required.

IV. SUMMARY

An adequate length of cable will be tagged and stored on site for the potential replacement of cables as part of damage control measures. Suitable pressure gauges will also be tagged and stored on site for possible installation as part of damage control measures.

Adequacy of the 26 GPM Standby Makeup Pump

This letter also provided a discussion regarding the adequacy of the 26 GPM Standby Makeup pump, as follows:

"The Standby Shutdown System (SSS) is designed to provide an alternate method of bringing the plant from normal operating conditions to hot standby conditions. Since decay heat removal is accomplished via the steam generators and their associated safety valves, the Reactor Coolant System (RCS) temperature remains high and significant contraction of the RCS inventory does not occur. The RCS pressure boundary is isolated with the exception of the reactor coolant pump {RCP) seal leakoff lines. Thus they are the only paths which could cause a decrease of RCS inventory.

The standby makeup pump will provide at least 26 GPM of borated water to the RCP seals. During normal operation, the flow past the number 1 seal is 3.5 GPM per pump (i.e., 14 GPM total for the four pumps). The Technical Specification 3.4.6.2 limits unidentified leakage to 1.0 GPM, identified leakage to 10 GPM and pressure boundary leakage to 0 GPM. (During normal operation, both identified and unidentified leakage are normally essentially zero.) However, conservatively assuming these leakages are at their maximum Technical Specification limits, the maximum makeup requirement is 25 GPM. Thus the pump is capable of maintaining RCS inventory (with a 1 GPM margin) under these conservative assumptions.

We plan to modify the standby makeup pump to increase the flowrate so that, after consideration of possible measurement errors, test results will demonstrate that the pump is capable of delivering at least 26 GPM. The modification will be completed and the flowrate verified prior to declaring the SSS operable.

In order to provide assurance that normal operational leakage is within the capacity of the standby makeup pump, it is requested that Technical Specification 3.4.6.2 and 4.7.14.2 be revised as marked on the attached pages."

Document ID

1984-06-29 Letter [Page 1 of 3] - H.B. Tucker Letter to Denton

Evaluation

In response to the 02/01/1983 Safety Evaluation Report Duke issued this letter that discussed the following: Certain features of the SSS will not be available by fuel loading; however, would be completed by initial criticality. These features included modifications to: SSF D/G fuel line, standby makeup pump capacity, Train A disconnect enclosure cover, standby makeup pump SSF flow gage, SSS related 8-hour emergency lights, SSS related equipment access platforms. The letter also states in part: "Section 9.5.1.2 of the Catawba Safety Evaluation report discusses fire protection program requirements. This section specifically states that the fire protection program should be operational before initial fuel loading. This is to advise that the fire protection program will be complete and in place inside the Unit 1 protected area prior to Unit 1 fuel load with the following exceptions:...".

Document ID

1984-07-01 NRC Safety Evaluation Report [Pages 9-16 and 9-17] - Supplement 3

Licensing Action 17. Installation of Standby Shutdown System per NRC SER Requirement

Evaluation

Although the staff has not yet completed its review of the alternate shutdown system, it has determined that no safety issue exists during fuel load regarding the requirements for post-fire alternate shutdown. It is the staff's position that all applicant commitments regarding post-fire alternate shutdown including procedures and operator training be complete and implemented prior to initial criticality. Specifically, the staff's review has identified the following open items which need to be resolved prior to initial criticality:

1. Justification for the adequacy of the standby makeup pump capacity.

2. Specific identification of the required cold shutdown repair materials and procedures for their installation.

3. Post-fire shutdown procedures and training.

The staff will report on its alternate shutdown review and these unresolved items in a supplement to this safety evaluation report.

Document ID

1984-11-13 Letter [Page 1 of 1] - H.B. Tucker Letter to Denton

Evaluation

To formally provide notice to the NRC that outstanding items identified in the 02/01/1983 Safety Evaluation Report and Duke letter, dated 06/29/1984 have been completed, Duke submitted the following letter that states in part:"My letter of June 29, 1984 identified certain features of the Catawba Unit 1 fire protection program which would not be complete at the time of fuel loading for Unit 1. This is to advise that items 1 (SSS modifications), 2 (damage control measures and cold shutdown procedures), 5 (CO2 fire protection for D/G 1A), 6 (fire detector installed above the turbine driven auxiliary feedwater pump) and 7 (cork filler material) have been completed."

Document ID

1984-12-01 NRC Safety Evaluation Report [Pages 9-3 and 9-4] - Supplement 4

Evaluation

The standby shutdown system (SSS) is designed to mitigate the consequences of a postulated fire incident to either Catawba Unit 1 or Unit 2 and consists of normal plant safety-related equipment (i.e., each unit's turbine-driven auxiliary feedwater pump) and dedicated equipment (i.e., the standby diesel generator and each unit1s standby makeup pump). The SSS is designed to remove decay heat through the steam generator and provide normal reactor coolant system makeup to maintain hot standby. The SSS supplements the current shutdown capability described in Section 7.4 of the Final Safety Analysis Report (FSAR). It would be operated only in the event that installed normal and emergency systems were inoperable. Manual operator action is required to actuate the system. There is one SSS for both units of the station, but each unit has separate SSS controls.

The major equipment for the SSS is housed within the following plant areas:

(1) dedicated standby shutdown facility (SSF) structure

(2) division A switchgear room for each unit

(3) division B disconnect cubicle for each unit

(4) turbine-driven auxiliary feedwater pump area for each unit

(5) reactor containment building for each unit

Licensing Action 17. Installation of Standby Shutdown System per NRC SER Requirement

Evaluation

The SSF houses a dedicated diesel generator (which powers the standby makeup pump and associated SSS electrical equipment) and its supporting equipment, electrical equipment room, batteries, and control room with the necessary control panels for both units. The SSF is a separate structure from the other plant buildings and is provided with its own heating, ventilating, and air conditioning (HVAC) and lighting systems. Power and control cables are routed from the SSF to the division A switchgear room and do not pass through other plant areas. A fire in one of the following areas may require the use of the SSS: residual heat removal equipment area, motor-driven auxiliary feedwater pump area, charging pump area, battery room, cable room, control room, component cooling water pump area, and spent fuel pool cooling pump area. To activate the SSS, certain operations (such as activation of transfer switches) are performed in the division A switchgear room and the division B disconnect cubicle. These two areas are separated from other plant areas and from each other by 3-hour-fire-rated barriers.

Operation of the turbine-driven auxiliary feedwater (AFW) pump as part of the SSS is accomplished by removing normal power to the pump instrumentation and control cables and transferring power to the SSS power source by means of a transfer switch. The SSS cables for the turbine-driven AFW pump are routed only through designated SSS areas of the plant. The pump is separated from other plant areas by 3-hour-fire-rated barriers.

The standby makeup pump, which supplies reactor coolant system makeup during SSS operation is located in the containment annulus of each unit. The pump provides makeup for normal reactor coolant system leakage and reactor coolant pump seal leakage. The pump draws borated water from the spent fuel pool transfer canal through a pipe connected to the fuel transfer tube in the annulus. The standby makeup pump and valves in the standby makeup flow path are powered by the emergency diesel generator in the SSF and are controlled at the SSF control panel. By letter dated June 29, 1984, the licensee stated that the standby makeup pump will provide at least 26 gallons per minute (gpm) of borated water to the reactor coolant system. Approximately 14 gpm will be available for seal leakage, and the remaining 12 gpm is for reactor coolant system makeup and boration. The standby makeup pump capacity equals the Technical Specifications limit of 26 gpm for minimum makeup requirements and therefore is acceptable.

The design function of the SSS is to achieve and maintain safe hot standby conditions in the plant. While in the hot standby mode of operation, damage control measures can be taken, as necessary, to restore the capability to achieve cold shutdown within 72 hours. This may involve replacing fire-damaged cables and pressure gauges; however, replacement of major components such as pump motors will not be required. Cables and pressure gauges will be available on site to replace any that may be damaged by fire and are needed for cold shutdown. The licensee stated that damage control procedures and shutdown procedures will be completed and personnel will be trained on them by initial criticality. By letter dated November 13, 1984, the licensee stated that these actions have been completed. The licensee also stated that sufficient manpower will be available on site to perform the required manual operations in a timely manner to achieve and maintain a safe hot standby condition with a minimum onsite shift crew and will not include fire brigade members. The staff finds this acceptable.

The design of the SSS complies with the performance goals outlined in the guidelines of SRP Section 9.5.1, Position C.5.c. Reactivity control is accomplished by a manual scram before the operator leaves the control room, and boron addition as well as reactor coolant makeup is provided by the standby makeup pump. Reactor decay heat removal in the hot standby mode before transfer to the SSS is provided through the steam generators by the turbine-driven auxiliary feedwater pump and main steam safety valves. The main steam isolation valves (MSIVs) and the steam generator power-operated relief valves are shut on transfer to the SSS. Steam is initially released from the steam generators through the safety valves to maintain hot standby. Reactor cooldown can be accomplished by local manual operation of the steam generator power-operated relief valves as necessary. Decay heat removal in cold shutdown is provided by the residual heat removal system, component cooling water system, and nuclear service water system. Cold shutdown can be achieved within 72 hours following a postulated fire in any plant fire area.

The direct readings of the following process variables are provided at the SSF:

(1) reactor coolant system cold leg temperature

(2) steam generator level

(3) standby makeup pump discharge flow

(4) pressurizer level

(5) reactor coolant system pressure

(6) core exit temperature

On the basis of the preceding, the staff concludes that the SSS complies with the guidelines of SRP Section 9.5.1, Position C.5.c, and is, therefore, acceptable.

Licensing Action 18. Protection of penetrations of fire area boundaries in the Reactor Building

Required Post-Transition Yes

Licensing Basis

The NRC's fire protection site audit was conducted between November 1 and November 4, 1983. The staff also expressed a number of concerns pertaining to previous applicant commitments and the degree of compliance with NRC's fire protection criteria. By letters dated April 9, 1984, Duke Energy provided additional information on the reactor building penetrations. In SSER #3 dated July 1984, the NRC evaluated the fire protection ability of the various reactor building penetrations. The NRC evaluations considered the following:

- The adequacy of interior walls and floor/ceiling assemblies which define fire area boundaries
- Two personnel access portals
- Instrumentation tubing and process piping
- Process piping penetrating the shell wall ranging in size from 1 inch to 34 inches in diameter.
- Penetration of cables through the shell wall of the Reactor Building

When evaluating the penetrations the NRC also considered the following:

- Materials of construction
- Thickness of the penetration
- Fire resistant material utilized
- Available fire detection
- Type and amount of combustible material
- Fire hazards present on either side of the penetrations

The NRC found them acceptable.

The bases for acceptability remains valid.

Fire Areas

ID	Description
RB1	Unit 1 Reactor Building
RB2	Unit 2 Reactor Building

References

Document ID

1984-04-09 Letter [Page 2] - H.B. Tucker Letter to Denton

Licensing Action 18. Protection of penetrations of fire area boundaries in the Reactor Building

Evaluation

The letter states, "2. Reactor Building Mechanical Penetrations. To facilitate penetration of instrumentation tubing and process piping through the 3 foot thick concrete shell wall of each Reactor Building, approximately 143 minimum 3/8 inch wall thickness metal sleeves were installed per unit. These sleeves range in size from 12 inches to 72 inches in diameter.

Spare sleeves and those used for penetration of instrumentation tubing are sealed by welding a schedule 100 pipe cap to the Annulus side of each sleeve opening. We intend to install Dow Corning 3-6548 Silicone RTV Foam or another approved material in each of these sleeves to form a rated penetration fire stop. Attachment No. 1 contains five copies of drawing CN-1678-06 detailing typical sleeve capping methods.

Process piping penetrating the shell wall ranges in size from 1 inch to 34 inches in diameter. Each of these pipes incorporates a special guarded sleeve mechanical assembly designed to maintain the integrity of the Reactor Building pressure boundary. These sleeve designs are typical of those utilized at other stations where the Reactor Building includes an Annulus area. Attachment No. 2 contains five copies each of drawings CN-1678-1, -2, -3.1, -3.2, -3.3 and -14. These drawings detail the design of each type of guarded sleeve used at Catawba.

The design of these sleeves precludes foaming of the penetration sleeve in the conventional manner. In reviewing alternatives, the heat transfer aspects of the sleeve designs were considered. Based on the large mass of each sleve, the thickness of the penetrated wall, and large embedded surface area of each sleeve, the heat transfer through any penetration under credible fire conditions appears well controlled and within recognized limits.

Additional assurance of penetration integrity is provided through administrative control of combustible loading."

Document ID

1984-07-01 NRC Safety Evaluation Report [Pages 9-6 and 9-7] - Supplement 3

Evaluation

The SER states, "The staff evaluated the adequacy of interior walls and floor/ceiling assemblies which define fire area boundaries. During the site audit, the staff observed that the fire area boundary of the Reactor Building includes two personnel access portals of a design which is not specifically fire rated. The upper portal is enclosed with concrete walls, floor and ceiling. The lower portal is enclosed with a concrete ceiling and floor. The walls of the enclosure are constructed of minimum 3/16-inch steel plate sandwiching 8 inches of a fire rated silicone foam supported by steel channels and wide flange members.

Combustible materials on either side of the portal consist primarily of armored cable, which will not significantly contribute to a fire if one should occur.

Fire detection systems are provided in these areas as well. Therefore, the staff has concluded that a fire will be detected in its initial stages, before a significant temperature rise can occur. Such a fire would be well within the capability of the plant fire brigade to extinguish using manual fire fighting equipment. During the time delay between fire detection and the arrival of the brigade, the hot gases generated would rise to the ceiling, away from the portals. The ceiling area would thus act as a heat sink, preventing the portals from being significantly damaged pending fire extinguishment. Therefore, the staff has concluded that on the basis of (1) the limited fire hazard, (2) the available protection and (3) the construction of the portals, the staff has reasonable assurance that the enclosure will prevent fire and smoke propagation from one side to another.

To facilitate penetrations of instrumentation tubing and process piping through the 3-foot-thick concrete shield wall of the Reactor Building, at least 143, 3/8-inch wall thickness, metal sleeves are installed per unit. These sleeves range in size from 12 inches to 72 inches in diameter. Spare sleeves and those used for penetrations of instrumentation tubing are sealed by welding a Schedule 100 pipe cap to the annulus side of each sleeve opening. By letter dated April 9, 1984, the applicant committed to install a 3-hour fire rated sealant material in each of these sleeves to prevent fire propagation through the penetration. The staff finds this acceptable.

Process piping penetrating the shell wall ranges in size from 1 inch to 34 inches in diameter. Each of these pipes incorporates a guarded sleeve mechanical assembly designed to maintain the integrity of the Reactor Building pressure boundary. These sleeve designs are typical of those utilized where the Reactor Building includes an annulus area. The staff has evaluated the fire hazards on either side of the shell wall and, based on the large mass of each sleeve, the thickness of the penetrated wall and large embedded surface area of each sleeve, the staff concludes that fire propagation through the penetration will not occur.

To facilitate penetration of cables through the shell wall of the Reactor Building, approximately 100 9-inch x 20-inch metal sleeved openings are provided per unit. To

Licensing Action	18. Protection of penetrations of fire area boundaries in the Reactor Building

Evaluation

prevent fire propagation through the openings and to withstand the effects of the annulus ventilation system during leak rate testing, the applicant proposes to use a fire rated silicone foam, cured with a different catalyst, which results in a foam of greater density than that used in other fire barrier penetrations. Based on the staff's evaluation of the fire hazards on either side of the penetration and the proven ability of the lower density foam to withstand the effects of a fire, the staff concluded that the denser formula provides an equivalent level of safety and is, therefore, acceptable."

Chapter 3 References

Reference

3.11.2 Fire Barriers.

3.11.4 Through Penetration Fire Stops. (a)

L. NFPA 805 Chapter 3 Requirements for Approval (10 CFR 50.48(c)(2)(vii))

14 Pages Attached

In accordance with 10 CFR 50.48(c)(2)(vii), "Performance-based methods," the fire protection program elements and minimum design requirements of Chapter 3 may be subject to the performance-based methods permitted elsewhere in the standard.

In accordance with NFPA 805 Section 2.2.8, the performance-based approach to satisfy the nuclear safety, radiation release, life safety, and property damage/business interruption performance criteria requires engineering analyses to evaluate whether the performance criteria are satisfied.

In accordance with 10 CFR 50.48(c)(2)(vii), the engineering analysis performed shall determine that the performance-based approach utilized to evaluate a variance from the requirements of NFPA 805 Chapter 3:

(A) Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;

(B) Maintains safety margins; and

(C) Maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire nuclear safety capability).

Duke Energy requests formal approval of performance-based methods used to demonstrate an equivalent level of fire protection for the requirements in Chapter 3 of NFPA 805 as follows:

Approval Request 1

NFPA 805 Section 3.2.3(1)

NFPA 805, Section 3.2.3(1)

> "Procedures shall be established for implementation of the fire protection program. In addition to procedures that could be required by other sections of the standard, the procedures to accomplish the following shall be established:
>
> Inspection, testing, and maintenance for fire protection systems and features credited by the fire protection program."

Duke Energy requests the ability to utilize performance-based methods to establish the appropriate inspection, testing, and maintenance frequencies for fire protection systems and features required by NFPA 805. Performance-based inspection, testing, and maintenance frequencies will be established as described in EPRI Technical Report TR-1006756, "Fire Protection Surveillance
Optimization and Maintenance Guide for Fire Protection ", Final Report, July 2003.

Basis for Request:

NFPA 805 Section 2.6, "Monitoring," requires that

> "A monitoring program shall be established to ensure that the availability and reliability of the fire protection systems and features are maintained and to assess the performance of the fire protection program in meeting the performance criteria. Monitoring shall ensure that the assumptions in the engineering analysis remain valid."

NFPA 805 Section 2.6.1, "Availability, Reliability, and Performance Levels," requires that

> "Acceptable levels of availability, reliability, and performance shall be established."

NFPA 805 Section 2.6.2, "Monitoring Availability, Reliability, and Performance," requires that

> "Methods to monitor availability, reliability, and performance shall be established. The methods shall consider the plant operating experience and industry operating experience."

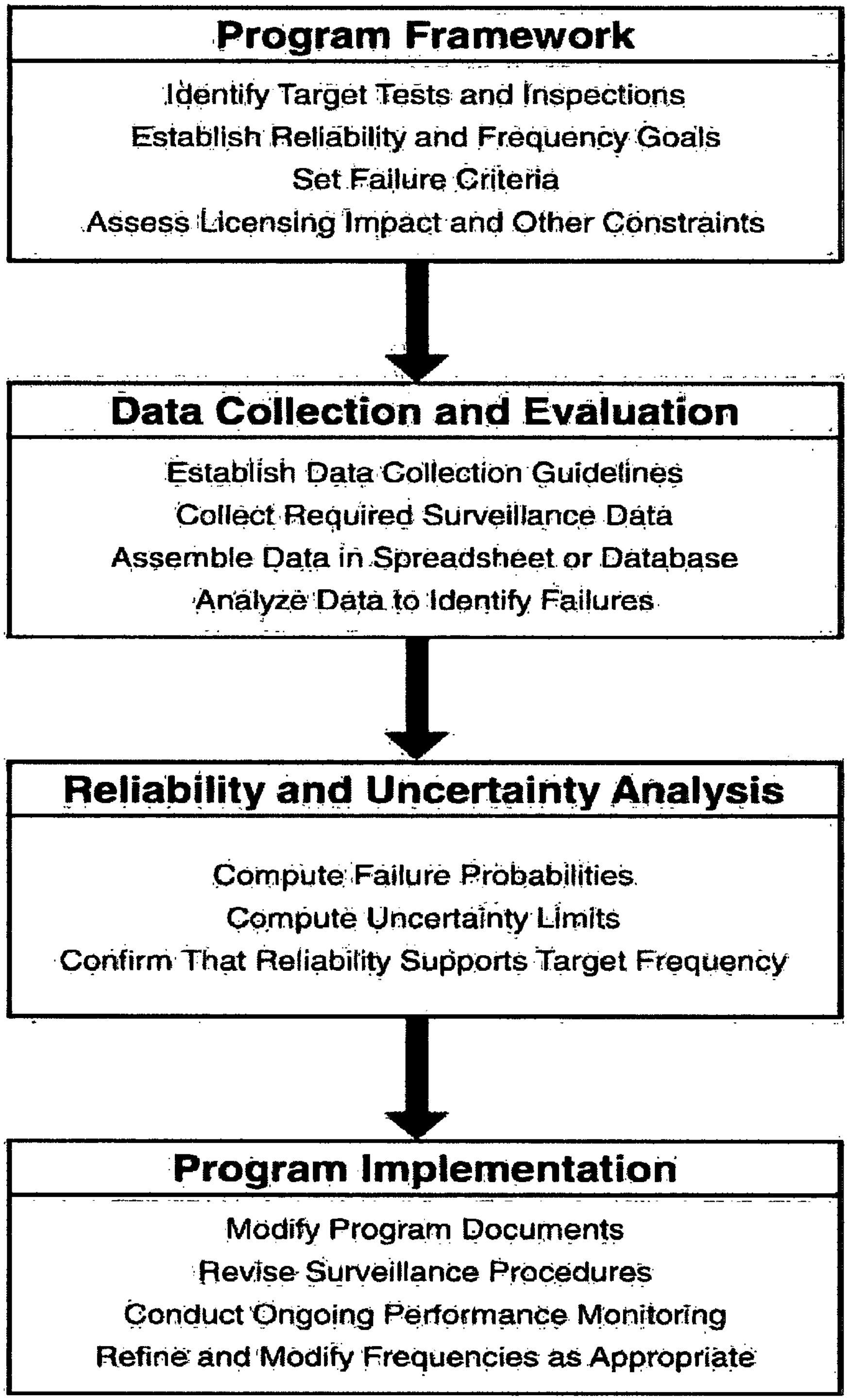
The scope and frequency of the inspection, testing, and maintenance activities for fire protection systems and features required in the fire protection program have been established based on the previously approved Technical Specifications / License Controlled Documents, and appropriate NFPA codes and standard. This request does not involve the use of the EPRI Technical Report TR-1006756 to establish the scope of those activities as that is determined by the required systems review identified in Table 4-3, "NFPA 805 Ch 4 Required FP Systems/Features."

This request is specific to the use of EPRI Technical Report TR-1006756 to establish the appropriate inspection, testing, and maintenance frequencies for fire protection systems and features credited by the fire protection program. As stated in EPRI Technical Report TR- 1006756 Section 10.1, *"The goal of a performance-based surveillance program is to adjust test and inspection frequencies commensurate with*

equipment performance and desired reliability." This goal is consistent with the stated requirements of NFPA 805 Section 2.6. The EPRI Technical Report TR-1006756 provides an accepted method to establish appropriate inspection, testing, and maintenance frequencies which ensure the required NFPA 805 availability, reliability, and performance goals are maintained.

The target tests, inspections, and maintenance will be those activities for the NFPA 805 required fire protection systems and features. The reliability and frequency goals will be established to ensure the assumptions in the NFPA 805 engineering analysis remain valid. The failure criterion will be established based on the required fire protection systems and features credited functions and will ensure those functions are maintained. Data collection and analysis will follow the EPRI Technical Report TR-1006756 document guidance. The failure probability will be determined based on EPRI

Technical Report TR-1006756 guidance and a 95% confidence level will be utilized. The performance monitoring will be performed in conjunction with the Monitoring Program required by NFPA 805 Section 2.6 and it will ensure site specific operating experience is considered in the monitoring process. The following is a flow chart that identifies the basic process that will be utilized.



EPRI TR-1006756 - Figure 10-1
Flowchart for Performance-Based Surveillance Program

Duke Energy does not intend to revise any fire protection surveillance, test or inspection frequencies until after transitioning to NFPA 805. Existing fire protection surveillance, test and inspection will remain consistent with applicable Selected Licensee Commitments (SLCs), Insurer, and NFPA Code requirements. Duke Energy's intent is to obtain approval via the NFPA 805 Safety Evaluation to use EPRI Technical Report TR1006756 guideline in the future as opportunities arise. Duke Energy reserves the ability to evaluate fire protection features with the intent of using the EPRI performance based methods to provide evidence of equipment performance beyond that achievable under traditional prescriptive maintenance practices to ensure optimal use of resources while maintaining reliability.

Acceptance Criteria Evaluation:

Nuclear Safety and Radiological Release Performance Criteria:

Use of performance-based test frequencies established per EPRI Technical Report TR-1006756 methods combined with NFPA 805 Section 2.6, Monitoring Program, will ensure that the availability and reliability of the fire protection systems and features are maintained to the levels assumed in the NFPA 805 engineering analysis. Therefore, there is no adverse impact to Nuclear Safety Performance Criteria by the use of the performance-based methods in EPRI Technical Report TR-1006756.

The radiological release performance criteria are satisfied based on the determination of limiting radioactive release. Fire Protection Systems and Features may be credited as part of that evaluation. Use of performance-based test frequencies established per the EPRI Technical Report TR-1006756 methods combined with NFPA 805 Section 2.6, Monitoring Program, will ensure that the availability and reliability of the fire protection systems and features are maintained to the levels assumed in the NFPA 805 engineering analysis which includes those assumptions credited to meet the Radioactive Release performance criteria. Therefore, there is no adverse impact to Radioactive Release performance criteria.

Safety Margin and Defense-in-Depth:

Use of performance-based test frequencies established per EPRI Technical Report TR-1006756 methods combined with NFPA 805, Section 2.6, Monitoring Program, will ensure that the availability and reliability of the fire protection systems and features are maintained to the levels assumed in the NFPA 805 engineering analysis which includes those assumptions credited in the Fire Risk Evaluation safety margin discussions. In addition, the use of these methods in no way invalidates the inherent safety margins contained in the codes and standards used for design and maintenance of fire protection systems and features. Therefore, the safety margin inherent and credited in the analysis has been preserved.

The three echelons of defense-in-depth described in NFPA 805 Section 1.2 are 1) to prevent fires from starting (combustible/hot work controls), 2) rapidly detect, control and extinguish fires that do occur thereby limiting damage (fire detection systems, automatic fire suppression, manual fire suppression, pre-fire plans), and 3) provide adequate level of fire protection for systems and structures so that a fire will not prevent essential

safety functions from being performed (fire barriers, fire rated cable, success path remains free of fire damage, recovery actions).

Echelon 1 is not affected by the use of the EPRI Technical Report TR-1006756 methods. Use of performance-based test frequencies established per EPRI Technical Report TR-1006756 methods combined with NFPA 805 Section 2.6, Monitoring Program, will ensure that the availability and reliability of the fire protection systems and features credited for defense-in-depth are maintained to the levels assumed in the NFPA 805 engineering analysis. Therefore, there is no adverse impact to echelons 2 and 3 for defense-in-depth.

Conclusion:

NRC approval is requested for use of the performance-based methods contained in the EPRI Technical Report TR-1006756, "Fire Protection Surveillance Optimization and Maintenance Guide for Fire Protection Systems and Features", Final Report, July 2003 to establish the appropriate inspection, testing, and maintenance frequencies for fire protection systems and features required by NFPA 805. As described above, this approach is considered acceptable because it:

(A) Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;

(B) Maintains safety margins; and

(C) Maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

Approval Request 2

NFPA 805 Section 3.3.5.1

NFPA 805 Section 3.3.5.1 states:

> *"Wiring above suspended ceiling shall be kept to a minimum. Where installed, electrical wiring shall be listed for plenum use, routed in armored cable, routed in metallic conduit, or routed in cable trays with solid metal top and bottom covers."*

Duke Energy has identified that wiring/cable is installed above suspended ceilings that may not comply with the requirements of this code section and that tray covers are not provided on all trays present. The wiring/cable may be small amounts of video/communications cable that is not listed for plenum use as required by this section of the code.

The areas at CNS that have suspended ceilings installed inside the NFPA 805 defined power block are as follows:

- Control Room and Work Control Center (WCC)
- Technical Support Center (TSC)
- Service Building offices and corridors
- Turbine Building OAC Computer Room
- Auxiliary Service Building RP/Chemistry offices/laboratories

These areas are not risk significant with the exception of the Control Room. CNS cable construction for power, control, and instrumentation cables are IEEE-383 (or equivalent) in steel jackets (armored). Therefore, power, control, and instrumentation cables meet the requirements of this section.

Therefore the cables in question are video/communication/data cables which have been field routed above suspended ceilings. These cables may not be plenum rated. Video/communication/data cables are low voltage. These low voltage cables are not generally susceptible to shorts which would result in a fire.

Basis for Request:

The basis for the approval request of this deviation is:

- The wiring above ceilings in offices, corridors, etc. does not pose a hazard:
  - Low voltage is not susceptible to shorts causing a fire.
  - Power, control, and instrumentation cables are protected (armored) per this code section.
  - By eliminating cables with the potential shorts, this eliminates ignition sources and therefore the jacketing of cable is not relevant.
  - There is no equipment important to nuclear safety in the vicinity of these cables.
  - There are limited/no ignition sources above these ceilings and the lack of continuity of combustibles make it unlikely a significant fire could develop.

Acceptance Criteria Evaluation:

Nuclear Safety and Radiological Release Performance Criteria:

The location of wiring above suspended ceilings does not affect nuclear safety. Power, control, and instrumentation cables comply with this section. Other wiring, while it may not be in armored cable, in metallic conduit, or plenum rated, is low voltage cable not susceptible to shorts that would result in a fire. Therefore there is no impact on the nuclear safety performance criteria.

The location of cables above suspended ceilings has no impact on the radiological release performance criteria. The radiological review was performed based on the potential location of radiological concerns and is not dependent on the type of cables or locations of suspended ceilings. The cables do not change the results of the radiological release evaluation performed that concluded that potentially contaminated water is contained and smoke is monitored. The cables do not add additional radiological materials to the areas or challenge systems boundaries.

Safety Margin and Defense-in-Depth:

Power, control, and instrumentation cables meet the requirements of this code section. Other wiring, while it may not be in armored cable, in metallic conduit, or plenum rated, is low voltage cable not susceptible to shorts that would result in a fire. These areas with video/communication/data cables have been analyzed in their current configuration. The amount of non-rated and non-enclosed wiring above the ceilings in the Power Block is minor and does not present a significant fire hazard. Therefore, the safety margin inherent in the analysis for the fire event has been preserved.

The three echelons of defense-in-depth are 1) prevent fires from occurring (hot work and other administrative controls), 2) rapidly detect, control and extinguish fires that occur thereby limiting damage (fire detection systems, automatic fire suppression systems, manual fire suppression and pre-fire plans to aid the fire brigade), and 3) provide an adequate level of fire protection for systems and structures, so that a fire will not prevent essential safety functions from being performed (fire barriers, fire rated cable, success path remains free of fire damage, recovery actions). The prior introduction of non-listed video/communications/data cables routed above suspended ceilings does not impact fire protection defense-in-depth. Echelon 1 is maintained by the cable installation procedures documenting the requirements of NFPA 805 Section 3.3.5.1. The introduction of cables above suspended ceilings does not affect echelons 2 or 3. The video/communications/data cables routed above suspended ceilings does not directly result in compromising automatic fire suppression systems, manual fire suppression functions, or post-fire safe shutdown capability.

Conclusion:

NRC approval is requested for the use of the currently installed non-plenum listed cables routed above suspended ceilings. See Implementation Item 7 in Table S-3 of Attachment S for an implementation item to change electrical installation criteria to ensure all future cable installation above suspended ceilings meets the requirements of NFPA 805 Section 3.3.5.1.

The engineering analysis performed determined that the performance-based approach utilized to evaluate a variance from the requirements of NFPA 805 Chapter 3:

(A) Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;

(B) Maintains safety margins; and

(C) Maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

Approval Request 3

NFPA 805 Section 3.3.5.2

NFPA 805 Section 3.3.5.2 states:

"Only metal tray and metal conduits shall be used for electrical raceways. Thin wall metallic tubing shall not be used for power, instrumentation, or control cables. Flexible metallic conduits shall only be used in short lengths to connect components."

The use of PVC conduit is permitted by CNS. PVC conduits are permitted when embedded in building walls, floors or foundations and in outdoor buried locations with or without concrete encasement.

Where embedded/buried/encased, the PVC conduit is within a non-combustible enclosure which provides protection from mechanical damage and from damage resulting from either an exposure fire or from a fire within the conduit impacting other targets.

Basis for Request:

The basis for the approval request of this deviation is:

- The PVC conduit, while a combustible material, is not subject to flame/heat impingement from an external source which would result in structural failure, contribution to fire load, and damage to the circuits contained within where the conduit is embedded in concrete or compacted sand/soil.
- Failure of circuits within the conduit resulting in a fire would not result in damage to external targets.

Acceptance Criteria Evaluation:

Nuclear Safety and Radiological Release Performance Criteria:

The use of PVC conduit in embedded/buried/encased locations does not affect nuclear safety as the material in which conduits are run within an embedded location is not subject to the failure mechanisms potentially resultant in circuit damage or resultant damage to external targets. Therefore there is no impact on the nuclear safety performance criteria.

The use of PVC conduits in embedded/buried/encased installations has no impact on the radiological release performance criteria. The radiological review was performed based on the potential location of radiological concerns and is not dependent on the type or location of conduit. The PVC conduits do not change the results of the radiological release evaluation performed that concluded that potentially contaminated water is contained and smoke is monitored. The PVC conduits do not add additional radiological materials to the areas or challenge systems boundaries.

Safety Margin and Defense-in-Depth:

The PVC conduit material is embedded/buried/encased in a non-combustible configuration. Therefore, the safety margin inherent in the analysis for the fire event has been preserved.

The use of PVC conduits in embedded/buried/encased does not impact fire protection defense-in-depth. The PVC conduits do not directly result in compromising automatic or manual fire suppression functions.

Conclusion:

NRC approval is requested for the use of PVC conduits in embedded/buried/encased installation.

The engineering analysis performed determined that the performance-based approach utilized to evaluate a variance from the requirements of NFPA 805 Chapter 3:

(A) Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;

(B) Maintains safety margins; and

(C) Maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

Approval Request 4

NFPA 805 Section 3.3.12(1)

NFPA 805 Section 3.3.12(1) states:

> *"The oil collection system for each reactor coolant pump shall be capable of collecting lubricating oil from all potential pressurized and nonpressurized leakage sites in each reactor coolant pump oil system."*

The CNS RCP oil collection system is designed and was reviewed in accordance with 10 CFR 50 Appendix R, Section III.O to collect leakage from pressurized and nonpressurized leakage sites in the reactor coolant pump oil system. This may not include collection of oil mist as result of pump/motor operation. Oil misting is not leakage due to equipment failure, but inherent occurrence in the operation of large rotating equipment. It is normal for large motors to lose some oil through seals and the oil to potentially become 'atomized' in the ventilation system. This atomized oil mist can then collect on surfaces in the vicinity of the reactor coolant pump as the pump design is not completely sealed to permit airflow for cooling. The oil mist resulting from normal operation will not adversely impact the ability of a plant to achieve and maintain safe shutdown even if ignition occurred.

In addition Generic Letter 86-10, Response to Industry Questions, dated April 24, 1986, Question 6.2 (shown below) discussed oil dripping. The response concluded that there was no concern with oil consumption (which is an oil misting phenomena) but the concern was with an oil fire started from a pressurized leakage point and/or spilled leakage.

> *QUESTION 6.2*
>
> *It would appear that a literal reading of Section III.0 regarding the oil collection system for the reactor coolant pump could be met by a combination of seismically designed splash shields and a sump with sufficient capacity to contain the entire lube oil system inventory. If the reactor coolant pump is seismically designed and the nearby piping hot surfaces are protected by seismically designed splash shields such that any spilled lube oil would contact only cold surfaces, does this design concept conform to the requirements of the rule?*
>
> *RESPONSE*
>
> *If the reactor coolant pump, including the oil system, is seismically designed and the nearby hot surfaces of piping are protected by seismically designed splash shields such that any spilled lube oil would contact only cold surfaces, and it could be demonstrated by engineering analysis that sump and splash shields would be capable of preventing a fire during normal and design basis accident conditions, the safety objective of Section III.O would be achieved. Such a design concept would have to be evaluated under the exemption process. The justification for the exemption should provide reasonable assurance that oil from all potential pressurized and unpressurized leakage points would be safely collected and drained to the sump. The sump should be shown capable of safely containing all of the anticipated oil leakage. The analysis should verify that there are no electric sources of ignition.*

The CNS comparison to the criteria in 10 CFR 50, Appendix R stated,

> *"The system is designed to collect lube oil from all pressurized and unpressurized leakage sites in the RCP lube oil systems."*

Fires have occurred due to oil leakage from equipment failure such as cracked welds on piping or inadequate collection pan design. CNS does not have a history of significant oil loss from the reactor coolant pumps as a result of oil misting or oil leakage that is not contained by the properly designed and installed oil leakage collection system.

Basis for Request:

The basis for the approval request of this deviation is:

- The oil collection system is designed to collect leakage from pressurized and nonpressurized leakage sites in the reactor coolant pump oil system.
- Oil misted from normal operation is not leakage; it is normal motor oil consumption.
- Oil misted from normal operation does not significantly reduce the oil inventory. The oil historically released as misting does not account for an appreciable heat release rate or accumulation near potential ignition sources or non-insulated reactor coolant piping.
- The reactor coolant pumps use a synthetic oil of a high flash point, over 400 degrees Fahrenheit.

Acceptance Criteria Evaluation:

Nuclear Safety and Radiological Release Performance Criteria:

Reactor Coolant Pumps are not required to achieve or maintain fire safe shutdown. Therefore there is no impact on the nuclear safety performance criteria.

The potential for oil mist from the reactor coolant pumps has no impact on the radiological release performance criteria. The radiological review was performed based on the potential location of radiological concerns which encompasses the Reactor Building in which the reactor coolant pumps are located.

Safety Margin and Defense-in-Depth:

The oil mist resultant from normal operation will not adversely impact the ability of a plant to achieve and maintain fire safe shutdown even if ignition occurred. Therefore, the safety margin inherent in the analysis for the fire event has been preserved.

The potential for mist from the reactor coolant pumps do not directly result in compromising automatic fire suppression functions, manual fire suppression functions, or post-fire safe shutdown capability.

Conclusion:

NRC approval is requested for the potential of oil misting from the reactor coolant pumps due to normal motor consumption not captured by the oil collection system designed for pressurized and non-pressurized leakage and spillage.

The engineering analysis performed determined that the performance-based approach utilized to evaluate a variance from the requirements of NFPA 805 Chapter 3:

(A) Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;

(B) Maintains safety margins; and

(C) Maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

M. License Condition Changes

8 Pages Attached

Replace the current CNS fire protection license condition 2.C (5) for both Unit 1 and Unit 2 with the standard license condition in Regulatory Position 3.1 of RG 1.205, modified as shown below.

==

Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment request dated September 25, 2013 (and supplements dated ____________) and as approved in the safety evaluation report dated _________ (and supplements dated _________). Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

Risk-Informed Changes that May Be Made Without Prior NRC Approval

A risk assessment of the change must demonstrate that the acceptance criteria below are met. The risk assessment approach, methods, and data shall be acceptable to the NRC and shall be appropriate for the nature and scope of the change being evaluated be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant. Acceptable methods to assess the risk of the change may include methods that have been used in the peer-reviewed fire PRA model, methods that have been approved by NRC through a plant-specific license amendment or NRC approval of generic methods specifically for use in NFPA 805 risk assessments, or methods that have been demonstrated to bound the risk impact.

a) Prior NRC review and approval is not required for changes that clearly result in a decrease in risk. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

b) Prior NRC review and approval is not required for individual changes that result in a risk increase less than 1×10^{-7}/year (yr) for CDF and less than 1×10^{-8}/yr for LERF. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

Other Changes that May Be Made Without Prior NRC Approval

(1) Changes to NFPA 805, Chapter 3, Fundamental Fire Protection Program

Prior NRC review and approval are not required for changes to the NFPA 805, Chapter 3, fundamental fire protection program elements and design requirements for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is functionally equivalent or adequate for the hazard. The licensee may use an engineering evaluation to demonstrate that a change to NFPA 805, Chapter 3, element is functionally equivalent to the corresponding technical requirement. A qualified fire

protection engineer shall perform the engineering evaluation and conclude that the change has not affected the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard.

The licensee may use an engineering evaluation to demonstrate that changes to certain NFPA 805, Chapter 3, elements are acceptable because the alternative is "adequate for the hazard." Prior NRC review and approval would not be required for alternatives to four specific sections of NFPA 805, Chapter 3, for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is adequate for the hazard. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the change has not affected the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard. The four specific sections of NFPA 805, Chapter 3, are as follows:

- Fire Alarm and Detection Systems (Section 3.8);
- Automatic and Manual Water-Based Fire Suppression Systems (Section 3.9);
- Gaseous Fire Suppression Systems (Section 3.10); and,
- Passive Fire Protection Features (Section 3.11).

(2) Fire Protection Program Changes that Have No More than Minimal Risk Impact

Prior NRC review and approval are not required for changes to the licensee's fire protection program that have been demonstrated to have no more than a minimal risk impact. The licensee may use its screening process as approved in the NRC safety evaluation dated ___________ to determine that certain fire protection program changes meet the minimal criterion. The licensee shall ensure that fire protection defense-in-depth and safety margins are maintained when changes are made to the fire protection program.

Transition License Conditions

(1) Before achieving full compliance with 10 CFR 50.48(c), as specified by (2) below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in (2) above.

(2) The licensee shall implement the following modifications to its facility to complete the transition to full compliance with 10 CFR 50.48(c) by {date}.

[See plant specific list of modifications identified in Attachment S]

(3) The licensee shall maintain appropriate compensatory measures in place until completion of the modifications delineated above.

==

License condition 2.C (5) for both Unit 1 and Unit 2 shall be superseded:

(5) Fire Protection Program (Section 9.5.1, SER, SSER #2, SSER #3, SSER #4, SSER #5)*

Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety

> The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

*The parenthetical notation following the title of this renewed operating license condition denotes the section of the Safety Evaluation Report and/or its supplement wherein this renewed license condition is discussed.

It is Duke Energy's understanding that implicit in the revocation of this license condition, all prior Fire Protection Program Safety Evaluations and commitments have been superseded in their entirety by the revised license condition.

No other license conditions need to be revised or superseded.

CNS implemented the following process for determining that these are the only license conditions required to be either revised or superseded to implement the new FPP which meets the requirements in 10 CFR 50.48(a) and 50.48(c):

- A review was conducted of the CNS Renewed Facility Operating Licenses NPF-35 and NPF-52, by CNS licensing staff and the NFPA 805 Transition Team. The review was performed by reading the Operating License and performing electronic searches in the CNS Electronic Licensing Library. Outstanding LARs that have been submitted to the NRC were also reviewed for potential impact on the license conditions.

Proposed Changes to Facility Operating License – Markup

The current versions of Renewed Facility Operating Licenses NPF-35 and NPF-52 have been marked up to reflect the proposed change.

CNS Facility Operating License - Unit 1

- 4 -

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. ~~269~~, which are attached hereto, are hereby incorporated into this renewed operating license. Duke Energy Carolinas, LLC shall operate the facility in accordance with the Technical Specifications.

(3) Updated Final Safety Analysis Report

The Updated Final Safety Analysis Report supplement submitted pursuant to 10 CFR 54.21(d), as revised on December 16, 2002, describes certain future activities to be completed before the period of extended operation. Duke shall complete these activities no later than December 6, 2024, and shall notify the NRC in writing when implementation of these activities is complete and can be verified by NRC inspection.

The Updated Final Safety Analysis Report supplement as revised on December 16, 2002, described above, shall be included in the next scheduled update to the Updated Final Safety Analysis Report required by 10 CFR 50.71(e)(4), following issuance of this renewed operating license. Until that update is complete, Duke may make changes to the programs described in such supplement without prior Commission approval, provided that Duke evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59 and otherwise complies with the requirements in that section.

(4) Antitrust Conditions

Duke Energy Carolinas, LLC shall comply with the antitrust conditions delineated in Appendix C to this renewed operating license.

(5) ~~Fire Protection Program (Section 9.5.1, SER, SSER #2, SSER #3, SSER #4, SSER #5)*~~
Insert Attachment

~~Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report, as amended, for the facility and as approved in the SER through Supplement 5, subject to the following provision:~~

> ~~The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.~~

~~*The parenthetical notation following the title of this renewed operating license condition denotes the section of the Safety Evaluation Report and/or its supplement wherein this renewed license condition is discussed.~~

Renewed License No. NPF-35
Amendment No. ~~269~~

CNS Facility Operating License - Unit 2

- 4 -

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. ~~265~~, which are attached hereto, are hereby incorporated into this renewed operating license. Duke Energy Carolinas, LLC shall operate the facility in accordance with the Technical Specifications.

(3) Updated Final Safety Analysis Report

The Updated Final Safety Analysis Report supplement submitted pursuant to 10 CFR 54.21(d), as revised on December 16, 2002, describes certain future activities to be completed before the period of extended operation. Duke shall complete these activities no later than February 24, 2026, and shall notify the NRC in writing when implementation of these activities is complete and can be verified by NRC inspection.

The Updated Final Safety Analysis Report supplement as revised on December 16, 2002, described above, shall be included in the next scheduled update to the Updated Final Safety Analysis Report required by 10 CFR 50.71(e)(4), following issuance of this renewed operating license. Until that update is complete, Duke may make changes to the programs described in such supplement without prior Commission approval, provided that Duke evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59 and otherwise complies with the requirements in that section.

(4) Antitrust Conditions

Duke Energy Carolinas, LLC shall comply with the antitrust conditions delineated in Appendix C to this renewed operating license.

(5) ~~Fire Protection Program (Section 9.5.1, SER, SSER #2, SSER #3, SSER #4, SSER #5)*~~
Insert Attachment

~~Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report, as amended, for the facility and as approved in the SER through Supplement 5, subject to the following provision:~~

> ~~The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.~~

~~*The parenthetical notation following the title of this renewed operating license condition denotes the section of the Safety Evaluation Report and/or its supplements wherein this renewed license condition is discussed.~~

Renewed License No. NPF-52
Amendment No. ~~265~~

ATTACHMENT

Duke Energy Carolinas, LLC shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment request dated September 25, 2013 (and supplements dated ___________) and as approved in the safety evaluation report dated ________ (and supplements dated ________). Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

Risk-Informed Changes that May Be Made Without Prior NRC Approval

A risk assessment of the change must demonstrate that the acceptance criteria below are met. The risk assessment approach, methods, and data shall be acceptable to the NRC and shall be appropriate for the nature and scope of the change being evaluated be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant. Acceptable methods to assess the risk of the change may include methods that have been used in the peer-reviewed fire PRA model, methods that have been approved by NRC through a plant-specific license amendment or NRC approval of generic methods specifically for use in NFPA 805 risk assessments, or methods that have been demonstrated to bound the risk impact.

c) Prior NRC review and approval is not required for changes that clearly result in a decrease in risk. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

d) Prior NRC review and approval is not required for individual changes that result in a risk increase less than 1×10^{-7}/year (yr) for CDF and less than 1×10^{-8}/yr for LERF. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

Other Changes that May Be Made Without Prior NRC Approval

(1) Changes to NFPA 805, Chapter 3, Fundamental Fire Protection Program

Prior NRC review and approval are not required for changes to the NFPA 805, Chapter 3, fundamental fire protection program elements and design requirements for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is functionally equivalent or adequate for the hazard. The licensee may use an engineering evaluation to demonstrate that a change to NFPA 805, Chapter 3, element is functionally equivalent to the corresponding technical requirement. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the

change has not affected the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard.

The licensee may use an engineering evaluation to demonstrate that changes to certain NFPA 805, Chapter 3, elements are acceptable because the alternative is "adequate for the hazard." Prior NRC review and approval would not be required for alternatives to four specific sections of NFPA 805, Chapter 3, for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is adequate for the hazard. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the change has not affected the functionality of the component, system, procedure, or physical arrangement, using a relevant technical requirement or standard. The four specific sections of NFPA 805, Chapter 3, are as follows:

- Fire Alarm and Detection Systems (Section 3.8);
- Automatic and Manual Water-Based Fire Suppression Systems (Section 3.9);
- Gaseous Fire Suppression Systems (Section 3.10); and,
- Passive Fire Protection Features (Section 3.11).

(2) Fire Protection Program Changes that Have No More than Minimal Risk Impact

Prior NRC review and approval are not required for changes to the licensee's fire protection program that have been demonstrated to have no more than a minimal risk impact. The licensee may use its screening process as approved in the NRC safety evaluation dated __________ to determine that certain fire protection program changes meet the minimal criterion. The licensee shall ensure that fire protection defense-in-depth and safety margins are maintained when changes are made to the fire protection program.

Transition License Conditions

(1) Before achieving full compliance with 10 CFR 50.48(c), as specified by (2) below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in (2) above.

(2) The licensee shall implement the following modifications to its facility to complete the transition to full compliance with 10 CFR 50.48(c) by {date}.

[See plant specific list of modifications identified in Attachment S]

(3) The licensee shall maintain appropriate compensatory measures in place until completion of the modifications delineated above.

N. Technical Specification Changes

1 Page Attached

CNS implemented the following process for determining the Technical Specifications that are required to be revised or deleted to implement the new Fire Protection Program which meets the requirements in 10 CFR 50.48(a) and 50.48(c).

- A review was conducted of the CNS Technical Specifications, by Duke Energy Licensing and NFPA 805 Transition Team. The review was performed by reading the Technical Specifications and performing electronic searches using the CNS electronic licensing library. Outstanding Technical Specification changes that have been submitted to the NRC were also reviewed for potential impact on the license conditions.

There are no Technical Specifications that need to be revised, deleted, or added as a result of the transition to NFPA 805.

O. Orders and Exemptions

1 Page Attached

Exemptions

CNS is a NUREG-0800 (Standard Review Plan) plant licensed to operate after January 1, 1979, and as such,10 CFR 50 Appendix R is not applicable and exemptions from the regulation were not necessary. Therefore no exemptions need to be rescinded.

Orders

No Orders need to be superseded or revised.

CNS implemented the following process for making this determination:

- A review was conducted of the CNS docketed correspondence by CNS licensing staff. The review was performed by reviewing the correspondence files and performing electronic searches of internal CNS records and the NRC's ADAMS document system.

A specific review was performed of the license amendment that incorporated the mitigation strategies required by Section B.5.b of Commission Order EA-02-026 (TAC Nos. MD4708 and MD4709) to ensure that any changes being made to ensure compliance with 10 CFR 50.48(c) do not invalidate existing commitments applicable to the plant. The review of this order demonstrated that changes to the fire protection program will not affect measures required by B.5.b.

The NRC Orders issued in response to the Beyond Design Basis External Events (Fukushima) Orders, EA-12-049 and EA-12-051, are being independently evaluated.

P. RI-PB Alternatives to NFPA 805 10 CFR 50.48(c)(4)

No risk-informed or performance-based alternatives to compliance with NFPA 805 (per 10 CFR 50.48(c)(4)) were utilized by CNS.

Q. No Significant Hazards Evaluations

3 Pages Attached

No Significant Hazards Consideration Evaluation

Pursuant to 10 CFR 50.91, Duke Energy Carolinas, LLC has made the determination that this amendment request involves a "No Significant Hazards Consideration" by applying the standards established by the NRC regulations in 10 CFR 50.92. This amendment does not involve a significant hazards consideration for the following responses:

To the extent that these conclusions apply to compliance with the requirements in NFPA 805, these conclusions are based on the following NRC statements in the Statements of Consideration accompanying the adoption of alternative Fire Protection requirements based on NFPA 805.

1) Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   Operation of Catawba Nuclear Station in accordance with the proposed amendment does not increase the probability or consequences of accidents previously evaluated. The Updated Final Safety Analysis Report documents the analyses of design basis accidents at Catawba Nuclear Station. The proposed amendment does not adversely affect accident initiators nor alter design assumptions, conditions, or configurations of the facility and does not adversely affect the ability of structures, systems, and components to perform their design function. Structures, systems, and components required to safely shut down the reactor and to maintain it in a safe shutdown condition will remain capable of performing their design functions.

   The purpose of this amendment is to permit Catawba Nuclear Station to adopt a new fire protection licensing basis which complies with the requirements in 10 CFR 50.48(a) and (c) and the guidance in Regulatory Guide 1.205. The NRC considers that National Fire Protection Association 805 provides an acceptable methodology and performance criteria for licensees to identify Fire Protection system and features that are an acceptable alternative to Catawba Nuclear Station's existing fire protection requirements. Engineering Analyses, in accordance with National Fire Protection Association 805, have been performed to demonstrate that the risk-informed performance-based requirements for National Fire Protection Association 805 have been met.

   National Fire Protection Association 805, taken as a whole, provides an acceptable alternative to 10 CFR 50.48(b) and satisfies 10 CFR 50.48(a) and General Design Criterion 3 of Appendix A to 10 CFR Part 50 and meets the underlying intent of the NRCs existing fire protection regulations and guidance, and achieves defense-in-depth and the goals, performance objectives, and performance criteria specified in Chapter 1 of the standard. The small increases in core damage frequency associated with the LAR submittal are consistent with the Commission's Safety Goal Policy. Additionally 10 CFR 50.48(c) allows self-approval of the fire protection program changes post-transition. If there are any increases post-transition in core

damage frequency or risk, the increase will be small and consistent with the intent of the Commission's Safety Goal Policy.

Based on this, the implementation of this amendment does not significantly increase the probability of any accident previously evaluated. Equipment required to mitigate an accident remains capable of performing the assumed function. Therefore, the consequences of any accident previously evaluated are not significantly increased with the implementation of the amendment.

2) Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

Operation of Catawba Nuclear Station in accordance with the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated. Any scenario or previously analyzed accident with offsite dose was included in the evaluation of design basis accidents documented in the Updated Final Safety Analysis Report. The proposed change does not alter the requirements or function for systems required during accident conditions. Implementation of the new Fire Protection licensing basis which complies with the requirements in 10 CFR 50.48(a) and (c) and the guidance in Regulatory Guide 1.205 will not result in new or different accidents.

The proposed amendment does not adversely affect accident initiators nor alter design assumptions, conditions, or configurations of the facility. The proposed amendment does not adversely affect the ability of structure, systems, and components to perform their design function. Structure, systems, and components required to safely shut down the reactor and maintain it in a safe shutdown condition remain capable of performing their design functions.

The purpose of this amendment is to permit Catawba Nuclear Station to adopt a new Fire Protection licensing basis which complies with the requirements in 10 CFR 50.48(a) and (c) and the guidance in Regulatory Guide 1.205. The NRC considers that NFPA 805 provides an acceptable methodology and performance criteria for licensees to identify Fire Protection systems and features that are an acceptable alternative to Catawba Nuclear Station's exising fire protection requirements.

The requirements in National Fire Protection Association 805 address only Fire Protection and the impacts of fire on the plant have already been evaluated. Based on this, the implementation of this amendment does not create the possibility of a new or different kind of accident from any kind of accident previously evaluated. The proposed changes do not involve new failure mechanisms or malfunctions that can initiate a new accident.

Therefore, the possibility of a new or different kind of accident from any kind of accident previously evaluated is not created with the implementation of this amendment.

3) Does the proposed amendment involve a significant reduction in a margin of safety?

   Response: No.

   Operation of Catawba Nuclear Station in accordance with the proposed amendment does not involve a significant reduction in the margin of safety. The proposed amendment does not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not affected by this change. The proposed amendment does not adversely affect existing plant safety margins or the reliability of equipment assumed to mitigate accidents in the Updated Final Safety Analysis Report. The proposed amendment does not adversely affect the ability of Structure, Systems, and Components to perform their design function. Structure, Systems, and Components required to safely shut down the reactor and to maintain it in a safe shutdown condition remain capable of performing their design functions.

   The purpose of this amendment is to permit Catawba Nuclear Station to adopt a new fire protection licensing basis which complies with the requirements in 10 CFR 50.48(a) and (c) and the guidance in Regulatory Guide 1.205. The NRC considers that National Fire Protection Association 805 provides an acceptable methodology and performance criteria for licensees to identify Fire Protection systems and features that are an acceptable alternative to Catawba Nuclear Station's existing fire protection requirements. Engineering analyses, which may include engineering evaluations, probabilistic safety assessments, and fire modeling calculations, have been performed to demonstrate that the performance-based methods do not result in a significant reduction in the margin of safety.

   Based on this, the implementation of this amendment does not significantly reduce the margin of safety. The proposed changes are evaluated to ensure that risk and safety margins are kept within acceptable limits. Therefore, the transition does not involve a significant reduction in the margin of safety.

   National Fire Protection Association 805 continues to protect public health and safety and the common defense and security because the overall approach of National Fire Protection Association 805 is consistent with the key principles for evaluating license basis changes, as described in Regulatory Guide 1.174, is consistent with the defense-in-depth philosophy, and maintains sufficient safety margins.

   Margins previously established for the Catawba Nuclear Station Fire Protection program in accordance with existing fire protection requirements are not significantly reduced. Therefore, this amendment does not result in a reduction in a margin of safety.

R. Environmental Considerations Evaluation

1 Page Attached

Environmental Considerations Evaluation

Duke Energy Carolinas, LLC, has evaluated this License Amendment Request against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21. Duke Energy Carolinas, LLC., has determined that this License Amendment Request meets the criteria for a categorical exclusion set forth in 10 CFR 51.22(c)(9). This determination is based on the fact that this change is being proposed as an amendment to a license issued pursuant to 10 CFR 50.

The purpose of this License Amendment Request is to permit Catawba Nuclear Station to adopt a new Fire Protection licensing basis which complies with the requirements in 10 CFR 50.48(a) and (c) and the guidance in Regulatory Guide 1.205. The Nuclear Regulatory Commission considers that National Fire Protection Association 805 provides an acceptable methodology and performance criteria for licensees to identify Fire Protection requirements that are an acceptable alternative to Catawba Nuclear Station's existing fire protection requirements. The requirements in NFPA 805 address only Fire Protection and the impacts of fire on the plant have already been evaluated, as part of compliance to 10 CFR 50.48(a).

This amendment meets the following specific criteria:

i. The amendment involves no significant hazards consideration.

   As stated in Attachment Q, this proposed amendment does not involve a significant hazards consideration.

ii. There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

   Compliance with NFPA 805 explicitly requires the attainment of performance criteria, objectives, and goals for radioactive releases to the environment. Transition to NFPA 805 requirements does not impact any type or amount of effluents. Therefore, the proposed amendment will not change the types or amounts of any effluents that may be released offsite.

iii. There is no significant increase in individual or cumulative occupational radiation exposure.

   Compliance with NFPA 805 explicitly requires the attainment of performance criteria, objectives and goals for occupational exposures. Therefore, the proposed amendment will not change the types or amounts of occupational exposures based on the results of the analysis performed and documented in Attachment E to this document based on firefighting activities.

Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in conjunction with the proposed amendment.

S. Modifications and Implementation Items

11 Pages Attached

Tables S-1, Plant Modifications Completed, S-2a, Plant Modifications Committed – Internal Events PRA, and S-2b, Plant Modifications Committed – Fire PRA, provided below, include a description of the modifications along with the following information:

- A problem statement,
- Risk ranking of the modification,
- An indication if the modification is currently included in the Fire PRA,
- Compensatory Measure in place, and
- A risk-informed characterization of the modification and compensatory measure.

Table S-1 Plant Modifications Completed

Item	Rank	Unit	Problem Statement	Proposed Modification	In FPRA	Comp Measure	Risk Informed Characterization
				NONE			

Table S-2a Plant Modifications Committed – Internal Events PRA

Item	Rank	Unit	Problem Statement	Proposed Modification	In IEPRA	Comp Measure	Risk Informed Characterization
01	High	1, 2	Auxiliary Shutdown Panels A and B are located in the CA (Aux. Feed water) Pump room and are theoretically susceptible to being rendered non-functional by an internal flood from a pipe break at a higher elevation within the Auxiliary Building.	Harden the doorways and associated flow paths into the Auxiliary Feedwater Pump Rooms against water intrusion from the stairwell area for both Units. Completion Date: December 31, 2017	Y	N	This modification will provide an internal flood risk reduction to offset the Fire PRA risk increase post-transition.
02	High	1, 2	Unit 1 and 2 ETB (4160 volt B train essential switchgear rooms) are located on elevation 560 and are theoretically susceptible to being affected by an internal flooding event occurring within the Diesel Generator rooms (unit 1 or 2) which are located at approximately 554 elevation.	Harden the doorways between the ETB switchgear rooms and the A sequencer corridors against water intrusion into the switchgear rooms from the A DG rooms. Completion Date: December 31, 2017	Y	N	This modification will provide an internal flood risk reduction to offset the Fire PRA risk increase post-transition.
03	High	1, 2	The current installation and maintenance program of the turbine building siding fasteners leave the siding susceptible to being affected by low speed (73-114 mph) straight line winds thus increasing the PRA risk probability of a LOOP event.	Replace/upgrade turbine building siding fasteners and institute a preventative maintenance program to periodically inspect the fasteners. Completion Date: December 31, 2017	Y	N	This modification will provide an internal events high winds risk reduction to offset the Fire PRA risk increase post-transition.

Table S-2b Plant Modifications Committed – Fire PRA

Item	Rank	Unit	Problem Statement	Proposed Modification	In FPRA	Comp Measure	Risk Informed Characterization
01	High	2	KSI Inverter Modification to relocate cable in fire area 9.	Cable 2KSI-SKXP for 0ETLPLSKXP will be re-routed from SSF shutdown fire area 9 (Unit 2 Battery Room) to non-SSF shutdown fire area(s). Completion Date: December 31, 2017	N	Y	This cable modification is required for NFPA 805. Compensatory measures will be established when the NFPA 805 fire protection program becomes effective and remain in place until this modification is complete.
02	Med	1	Unit 1 Breaker Coordination issues identified for MCCs 1EMXA, 1EMXB, 1EMXC, 1EMXD, 1EMXI, 1EMXJ, 1EMXK, and 1EMXL.	Remove the incoming breaker and connect wiring directly to the MCC bus for the following MCCs: 1EMXA, 1EMXB, 1EMXC, 1EMXD, 1EMXI, 1EMXJ, 1EMXK, and 1EMXL. Completion Date: December 31, 2017	Y	Y	This coordination modification is required for NFPA 805. The current coordination study is valid for current licensing basis. Compensatory measures will be established when the NFPA 805 fire protection program becomes effective and remain in place until this modification is complete.
03	Med	2	Unit 2 Breaker Coordination issues identified for MCCs 2EMXA, 2EMXB, 2EMXC, 2EMXD, 2EMXI, 2EMXJ, 2EMXK, and 2EMXL.	Remove the incoming breaker and connect wiring directly to the MCC bus for the following MCCs: 2EMXA, 2EMXB, 2EMXC, 2EMXD, 2EMXI, 2EMXJ, 2EMXK, and 2EMXL. Completion Date: December 31, 2017	Y	Y	This coordination modification is required for NFPA 805. The current coordination study is valid for current licensing basis. Compensatory measures will be established when the NFPA 805 fire protection program becomes effective and remain in place until this modification is complete.

Table S-2b Plant Modifications Committed – Fire PRA

Item	Rank	Unit	Problem Statement	Proposed Modification	In FPRA	Comp Measure	Risk Informed Characterization
04	Med	1, 2	Breaker Coordination issues identified on load side of EDE and EDF breakers.	Install fuses on the load side of EDE and EDF breakers. Involves 4 breakers on EDE and 3 on EDF. Mount new fuses in each panel. Completion Date: December 31, 2017	Y	Y	This coordination modification is required for NFPA 805. The current coordination study is valid for current licensing basis. Compensatory measures will be established when the NFPA 805 fire protection program becomes effective and remain in place until this modification is complete.
05	Med	1, 2	Breaker Coordination issues identified with 600 VAC MCCs.	Remove the fuse from the Motor Operator Heater circuit for 1CA VA0050A and 2CAVA0050A. Completion Date: December 31, 2017	Y	Y	This coordination modification is required for NFPA 805. The current coordination study is valid for current licensing basis. Compensatory measures will be established when the NFPA 805 fire protection program becomes effective and remain in place until this modification is complete.
06	Med	1, 2	Breaker Coordination issues identified with 600 VAC MCCs.	Route new cables for the normally energized circuits on 1WLLS5900 and 2WLLS5900. Completion Date: December 31, 2017	Y	Y	This coordination modification is required for NFPA 805. The current coordination study is valid for current licensing basis. Compensatory measures will be established when the NFPA 805 fire protection program becomes effective and remain in place until this modification is complete.

Table S-2b Plant Modifications Committed – Fire PRA

Item	Rank	Unit	Problem Statement	Proposed Modification	In FPRA	Comp Measure	Risk Informed Characterization
07	Med	1, 2	TDCAP is susceptible to fire in the ETA/ETB Switchgear Rooms.	Cable routes modified such that the TDCAP will remain available in the event of a fire in the ETA or ETB Switchgear Room. Completion Date: December 31, 2017	Y	Y	This modification is required for NFPA 805. The modification will ensure that the TDCAP is available in addition to the already credited opposite train motor driven CA pump for a fire in the ETA or ETB Switchgear Rooms. Compensatory measures will be established when the NFPA 805 fire protection program becomes effective and remain in place until this modification is complete.

Table S-3, Items provided below are those items (procedure changes, process updates, and training to affected plant personnel) that will be completed prior to the implementation of new NFPA 805 fire protection program. This will occur within 180 days after issuance of the license amendment unless that date falls within a scheduled refueling outage. Then, implementation will occur within 60 days after startup from that scheduled refueling outage. Note Item 13 is associated with modifications in Table S-2b and will be completed in accordance with the timetable described in Section 5.5.

Table S-3 Implementation Items

Item	Unit	Description	LAR Section / Source
1	1, 2	Perform the following recommendations from the Radiological Release Evaluation: 1. Within each yard area fire strategy, identify radiologically controlled area boundaries within the strategy and any potential escape paths. This includes building sumps and storm drains, where applicable. For consistency, it is recommended that even hardened barriers are identified. Examples of these would include: hatches, passage doors, and roll-up doors. 2. Enhance the appropriate existing procedures or guidelines, or create a new procedure or guideline, to include more detail on the control measures used to maintain radioactive release limits where monitoring cannot be accomplished. Examples include: ▪ Water fog streams used for smoke scrubbing ▪ Controlling water runoff during fire suppression activities ▪ Covering drains and other similar containment measures 3. Enhance Fire Brigade Guidelines (Procedure RP-29) to instruct Radiation Protection personnel to respond to fires where there are radiological concerns inside and outside the Protected Area. 4. Enhance the appropriate existing procedures or guidelines, or create a new procedure or guideline, to include guidance for crossing RCA/Radioactive Control Zone boundaries including escape routes. 5. Create new fire strategies for yard areas that contain RCAs. This includes the following: ▪ Retired Steam Generator Storage Facility (Building 7777)	4.4.2 and Attachment E

Table S-3 Implementation Items

Item	Unit	Description	LAR Section / Source
		▪ Radiation Materials Control Building (Building 7767) ▪ Hold-Up Ponds ▪ Radiography Vault ▪ Radioactive Materials Containers ▪ Tents Containing Radioactive Material ▪ Mixed Waste Storage ▪ ISFSI Storage of non-ISFSI Radioactive Materials 6. Within each fire strategy, identify the Radiologically Controlled Area (RCA) or Radioactive Control Zone in the written text. 7. Fire Brigade training will be revised to ensure the new guidance proposed in Recommendations 2, 3 and 4 for radioactive release is covered during the established training interval. 8. Add a standard statement for smoke and water runoff to all radiologically controlled area fire strategies to prompt measures to avoid radioactive release. 9. Incorporate all fire fighting strategies into the electronic records management retrieval system (internally referred to as NEDL). This will provide consistency for current users and the ability to conduct effective reviews to ensure all radioactive release recommendations have been incorporated. 10. Add an appendix to the fire strategies for building sump drainage and site storm drains. This is NOT intended to be a detailed plan, but a site overview that identifies areas where runoff has the potential to route to a storm drain or an automatic sump that will pump without radiation monitoring. 11. Develop administrative guidance in collaboration with radiation protection to support ensuring that radioactive release(s) do not exceed limits in the event of a fire in areas where engineering controls will not contain the potential release. Attachment A contains a flow chart of the various considerations needed for administrative controls that can be directed via one or more plant procedures depending upon the performing group(s).	

Table S-3 Implementation Items

Item	Unit	Description	LAR Section / Source
2	1, 2	After the approval of the LAR, in accordance with 10 CFR 50.71(e) and approved exemptions, the CNS UFSAR will be revised. The format and content will be consistent with NEI 04-02 FAQ 12-0062.	5.4
3	1,2	The Design Basis Specification for the Plant Fire Protection, which is the primary fire protection program policy document, will be updated to include the statement that the NRC is the AHJ for fire protection changes requiring approval.	Attachment A, 3.2.2.4
4	1,2	Appropriate fire protection program document(s) will be updated to provide a requirement that if a plant elects to implement the methodologies in EPRI Report TR1006756, that the methodologies will be implemented in their entirety as they pertain to the fire protection systems or features being evaluated.	Attachment A, 3.2.3(1)
5	1,2	The monitoring program required by NFPA 805 Section 2.6 will be implemented after the LAR approval as part of the fire protection program transition to NFPA 805, in accordance with NFPA 805 FAQ 10-0059, and will include a process that reviews fire protection performance and trends in performance. Program specifics are provided in LAR Section 4.6.2.	4.6.2, Attachment A, 3.2.3(3)
6	1,2	Revise station procedures/directives to comply with NFPA 805 Section 3.3.1.2(1).	Attachment A, 3.3.1.2(1)
7	1,2	Appropriate station documentation will be updated to include the requirements for installation of cable above suspended ceilings.	Attachment A, 3.3.5.1
8	1,2	The Fire Strategies will be reviewed and updated to include any changes to equipment important to nuclear safety and other updates pertinent to the NFPA 805 Transition.	Attachment A, 3.4.2.1
9	1,2	The Fire Protection Design Basis Document described in Section 2.7.1.2 of NFPA 805 and necessary supporting documentation described in Section 2.7.1.3 of NFPA 805 will be created as part of transition to 10 CFR 50.48(c) to ensure program implementation following receipt of the safety evaluation. Appropriate cross references will be established to supporting documents as required by Duke Energy processes.	4.7.1

Table S-3 Implementation Items

Item	Unit	Description	LAR Section / Source
10	1, 2	Ensure the CNS configuration control process follows the requirements in NFPA 805 and the guidance outlined in RG 1.174 which requires the use of qualified individuals, procedures that require calculations be subject to independent review and verification, record retention, peer review, and a corrective action program that ensures appropriate actions are taken when errors are discovered. The configuration control requirements should be implemented in accordance with FAQ 12-0061.	4.7.2
11	1, 2	Develop Engineering training guidelines to identify and document required training and mentoring to ensure individuals are appropriately qualified per the requirements of NFPA 805 Section 2.7.3.4 to perform assigned work.	4.7.3
12	1, 2	Revise Shutdown Risk Management procedures to reflect the following recommendations during higher risk evolutions from the calculation entitled, "NFPA 805 Transition Non-Power Fire Area Assessments (Pinch Points Analysis)": ▪ Include HRPOS definition. ▪ Limit hot work in this fire area during Higher Risk Plant Operating States (HRPOS's). ▪ Prohibit hot work in this fire area during Higher Risk Plant Operating States (HRPOS's). ▪ Verify that the available fire detection systems located in the fire area are functional. Post firewatch per SLCs in affected Fire Areas prior to entering Higher Risk Plant Operating States if system(s) are impaired. ▪ Verify that the available fire suppression systems located in the fire area are functional. Post firewatch per SLCs in affected Fire Areas prior to entering Higher Risk Plant Operating States if system(s) are impaired. ▪ Limit transient combustible storage in this fire area during Higher Risk Plant Operating States (HRPOS's). ▪ Prohibit transient combustible storage in this fire area during Higher Risk Plant Operating States (HRPOS's). ▪ Provide a firewatch (continuous or periodic) in this fire area during Higher Risk Plant Operating States (HRPOS's).	4.3 and Attachment D

Table S-3 Implementation Items

Item	Unit	Description	LAR Section / Source
		▪ Activities in fire areas be rescheduled to non-Higher Risk Plant Operating States (HRPOS's) periods.	
13	1, 2	Following installation of modifications and the as-built installation details, additional refinements surrounding the modification may need to be incorporated into the Fire PRA model. If the revised Fire PRA shows a risk increase of greater than 1E-07 for CDF or 1E-08 for LERF than enter the results into the corrective action program to determine the cause of the risk increase and determine corrective actions.	4.8.2
14	1, 2	Develop formal training program for nonfire brigade personnel that respond to a fire incident.	Attachment A, 3.4.3(b)
15	1, 2	Revise the QA Topical, as appropriate, to update the definition of QA 3 to match post NFPA 805 criteria. QA Topical currently defines QA 3 as: *"QA Condition 3 covers those systems, components, items, and services which are important to fire protection as defined in the Hazards Analysis for each station. The Hazards Analysis is in response to Appendix A of NRC Branch Technical Position APCSB 9.5-1."*	4.7.3
16	1, 2	Implementation items resulting from the feasibility evaluation include: ▪ Corrective Action to add equipment tags to the petcocks for the CA valves. These equipment numbers will be added to Fire Procedure, AP/0/A/5500/045. ▪ Corrective Action to revise steps to Fire Procedure, AP/0/A/5500/045 to add valve numbers (or descriptive nomenclature) as applicable to the individual steps for throttling the CA valves (valve to isolate air, bleed air). ▪ Corrective Action to revise steps to Fire Procedure, AP/0/A/5500/045 to include requiring operators to obtain a climbing harness prior to throttling the CA valves locally. ▪ Corrective Action to add steps to Fire Procedure AP/0/A/5500/045 to trip the NC pumps locally (if unable to trip from the control room).	Attachment G

Table S-3 Implementation Items

Item	Unit	Description	LAR Section / Source
		▪ Corrective Action to add performance of recovery action drills to Operator training.	
17	1, 2	Update station documentation to indicate requirements for interior floor finishes.	Attachment A, 3.3.3

T. Clarification of Prior NRC Approvals

There are no elements of the pre-transition fire protection program licensing basis for which specific NRC clarification is needed.

U. Internal Events PRA Quality

206 Pages Attached

In accordance with RG 1.205 position 4.3:

> *"The licensee should submit the documentation described in Section 4.2 of Regulatory Guide 1.200 to address the baseline PRA and application-specific analyses. For PRA Standard "supporting requirements" important to the NFPA 805 risk assessments, the NRC position is that Capability Category II is generally acceptable. Licensees should justify use of Capability Category I for specific supporting requirements in their NFPA 805 risk assessments, if they contend that it is adequate for the application. Licensees should also evaluate whether portions of the PRA need to meet Capability Category III, as described in the PRA Standard."*

U.1 Internal Events PRA Model and Peer Review

The most recent full scope CNS Internal Events PRA Peer Review was performed in March 2002 using the peer review process described in NEI 00-02. More recently, focused scope peer reviews have been conducted on the CNS LERF PRA model and the CNS Internal Flooding PRA model. The results from these focus scope peer reviews are discussed in section U.2 for LERF and U.3 for Internal Flooding.

In March 2002, the CNS internal events PRA model received a peer review to certify the acceptability of PRAs before a consensus PRA Standard was available. The industry-developed process and methodology outlined in NEI 00-02 was used for the peer review. The review process was originally developed and used by the Boiling Water Reactor Owners Group (BWROG) and subsequently broadened to be an industry-applicable process through the NEI Risk Applications Task Force.

Revision 2b of the CNS internal events PRA was the model of record at the time of the peer review. The Revision 3 model was used as the basis for the Fire PRA model which supports the NFPA 805 transition. Revision 4 of the internal events PRA is currently under development.

The NEI 00-02 Peer Review process used grades to assess the relative technical merits and capabilities of each sub-element reviewed. The grades provide guidance on appropriate use of the information covered by the sub-element for risk-informed applications. Per NEI 05-04, Revision 2, "Process for Performing Internal Events PRA Peer Reviews Using the ASME/ANS PRA Standard", in general, the following approximate correspondence exists between the NEI 00-02 grading system and the ASME/ ANS PRA Standard RA-Sa-2009:

NEI 00-02	ASME PRA Standard
Grade 1	No equivalent "grade"
Grade 2	Capability Category I
Grade 3	Capability Category II
Grade 4	Capability Category III

Approximately 73% of the graded sub-elements received grades of 3 or higher. None of the sub-elements received a grade of 1 (or contingent 2), and 27 % of the sub-elements received a grade of 2 or contingent 3 (roughly 75% of this group was contingent grade 3).

F&Os from the 2002 peer review were assigned a significance level of A, B, C, D, or S based on guidance in NEI 00-02. Significance level A and B are equivalent to "Findings" in NEI 05-04 Revision 2. There were no level A F&Os; there were 32 level B F&Os, and 1 superior notation. In the time since the NEI 00-02 peer review, focused peer reviews have been performed for the internal flood and LERF models, which supersede one of the 32 F&Os.

In 2008, Duke Energy performed a self assessment that evaluated the differences between the original peer review against NEI 00-02 and RA-S-2008 of the ASME/ANS PRA Standard, as endorsed by Regulatory Guide 1.200, Revision 1.

In 2013, Duke Energy performed a self-assessment against the ASME/ ANS PRA Standard RA-Sa-2009 supporting requirements, as endorsed by Reg. Guide 1.200 Revision 2.

Table U-1 presents an assessment of all ASME/ANS PRA Standard RA-Sa-2009 supporting requirements that were assessed to be "Not Met" at the equivalent of Capability Category II in the 2002 peer review, were not assessed in the 2002 peer review (no equivalent NEI 00-02 sub-elements), or were assessed to be "Met" but had related Findings. Regulatory Guide 1.200, Appendix B was used to correlate NEI 00-02 sub-elements to ASME/ANS PRA Standard RA-Sa-2009 supporting requirements for the assessments. F&Os from the 2002 peer review are dispositioned for the applicable ASME/ANS PRA Standard RA-Sa-2009 SRs.

All changes to the CNS internal events PRA model since the last full-scope peer review have been reviewed and, with the exception of the LERF and Internal Flood PRA models for which focused-scope peer reviews were performed, there are no changes that are considered PRA upgrades as defined in ASME/ANS-RA-Sa-2009, as endorsed by Regulatory Guide 1.200 Revision 2. The CNS Internal Events PRA was judged to meet Capability Category II consistent with RG 1.205 guidance.

U.2 LERF PRA Peer Review

In December 2012, a focused scope peer review was performed of the CNS LERF PRA against selected requirements of the ASME/ ANS PRA Standard RA-Sa-2009, and any Clarifications and Qualifications provided in the NRC endorsement of the Standard contained in Revision 2 to RG 1.200. The peer review was performed using the process defined in NEI 05-04. The scope of the review was limited to the High Level Requirements and SRs in Part 2, Requirements for Internal Events At-Power PRA, Tables 2-2.8-1 and 2-2.8-2 through 2-2.8-8, of the ASME/ANS PRA Standard. The model reviewed was the LERF portion of CNS Internal Events PRA Model.

The ASME/ANS PRA Standard contains a total of 41 numbered SRs for the LERF portion of the internal events standard requirements. Two of the LERF SRs were determined to be not applicable to the CNS LERF PRA. Of the 39 applicable SRs, 26 SRs, or 67%, were rated as SR Met, Capability Category I/II, or greater. Only two SRs were not met. However, 11 or 28% of the SRs were assessed at Capability Category 1. CNS uses a LERF model based on the simplified LERF model in NUREG/CR-6595. While a NUREG/CR-6595 model is classified as Capability Category 1, the NRC has determined this to be of sufficient capability to support risk-informed applications.

In the course of this review, 9 new F&Os were prepared, including 6 suggestions and 3 findings. Table U-2 lists the 13 SRs that were assessed at Capability Category 1 or Not Met and the related findings, including the peer review assessment comments, the disposition and status for each of the findings, and an assessment of the impact on the Fire PRA and NFPA 805 application. The LERF Analysis peer review report is available upon request.

U.3 Internal Flood PRA Peer Review

In September 2012, a focused scope peer review was performed of the CNS Internal Flood PRA using the NEI 05-04 process and the ASME PRA Standard ASME/ANS RA-Sa-2009, along with the NRC clarifications provided in Regulatory Guide 1.200, Revision 2. The peer review concluded that 56 of the total 62 numbered SRs outlined within the 2009 ASME PRA Standard for At-Power Internal Flood met Capability Category II or greater. Five of the SRs were rated as Not Met and 1 was rated as CC I.

The independent peer review identified 17 new F&Os which are comprised of 9 findings, 7 suggestions, and 1 best practice. Table U-3 presents the SRs and related F&O findings, including the peer review assessment comments, the disposition and status for each of the findings, and an assessment of the impact on the Fire PRA and NFPA 805 application. The Flooding Analysis peer review report is available upon request.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
IE-A1	IDENTIFY those initiating events that challenge normal plant operation and that require successful mitigation to prevent core damage using a structured, systematic process for identifying initiating events that accounts for plant-specific features. For example, such a systematic approach may employ master logic diagrams, heat balance fault trees, or failure modes and effects analysis (FMEA). Existing lists of known initiators are also commonly employed as a starting point.	Dispositioned	F&O IE-03: Although SAAG 691 states that a review of plant systems was performed to search for support initiators, documentation of the review was not located. Each system notebook includes a section indicating whether or not it was determined that loss of that system leads to an initiating event. However, there was no discussion in SAAG 691 or the system notebooks to indicate that the process followed was sufficiently structured to capture potential initiators across various system alignments and support system alignments, and to consider initiating event precursors. This finding was made against NEI SR IE-10 with grade 3 being contingent on its resolution.	The NEI SRs applicable to this ASME SR are IE-7, IE-8, IE-9, and IE-10, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated IE-7 and IE-9 as "3" and IE-8 and IE-10 as "3 with contingencies." IE-10 has one level "B" F&O: IE-03. F&O IE-03: Support systems were reviewed to identify plant specific initiating events and documentation of the review and approach has been added to CNC-1535.00-00-0114 Rev. 0. Since the Peer Review rated all of the applicable NEI SRs as "3" and there are no remaining open level "B" F&Os, this ASME SR is now Met Cat II.	There were no F&Os with "A" level of significance at CNS and there are no remaining open F&Os with "B" level of significance related to this SR. No impact on Fire PRA or NFPA 805.
IE-A2	INCLUDE in the spectrum of internal-event challenges considered at least the following general categories: (a) Transients. INCLUDE among the transients both	Open	F&O IE-06: The Loss of HVAC initiator was removed, because operators may shut down the plant from remote locations (the Auxiliary Shutdown Panel and the SSF) if the Control Room is incapable of maintaining inventory control. This is an inadequate reason to omit an IE. If loss of HVAC causes a plant trip and requires SSD from the ASP, that	The NEI SRs applicable to this ASME SR are IE-5, IE-7, IE-9, and IE-10, and there are no NRC objections. There is an industry action to confirm that the appropriate initiators were included. The original Peer Review rated IE-7 and IE-9 as "3" and IE-5 and IE-10 as "3 with contingencies." IE-5 has one	IE-06: PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	equipment and human-induced events that disrupt the plant and leave the primary system pressure boundary intact. (b) LOCAs. INCLUDE in the LOCA category both equipment and human-induced events that disrupt the plant by causing a breach in the core coolant system with a resulting loss of core coolant inventory. DIFFERENTIATE the LOCA initiators, using a defined rationale for the differentiation. Examples of LOCA types include (1) Small LOCAs. Examples: reactor coolant pump seal LOCAs, small pipe breaks (2) Medium LOCAs. Examples: stuck open safety or relief valves (3) Large LOCAs. Examples: inadvertent ADS, component ruptures (4) Excessive LOCAs (LOCAs that cannot be mitigated by any combination of engineered systems). Example: reactor		sequence should be identified and modeled. Note that the switchgear room may also be affected by failed HVAC. A particular example is the possibility that the switchgear chiller is working, in which case the operators may not diagnose the situation in time.	level "B" F&O: IE-06; IE-10 has one level "B" F&O: IE-03. F&O IE-03 is more applicable to SRs IE-A1 , IE-A5 and IE-A6, and is dispositioned under those SRs. F&O IE-06: This SR is not met because the loss of switchgear HVAC initiating event is not included in the PRA. An evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. Based on review of the Control Room Area Ventilation System (VC) and Control Area Chilled Water System (YC) during normal and emergency operations, and evaluation of important fire scenarios and VC/YC train separation, it is concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application.	completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	pressure vessel rupture (5) LOCAs Outside Containment. Example: primary system pipe breaks outside containment (BWRs). (c) SGTRs. INCLUDE spontaneous rupture of a steam generator tube (PWRs). (d) ISLOCAs. INCLUDE postulated events in systems interfacing with the reactor coolant system that could fail or be operated in such a manner as to result in an uncontrolled loss of core coolant outside the containment [e.g., interfacing systems LOCAs (ISLOCAs)]. (e) Special initiators (e.g., support systems failures, instrument line breaks) [Note (1)].				
IE-A5	PERFORM a systematic evaluation of each system, including support systems, to assess the possibility of an initiating event occurring due to a failure of the system.	Dispositioned	F&O IE-03: Although SAAG 691 states that a review of plant systems was performed to search for support initiators, documentation of the review was not located. Each system notebook includes a section indicating whether or not it was determined that loss of that system leads to an	The NEI SRs applicable to this ASME SR are IE-5, IE-7, IE-9, and IE-10, and there are no NRC objections. There is an industry action to check for initiating events that can be caused by a train failure or a system failure. The original Peer Review rated IE-7	Based on the disposition, the requirements of Cat II are considered met. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	USE a structured approach [such as a system-by-system review of initiating event potential, or a failure modes and effects analysis (FMEA), or other systematic process] to assess and document the possibility of an initiating event resulting from individual systems or train failures.		initiating event. However, there was no discussion in SAAG 691 or the system notebooks to indicate that the process followed was sufficiently structured to capture potential initiators across various system alignments and support system alignments, and to consider initiating event precursors. This finding was made against NEI SR IE-10 with grade 3 being contingent on its resolution.	and IE-9 as "3" and IE-5 and IE-10 as "3 with contingencies." IE-5 has one level "B" F&O: IE-06; IE-10 has one level "B" F&O: IE-03. F&O IE-06 is more applicable to SR IE-A2 and is dispositioned under that SR. F&O IE-03: Support systems were reviewed to identify plant specific initiating events and documentation of the review and approach has been added to CNC-1535.00-00-0114 Rev. 0. This is considered to resolve the finding and achieve grade 3 of NEI SR / meet CAT II of the ASME SR.	
IE-A6	When performing the systematic evaluation required in IE-A5, INCLUDE initiating events resulting from multiple failures, if the equipment failures result from common cause, and from routine system alignments.	Dispositioned	F&O IE-03: Although SAAG 691 states that a review of plant systems was performed to search for support initiators, documentation of the review was not located. Each system notebook includes a section indicating whether or not it was determined that loss of that system leads to an initiating event. However, there was no discussion in SAAG 691 or the system notebooks to indicate that the process followed was sufficiently structured to capture potential initiators across various system alignments and support system alignments, and to consider initiating event precursors. This finding was made against NEI SR IE-10 with grade 3 being contingent on its resolution.	The NEI SRs applicable to this ASME SR are IE-5, IE-7, IE-9, and IE-10, and there are no NRC objections. There is an industry action to check for initiating events that can be caused by multiple failures, if the equipment failures result from a common cause or from routine system alignments. The original Peer Review rated IE-7 and IE-9 as "3" and IE-5 and IE-10 as "3 with contingencies." IE-5 has one level "B" F&O: IE-06; IE-10 has one level "B" F&O: IE-03. F&O IE-06 is more applicable to SR IE-A2 and is dispositioned under that SR. F&O IE-03: Support systems were reviewed to identify plant specific	The internal initiating event frequencies are not used in the Fire PRA. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				initiating events and documentation of the review and approach has been added to CNC-1535.00-00-0114 Rev. 0. CNC-1535.00-00-0114 Rev. 0 documents the reviews of the common cause failure events and review of maintenance rule function for consideration of initiating events from multiple failures. This is considered to resolve the finding and achieve grade 3 of NEI SR / meet CAT II of the ASME SR.	
IE-A8	INTERVIEW plant personnel (e.g., operations, maintenance, engineering, safety analysis) to determine if potential initiating events have been overlooked.	Open	None	There are no NEI SRs applicable to this ASME SR. An extensive search for initiating events has been performed in CNC-1535.00-00-0114 Rev. 0, so it is unlikely that interviews with plant personnel would result in the addition of any new initiators to the internal events model. However, the interviews need to be performed and documented. Self-assessment DPC-1535.00-00-0013, Rev. 3 indicates that this requirement has not been met for CNS. Specifically, no interviews with plant personnel have been performed or documented.	The internal initiating event frequencies are not used in the Fire PRA. There is no impact to the Fire PRA or NFPA 805.
IE-A9	REVIEW plant-specific operating experience for initiating event	Dispositioned	F&O IE-03: Although SAAG 691 states that a review of plant systems was performed to search for support	The NEI SRs applicable to this ASME SR are IE-10 and IE-16, and there are no industry self	There were no F&Os with "A" level of significance at CNS and there are no remaining

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	precursors, for identifying additional initiating events. For example, plant-specific experience with intake structure clogging might indicate that loss of intake structures should be identified as a potential initiating event.		initiators, documentation of the review was not located. Each system notebook includes a section indicating whether or not it was determined that loss of that system leads to an initiating event. However, there was no discussion in SAAG 691 or the system notebooks to indicate that the process followed was sufficiently structured to capture potential initiators across various system alignments and support system alignments, and to consider initiating event precursors. This finding was made against NEI SR IE-10 with grade 3 being contingent on its resolution.	assessment actions and no NRC objections. The original Peer Review rated IE-16 as "3" and IE-10 as "3 with contingencies." IE-10 has one level "B" F&O: IE-03. F&O IE-03: Plant-specific operating experience has been reviewed for initiating event precursors. This review is documented in CNC-1535.00-00-0114 Rev. 0. This is considered to resolve the finding and achieve grade 3 of NEI SR / meet CAT II of the ASME SR.	open F&Os with "B" level of significance related to this SR. No impact on Fire PRA or NFPA 805.
IE-B2	USE a structured, systematic process for grouping initiating events. For example, such a systematic approach may employ master logic diagrams, heat balance fault trees, or failure modes and effects analysis (FMEA).	Dispositioned	None	The NEI SRs applicable to this ASME SR are IE-4 and IE-7, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated IE-7 as "3" and IE-4 as "3 with contingencies." There were no F&Os with "A" level of significance at CNS and there are no level "B" F&Os associated with either of these NEI SRs. Initiating events were combined into groups and a systematic approach was used as documented in CNC-1535.00-00-0114 Rev. 0 and CNC-1535.00-00-0031 Rev. 0 (SAAG 691). Self-assessment DPC-1535.00-00-0013, Rev. 3 indicates that this	There were no F&Os with "A" level of significance at CNS and there are no level "B" F&Os related to this SR. Documentation issue has no impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				requirement has not been met for CNS. Specifically, documentation of a structured, systematic approach to grouping initiating events was found to need enhancement.	
IE-C5	CALCULATE initiating event frequencies on a reactor year basis [Note (1)]. INCLUDE in the initiating event analysis the plant availability, such that the frequencies are weighted by the fraction of time the plant is at-power.	Dispositioned	None	There are no NEI SRs applicable to this ASME SR. Initiating event frequencies are calculated on a reactor year basis. The plant availability factor is included in the calculations. This is considered to meet CAT II of the ASME/ANS PRA Standard.	The internal initiating event frequencies are not used in the Fire PRA. There is no impact to the Fire PRA or NFPA 805.
IE-C6	USE as screening criteria no higher than the following characteristics (or more stringent characteristics as devised by the analyst) to eliminate initiating events or groups from further evaluation: (a) the frequency of the event is less than 1E-7 per reactor year (/yr), and the event does not involve either an ISLOCA, containment bypass, or reactor pressure vessel rupture	Open	F&O IE-06: The Loss of HVAC initiator was removed, because operators may shut down the plant from remote locations (the Auxiliary Shutdown Panel and the SSF) if the Control Room is incapable of maintaining inventory control. This is an inadequate reason to omit an IE. If loss of HVAC causes a plant trip and requires SSD from the ASP, that sequence should be identified and modeled. Note that the switchgear room may also be affected by failed HVAC. A particular example is the possibility that the switchgear chiller is working, in which case the operators may not diagnose the situation in time.	There are no NEI SRs applicable to this ASME SR. Although IE-C6 does not correlate directly to an NEI SR assessed by the peer review team, F&O IE-06 is judged to be applicable to this SR. The loss of Switchgear and Control Room HVAC systems are not modeled as initiating events in the Catawba PRA, and are excluded based on judgment, but the criteria in IE-C6 should be used to justify the exclusion. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk	IE-06: PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(b) the frequency of the event is less than 1E-6/yr, and core damage could not occur unless at least two trains of mitigating systems are failed independent of the initiator, or (c) the resulting reactor shutdown is not an immediate occurrence. That is, the event does not require the plant to go to shutdown conditions until sufficient time has expired during which the initiating event conditions, with a high degree of certainty (based on supporting calculations), are detected and corrected before normal plant operation is curtailed (either administratively or automatically). If either criterion (a) or (b) above is used, then CONFIRM that the value specified in the criterion meets the applicable requirements in Data Analysis (2-2.6) and Level 1			added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	Quantification (2-2.7).				
IE-C9	If fault tree modeling is used for initiating events, QUANTIFY the initiating event frequency [as opposed to the probability of an initiating event over a specific time frame, which is the usual fault tree quantification model described in Systems Analysis (2-2.4)]. MODIFY, as necessary, the fault tree computational methods that are used so that the top event quantification produces a failure frequency rather than a top event probability as normally computed. USE the applicable requirements in Data Analysis (2-2.6) for the data used in the fault-tree quantification.	Open	F&O IE-08: The estimation of the frequency of the loss service water (RN) is incorrect in the application of common cause factors. A "mission time" of 72 hours is used to describe the failure of all four pumps in the calculation of a yearly frequency. The equation used is basically: Lambda*72 hours * Beta * Gamma * Delta. Note that Lambda*72 hours is the frequency of a pump failing to run for 72 hours. The CCF factors are dimensionless and represent the failure of the other three pumps. The equation above calculates the frequency of failure in a 72 hour period. The "mission time" must be consistent with the frequency being calculated. That is, one would expect the frequency for an 18 month period (a refueling cycle) to be 1.5 times the frequency for a year. The current equation would provide the same frequency for a year, a refueling cycle, or the life of the plant. Ignoring a plant availability factor, the annual frequency is given by: Lambda*8760 hours * Beta * Gamma * Delta. Given the set of MGL parameters, the current equation underestimates the frequency by a factor of 365/3 ~ 122. One upper bound is provided by NUREG/CR-5750, which estimates the frequency at about 1E-3 per critical	There are no NEI SRs applicable to this ASME SR. Although IE-C8 does not correlate directly to an NEI SR assessed by the peer review team, F&O IE-08 is judged to be applicable to this SR. The F&O remains open (PRATracker C-03-0049) to implement a widely-accepted approach for common cause failure (CCF) treatment of components in initiator analyses once developed.	The internal initiating event frequencies are not used in the Fire PRA. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			operating year. This value is based on individual unit critical years, and may not be appropriate for cases where the failure is a station failure, not a single unit failure. An alternative approach is to develop, via NUREG/CR-4780 techniques, more realistic MGL parameters that deal with loss of a system as an initiating event not as a design basis function. Note the discussion does not question the MGL parameters. The point being made is the use of the parameters in calculating the frequency.		
IE-C10	If fault-tree modeling is used for initiating events, CAPTURE within the initiating event fault tree models all relevant combinations of events involving the annual frequency of one component failure combined with the unavailability (or failure during the repair time of the first component) of other components.	Open	F&O IE-08: The estimation of the frequency of the loss service water (RN) is incorrect in the application of common cause factors. A "mission time" of 72 hours is used to describe the failure of all four pumps in the calculation of a yearly frequency. The equation used is basically: Lambda*72 hours * Beta * Gamma * Delta. Note that Lambda*72 hours is the frequency of a pump failing to run for 72 hours. The CCF factors are dimensionless and represent the failure of the other three pumps. The equation above calculates the frequency of failure in a 72 hour period. The "mission time" must be consistent with the frequency being calculated. That is, one would expect the frequency for an 18 month period (a refueling cycle) to be 1.5 times the frequency for a year. The current	There are no NEI SRs applicable to this ASME SR. Although IE-C8 does not correlate directly to an NEI SR assessed by the peer review team, F&O IE-08 is judged to be applicable to this SR. The F&O remains open (PRATracker C-03-0049) to implement a widely-accepted approach for CCF treatment of components in initiator analyses once developed.	The internal initiating event frequencies are not used in the Fire PRA. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			equation would provide the same frequency for a year, a refueling cycle, or the life of the plant. Ignoring a plant availability factor, the annual frequency is given by: Lambda*8760 hours * Beta * Gamma * Delta. Given the set of MGL parameters, the current equation underestimates the frequency by a factor of 365/3 ~ 122. One upper bound is provided by NUREG/CR-5750, which estimates the frequency at about 1E-3 per critical operating year. This value is based on individual unit critical years, and may not be appropriate for cases where the failure is a station failure, not a single unit failure. An alternative approach is to develop, via NUREG/CR-4780 techniques, more realistic MGL parameters that deal with loss of a system as an initiating event not as a design basis function. Note the discussion does not question the MGL parameters. The point being made is the use of the parameters in calculating the frequency.		
IE-C12	COMPARE results and EXPLAIN differences in the initiating event analysis with generic data sources to provide a reasonableness check of the results.	Dispositioned	F&O IE-04: The initiating event frequency for a stuck open PORV or safety valve is taken from NUREG/CR-5750 but is conservative for the following reasons. The NUREG assigned a value to these events based on a non-informative prior updated with 0 events and the total number of critical reactor years in the study. In the case of a spurious	The NEI SR applicable to this ASME SR is IE-13, and there are no industry self assessment actions and no NRC objections. IE-13 was given a grade of "2" with F&O IE-04. F&O IE-04 appears to be an observation of conservatism in usage of generic industry data for	There were no F&Os with "A" level of significance at CNS and there are no remaining open F&Os with "B" level of significance related to this SR. In addition, use of generic data for stuck open PORV or safety valve initiating event frequency is not used in the Fire PRA.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			opening of a primary safety valve, the model should address the potential for the valve to close as the pressure decreased, effectively terminating the loss of coolant. The evaluation of the subsequent reclosure of the PORV is not as straightforward. The cause of the opening PORV would need to be addressed. However, either the PORV could be closed or the block valve could be closed.	stuck open SRV and PORV initiating events. However, this treatment is judged to be appropriate, and so this is considered to meet CAT II of the ASME/ANS PRA Standard.	No impact on Fire PRA or NFPA 805.
IE-C14	In the ISLOCA frequency analysis, INCLUDE the following features of plant and procedures that influence the ISLOCA frequency: (a) configuration of potential pathways including numbers and types of valves and their relevant failure modes and the existence, size, and positioning of relief valves (b) provision of protective interlocks (c) relevant surveillance test procedures (d) the capability of secondary system piping	Open	None	The NEI SR applicable to this ASME SR is IE-14, and there are no NRC objections. There is an industry action to confirm that secondary pipe system capability and isolation capability under high flow or differential pressures are included. The original Peer Review rated this NEI SR as "3". There were no F&Os with "A" level of significance at CNS and there are no level "B" F&Os associated with this NEI SR. Even though the NEI equivalent to this SR was assessed to be Grade 3 by the peer review team in 2002, the industry action relates to PRA Tracker Open Item C-02-0001, which indicates this item is still open. Credit may have been given to MOVs that will not function under the differential pressure conditions that result from ruptured check valves.	If credit for the MOVs is removed, the base Fire CDF and LERF and the base internal events CDF and LERF will increase. Impact on the internal events PRA LERF is expected to be greater than impact on CDF. The Fire CDF/LERF and delta CDF/LERF values are in the middle of Region II of the RG 1.174 acceptance criteria, and the expected increase in CDF/LERF with credit for the MOVs removed is small enough that the risk metrics would remain in Region II. The Fire PRA would require a fire initiator in addition to redundant check valve failure; thus the scenario frequency would be expected to be low and the Fire PRA impact would be expected to be insignificant.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(e) isolation capabilities given high flow/differential pressure conditions that might exist following breach of the secondary system			This item could result in an increase in the probability of certain ISLOCAs and may impact the base model CDF and LERF. For Fire PRA, discussion in CNC-1535.00-00-00111 regarding MSO 16, and the fault tree changes required to include fire induced ISLOCAS as inputs is addressed. Specifically, spurious opening of shutdown cooling suction line isolation valves was considered.	
IE-C15	CHARACTERIZE the uncertainty in the initiating event frequencies and PROVIDE mean values for use in the quantification of the PRA results.	Dispositioned	None	There are no NEI SRs applicable to this ASME SR. There is no equivalent NEI SR, however, the CNS self-assessment evaluated this SR as being met, and there is documentation of the mean value and error factor for the initiating event frequencies, so this is considered to meet CAT II of the ASME/ANS PRA Standard.	Based on the disposition, Cat II of the PRA Standard is met. There is no impact on Fire PRA or NFPA 805
AS-A1	USE a method for accident sequence analysis that (a) explicitly models the appropriate combinations of system responses and operator actions that affect the key safety functions for each modeled initiating event;	Open	AS-04: There were several observations on the modeling of event D3 in the SGTR tree: Event D3 is generally defined as the event to cooldown to RHR conditions using 2/3 SG for depressurization. D3 includes the HEP YAGRCOLDHE, which is directed by ECA 3.1 and 3.2. 1. D3 is defined as "primary system cooldown via secondary system depressurization". Primary system depressurization must be	The NEI SRs applicable to this ASME SR are AS-4 and AS-8, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-4 as "3" and AS-8 as "3 with contingencies." AS-8 has one level "B" F&O: AS-04. F&O AS-04 is only applicable to SGTR events. The modeling of SGTR events was changed to be	There were no F&Os with "A" level of significance at CNS. Open level "B" F&O AS-04 is only applicable to SGTR events. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(b) includes a graphical representation of the accident sequences in an "event tree structure" or equivalent such that the accident sequence progression is displayed; and (c) provides a framework to support sequence quantification.		accomplished in some sequences (YD1D2D3, YOD3, YUOD3), by either PORV, aux spray, or main spray. These functions are not included in D3. 2. Sequence YUOD3 needs a T/H justification that D3 can actually prevent core damage in this circumstance. This sequence has no injection and no SG isolation. This is "core cooling recovery" with an unisolated SGTR. ECA3 specifies cool down at less than 100F/hr. The core can not be maintained covered for the amount of time it takes to cooldown to RHR conditions at 100F/hr. Suggested resolution is to use a separate function for this heading, using an operator action directed by FRC.1 and without RCP operating. 3. Sequence YUD1QD3. comment #2 applies to this sequence as well. This is a stuck open relief PORV with no injection.	consistent with industry standards using the guidance in WCAP-15955. Success criteria runs were performed for the MNS PRA and are applicable to CNS. Reconstruction of the CNS SGTR success criteria is needed to close this F&O.	
AS-A2	For each modeled initiating event, IDENTIFY the key safety functions that are necessary to reach a safe, stable state and prevent core damage. [See Note (1).]	Open	AS-04: There were several observations on the modeling of event D3 in the SGTR tree: Event D3 is generally defined as the event to cooldown to RHR conditions using 2/3 SG for depressurization. D3 includes the HEP YAGRCOLDHE, which is directed by ECA 3.1 and 3.2. 1. D3 is defined as "primary system cooldown via secondary system depressurization". Primary system depressurization must be accomplished in some sequences (YD1D2D3, YOD3, YUOD3), by either	The NEI SRs applicable to this ASME SR are AS-6, AS-7, AS-8, AS-9, and AS-17, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-6 and AS-17 as "3" and AS-7, AS-8 and AS-9 as "3 with contingencies." AS-8 has one level "B" F&O: AS-04, and AS-9 has one level "B" F&O: AS-07. F&O AS-04 is only applicable to SGTR events. The modeling of	There were no F&Os with "A" level of significance at CNS. Open level "B" F&O AS-04 is only applicable to SGTR events. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			PORV, aux spray, or main spray. These functions are not included in D3. 2. Sequence YUOD3 needs a T/H justification that D3 can actually prevent core damage in this circumstance. This sequence has no injection and no SG isolation. This is "core cooling recovery" with an unisolated SGTR. ECA3 specifies cool down at less than 100F/hr. The core can not be maintained covered for the amount of time it takes to cooldown to RHR conditions at 100F/hr. Suggested resolution is to use a separate function for this heading, using an operator action directed by FRC.1 and without RCP operating. 3. Sequence YUD1QD3. comment #2 applies to this sequence as well. This is a stuck open relief PORV with no injection. AS-07: The success criteria for AFW for SGTR is 1 CA pump to 2 steam generators. The ruptured SG is assumed to be one of the two steam generators that supply steam to the turbine-driven AFW pump. In the Catawba Rev. 2b fault tree model, however, the dependency of the TDP on the SGTR initiator is not modeled. Thus, the TDP supply is not degraded by the initiating event in the model logic, so the model is incorrect. (This item is already on the list of corrective actions for the Catawba PRA, and Duke has indicated that it will be implemented in the Rev. 3	SGTR events was changed to be consistent with industry standards using the guidance in WCAP-15955. Success criteria runs were performed for the MNS PRA and are applicable to CNS. Reconstruction of the CNS SGTR success criteria is needed to close this F&O. F&O AS-07 is only applicable to SGTR events. The CA notebook was updated to reflect the correct success criteria due to SGTR loss of AFW pump, so AS-07 is considered resolved.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			PRA.)		
AS-A3	For each modeled initiating event, using the success criteria defined for each key safety function (in accordance with SR SC-A3), IDENTIFY the systems that can be used to mitigate the initiator. [See Note (1).]	Dispositioned	TH-03: Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. SY-03: System success criteria are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate	The NEI SRs applicable to this ASME SR are AS-17, AS-7, and SY-17, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-17 as "3" and AS-8 and SY-17 as "3 with contingencies." SY-17 has two level "B" F&Os: TH-03 and SY-03. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR / meet cat II of the ASME SR. F&O SY-03 - Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not	Peer Review F&O SY-03 is still open. While the success criteria have been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. For fire scenarios specifically, the LOCA success criteria is not important for fire since LOCA for Fire are transient initiated, (PORVs and RCP seal failures). The success criteria for these scenarios are well defined. Additionally the success criteria for MNS, (sister plant for CNS), has been updated and no change in mitigation equipment was identified.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis.	been added to these system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met.	
AS-A5	DEFINE the accident sequence model in a manner that is consistent with the plant-specific: system design, EOPs, abnormal procedures, and plant transient response.	Dispositioned	TH-03: Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes	The NEI SRs applicable to this ASME SR are AS-5, AS-18, AS-19, and SY-5, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-5, AS-19 and SY-5 as "3" and AS-18 as "3 with contingencies." AS-18 has one level "B" F&O: TH-03. The success criteria for all LOCA events were revisited since the Peer Review. For MLOCA and SLOCA events, thermal/hydraulic calculations were performed at the upper and lower ends of the	There were no F&Os with "A" level of significance at CNS and there are no remaining open F&Os with "B" level of significance related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs.	spectrum, as well as at several midpoints where changes in thermal/hydraulic behavior occur to determine the success criteria for those events. Availability of accumulators is also addressed. The design basis requirements for mitigation are used are used as the primary basis the success criteria for LLOCA events. Thus F&O TH-03 has been resolved. Since the Peer Review rated all of the applicable NEI SRs as "3" and there are no remaining open level "A" or "B" F&Os, this ASME SR is Met Cat II.	
AS-A7	DELINEATE the possible accident sequences for each modeled initiating event, unless the sequences can be shown to be a non-contribution using qualitative arguments.	Open	AS-04: There were several observations on the modeling of event D3 in the SGTR tree: Event D3 is generally defined as the event to cooldown to RHR conditions using 2/3 SG for depressurization. D3 includes the HEP YAGRCOLDHE, which is directed by ECA 3.1 and 3.2. 1. D3 is defined as "primary system cooldown via secondary system depressurization". Primary system depressurization must be accomplished in some sequences (YD1D2D3, YOD3, YUOD3), by either PORV, aux spray, or main spray. These functions are not included in D3. 2. Sequence YUOD3 needs a T/H justification that D3 can actually prevent core damage in this circumstance. This sequence has no	The NEI SRs applicable to this ASME SR are AS-4, AS-5, AS-6, AS-7, AS-8, and AS-9, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-4, AS-5 and AS-6 as "3" and AS-7, AS-8, and AS-9 as "3 with contingencies." AS-8 has one level "B" F&O: AS-04, and AS-9 has one level "B" F&O: AS-07. F&O AS-04 is only applicable to SGTR events. The modeling of SGTR events was changed to be consistent with industry standards using the guidance in WCAP-15955. Success criteria runs were performed for the MNS PRA and are applicable to CNS.	There were no F&Os with "A" level of significance at CNS. Open level "B" F&O AS-04 is only applicable to SGTR events. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			injection and no SG isolation. This is "core cooling recovery" with an unisolated SGTR. ECA3 specifies cool down at less than 100F/hr. The core can not be maintained covered for the amount of time it takes to cooldown to RHR conditions at 100F/hr. Suggested resolution is to use a separate function for this heading, using an operator action directed by FRC.1 and without RCP operating. 3. Sequence YUD1QD3. comment #2 applies to this sequence as well. This is a stuck open relief PORV with no injection. AS-07: The success criteria for AFW for SGTR is 1 CA pump to 2 steam generators. The ruptured SG is assumed to be one of the two steam generators that supply steam to the turbine-driven AFW pump. In the Catawba Rev. 2b fault tree model, however, the dependency of the TDP on the SGTR initiator is not modeled. Thus, the TDP supply is not degraded by the initiating event in the model logic, so the model is incorrect. (This item is already on the list of corrective actions for the Catawba PRA, and Duke has indicated that it will be implemented in the Rev. 3 PRA.)	Reconstruction of the CNS SGTR success criteria is needed to close this F&O. F&O AS-07 is only applicable to SGTR events. The CA notebook was updated to reflect the correct success criteria due to SGTR loss of AFW pump, so AS-07 is considered resolved.	
AS-A8	DEFINE the end state of the accident progression as occurring when either a	Dispositioned	TH-02: The original definition of core damage used in the Catawba PRA was the eutectic melting point of the fuel (4040 degF). This has been	The NEI SRs applicable to this ASME SR are AS-20, AS-21, AS-22, and AS-23. There are no NRC objections, but since the explicit	Changing the success criteria for core damage to a temperature provided in ASME/ANS PRA Standard

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	core damage state or a steady-state condition has been reached.		informally revised (i.e., not in a Workplace Procedure but known to the Duke PRA analysts associated with performing success criteria) based on a McGuire PRA Peer Review observation, to "success criteria is defined as the hottest core node remained below 2000 degF" as predicted by MAAP or other T/H code. The reference used by Duke for this definition is EPRI document NP-6328, "Release of Volatile Fission Products From Irradiated LWR Fuel: Mass Spectrometry Studies", Final Report, April 1989. The revised criterion is more in line with industry practice. In specific instances, it is possible that the 2000 degF criterion could be pushing the limit of acceptability for the code used, and investigation of the sensitivity of the results to a lower temperature value might be warranted (e.g., the ASME PRA Standard suggests 1800 degF for a code like MAAP, or even 1200 degF if there is prolonged core uncovery).	requirement for steady-state conditions for end state was not contained in NEI 00-02, this should be demonstrated. The original Peer Review rated all of these NEI SRs as "3". AS-22 has one level "C" F&O: TH-02, but a similar F&O for MNS was level "B" so it is retained here. An evaluation was performed in DPC-1535.00-00-0010 which provides the definition of core damage for PRA applications using the MAAP analysis code, determined to be 2500 F. This criterion is used in the development of success criteria and timing of operator actions. This evaluation meets the requirements of Section 1-2.2 of the Standard, and thus F&O TH-02 is resolved. The ASME SR is considered Met as reported in Duke self-assessments CNC-1535.00-00-0155 and DPC-1535.00-00-0013. More recently, MNS success criteria calculations have been revised to define success criteria as core temperature remains below 2000 Deg F. As noted in MCC-1535.00-00-0172, the difference in time to core damage is not significant when using either 2000 Deg F or 4000 Deg F because the exothermic nature of	SR SC-A2 examples for Cat II/III is expected to have negligible impact on system time windows used in the human reliability analysis, and should not impact the amount of equipment required for successful mitigation of sequences. The impact on the Fire PRA and NFPA 805 should be negligible.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				the zircaloy-water reaction rapidly increases the fuel temperature. Therefore, the revised success criterion does not have an impact on the time available for human recoveries or other non-recovery events such as loss of offsite power recoveries. There is also no impact on the equipment required for mitigation of any accident sequence. Even though the CNS success criteria have not been revised, the conclusions from MNS are considered applicable to CNS due to the similarities between the plants.	
AS-A9	USE realistic, applicable (i.e., from similar plants) thermal hydraulic analyses to determine the accident progression parameters (e.g., timing, temperature, pressure, steam) that could potentially affect the operability of the mitigating systems.	Dispositioned	TH-03: Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to	The NEI SRs applicable to this ASME SR are AS-18 and TH-4. There are no NRC objections, but the focus should be on the environmental conditions challenging the equipment during the accident sequence. The original Peer Review rated both of these NEI SRs as "3 with contingencies". AS-18 and TH-4 have the same level "B" F&O: TH-03. The success criteria for all LOCA events were revisited since the Peer Review. For MLOCA and SLOCA events, thermal/hydraulic calculations were performed at the upper and lower ends of the spectrum, as well as at several midpoints where changes in	There were no F&Os with "A" level of significance at CNS and there are no remaining open F&Os with "B" level of significance related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs.	thermal/hydraulic behavior occur to determine the success criteria for those events. Availability of accumulators is also addressed. The design basis requirements for mitigation are used are used as the primary basis the success criteria for LLOCA events. Thus F&O TH-03 has been resolved. Since the Peer Review rated all of the applicable NEI SRs as "3" and there are no remaining open level "A" or "B" F&Os, this ASME SR is Met Cat II.	
AS-A10	In constructing the accident sequence models, INCLUDE, for each modeled initiating event, sufficient detail that differences in requirements on systems and required operator interactions (e.g., systems initiations or valve alignment) are captured. Where diverse systems and/or operator actions provide a similar function, if choosing one over another changes the requirements for operator intervention or the need for other systems, MODEL each separately.	Open	AS-04: There were several observations on the modeling of event D3 in the SGTR tree: Event D3 is generally defined as the event to cooldown to RHR conditions using 2/3 SG for depressurization. D3 includes the HEP YAGRCOLDHE, which is directed by ECA 3.1 and 3.2. 1. D3 is defined as "primary system cooldown via secondary system depressurization". Primary system depressurization must be accomplished in some sequences (YD1D2D3, YOD3, YUOD3), by either PORV, aux spray, or main spray. These functions are not included in D3. 2. Sequence YUOD3 needs a T/H justification that D3 can actually prevent core damage in this circumstance. This sequence has no injection and no SG isolation. This is "core cooling recovery" with an	The NEI SRs applicable to this ASME SR are AS-4, AS-5, AS-6, AS-7, AS-8, AS-9, AS-19, SY-5, SY-8, and HR-23, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-4, AS-5 , AS-19, SY-5 and SY-18 as "3" and AS-7, AS-8, AS-9, and HR-23 as "3 with contingencies." AS-8 has one level "B" F&O: AS-04; AS-9 has one level "B" F&O: AS-07; and HR-23 has one level "B" F&O: HR-05. F&O AS-04 is only applicable to SGTR events. The modeling of SGTR events was changed to be consistent with industry standards using the guidance in WCAP-15955. Success criteria runs were	There were no F&Os with "A" level of significance at CNS. Open level "B" F&O AS-04 is only applicable to SGTR events. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			unisolated SGTR. ECA3 specifies cool down at less than 100F/hr. The core can not be maintained covered for the amount of time it takes to cooldown to RHR conditions at 100F/hr. Suggested resolution is to use a separate function for this heading, using an operator action directed by FRC.1 and without RCP operating. 3. Sequence YUD1QD3. comment #2 applies to this sequence as well. This is a stuck open relief PORV with no injection. AS-07: The success criteria for AFW for SGTR is 1 CA pump to 2 steam generators. The ruptured SG is assumed to be one of the two steam generators that supply steam to the turbine-driven AFW pump. In the Catawba Rev. 2b fault tree model, however, the dependency of the TDP on the SGTR initiator is not modeled. Thus, the TDP supply is not degraded by the initiating event in the model logic, so the model is incorrect. (This item is already on the list of corrective actions for the Catawba PRA, and Duke has indicated that it will be implemented in the Rev. 3 PRA.) F&O HR-05: In the Catawba HRA notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is	performed for the MNS PRA and are applicable to CNS. Reconstruction of the CNS SGTR success criteria is needed to close this F&O. F&O AS-07 is only applicable to SGTR events. The CA notebook was updated to reflect the correct success criteria due to SGTR loss of AFW pump, so AS-07 is considered resolved. Elements of F&O HR-05 related to this F&O are considered resolved. Success criteria, plant parameters and associated acceptance criteria derived from the success criteria analyses are used to support the timing analysis used in the PRA HRA. References to MAAP analysis that support the timing actions are included in the HRA spreadsheets.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios. This finding was made against NEI SR TH-5 with grade 3 being contingent on its resolution.		
AS-B1	For each modeled initiating event, IDENTIFY mitigating systems impacted by the occurrence of the initiator and the extent of the impact. INCLUDE the impact of initiating events on mitigating	Open	AS-07: The success criteria for AFW for SGTR is 1 CA pump to 2 steam generators. The ruptured SG is assumed to be one of the two steam generators that supply steam to the turbine-driven AFW pump. In the Catawba Rev. 2b fault tree model, however, the dependency of the TDP on the SGTR initiator is not modeled.	The NEI SRs applicable to this ASME SR are IE-4, IE-5, IE-10, AS-4, AS-5, AS-6, AS-7, AS-8, AS-9, AS-10, AS-11, and DE-5, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-4, AS-5 , AS-6 and AS-11 as "3" and all of the	Peer Review F&Os IE-06 and DE-04 are still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	systems in the accident progression either in the accident sequence models or in the system models.		Thus, the TDP supply is not degraded by the initiating event in the model logic, so the model is incorrect. (This item is already on the list of corrective actions for the Catawba PRA, and Duke has indicated that it will be implemented in the Rev. 3 PRA.) IE-06: The Loss of HVAC initiator was removed, because operators may shut down the plant from remote locations (the Auxiliary Shutdown Panel and the SSF) if the Control Room is incapable of maintaining inventory control. This is an inadequate reason to omit an IE. If loss of HVAC causes a plant trip and requires SSD from the ASP, that sequence should be identified and modeled. Note that the switchgear room may also be affected by failed HVAC. A particular example is the possibility that the switchgear chiller is working, in which case the operators may not diagnose the situation in time. DE-04: HVAC cooling of the essential switchgear rooms is stated as being required. The IPE quantitative analysis does not provide adequate success criteria. For example, the following are not specified: temperature limits of equipment, minimum number of Air Handling Units, or minimum number of chillers. The evaluation also states there is no concern within 24 hours provided that only those loads needed to provide	other NEI SRs as "3 with contingencies." IE-5 has one level "B" F&O: IE-06; IE-10 has one level "B" F&O: IE-03; AS-8 has one level "B" F&O: AS-04; AS-9 has one level "B" F&O: AS-07; AS-10 has one level "B" F&O: DE-04; and DE-5 has two level "B" F&Os: AS-07 and QU-02. Of the F&Os, AS-07, IE-06, and DE-04 appear to be related to this ASME SR, i.e., mitigating systems impacted by the occurrence of the initiator. F&O AS-07 is only applicable to SGTR events. The CA notebook was updated to reflect the correct success criteria due to SGTR loss of AFW pump, so AS-07 is considered resolved. F&Os IE-06 and DE-04 are not resolved because the loss of switchgear HVAC initiating event is not included in the PRA. The exclusion of the initiating event is not fully justified. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA	ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			core cooling are operated. There is no discussion of electrical load shedding for those loads not required, and of the human interface to execute load shedding. The human interface can be complex, involving both a discovery process (control room annunciators, or in the case of a local AHU failure, discovery through operator walkaround), and procedures and training to direct operation actions.	results or results for the NFPA 805 application. However, further evaluation of the issue is planned to ensure that all significant PRA scenarios are addressed and documented. Because of further action, this issue remains open until all evaluations are complete. For Fire PRA, CNC-1535.00-00-113, "FPRA Application Calculation," Section 6.2.1 "Control Complex Cooling" addresses impact of un-modeled HVAC dependencies and provides additional documentation to support concerns with maintaining cooling to electrical components (i.e., from a component length of life standpoint and not from a concern of inducing immediate failure) thus concluding the Control Complex HVAC dependencies to have minimal impact on the Fire PRA.	
AS-B3	For each accident sequence, IDENTIFY the phenomenological conditions created by the accident progression. Phenomenological impacts include generation of harsh environments affecting temperature, pressure, debris, water levels, humidity, etc. that could	Open	DE-04: HVAC cooling of the essential switchgear rooms is stated as being required. The IPE quantitative analysis does not provide adequate success criteria. For example, the following are not specified: temperature limits of equipment, minimum number of Air Handling Units, or minimum number of chillers. The evaluation also states there is no concern within 24 hours provided that only those loads needed to provide core cooling are operated. There is no	The NEI SRs applicable to this ASME SR are AS-10, SY-11, DE-10, and TH-8, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-10 and DE-10 as "3 with contingencies" and SY-11 as "2". TH-8 was unrated. AS-10 has one level "B" F&O: DE-04; SY-11 has one level "B" F&O: SY-06; DE-10 has one level "B" F&O: TH-06; TH-8 has one level "B" F&O: TH-	Peer Review F&Os DE-04 and TH-06 are still open. PIP PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	impact the success of the system or function under consideration [e.g., loss of pump net positive suction head (NPSH), clogging of flow paths]. INCLUDE the impact of the accident progression phenomena, either in the accident sequence models or in the system models.		discussion of electrical load shedding for those loads not required, and of the human interface to execute load shedding. The human interface can be complex, involving both a discovery process (control room annunciators, or in the case of a local AHU failure, discovery through operator walkaround), and procedures and training to direct operation actions. TH-06: There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. (Duke is already aware of this issue.) SY-06: For Catawba, there was no evaluation of the ability of non-qualified (non-EQ) equipment to survive in a degraded environment following an accident such as a steam line of feedwater line break outside of containment.	06. Of the F&Os, DE-04, TH-06, and SY-06 appear to be related to this ASME SR, i.e., phenomenological conditions created by the accident progression. F&O DE-06 is also associated with DE-10 but has been superseded by the more recent focus-scope peer review for the Flooding PRA model. F&Os DE-04 and TH-06 are not resolved because the loss of switchgear HVAC initiating event is not included in the PRA, and room heatup calculations for loss of ventilation are not performed for that and other locations. Room heatup calculations should be performed in all locations in which HVAC can be lost to justify not modeling those systems and/or determine timing of operator coping actions and equipment damage. If no room heatup calculation is performed, it should be assumed that the HVAC system is required in those locations. The appropriate dependencies should be included in the PRA model, including possible initiating events. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk	routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal. Peer Review F&O SY-06 is still open. However, the Fire PRA considers the impact of fire on the environment in the HGL analysis. High energy line breaks are not relevant to the Fire PRA. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application. However, further evaluation of the issue is planned to ensure that all significant PRA scenarios are addressed and documented. Because of further action, this issue remains open until all evaluations are complete. For Fire PRA, CNC-1535.00-00-113, "FPRA Application Calculation," Section 6.2.1 "Control Complex Cooling" addresses impact of un-modeled HVAC dependencies and provides additional documentation to support concerns with maintaining cooling to electrical components (i.e., from a component length of life standpoint and not from a concern of inducing immediate failure) thus concluding the Control Complex HVAC dependencies to have minimal impact on the Fire PRA. F&O SY-06 is not resolved because an evaluation of potential adverse effects on equipment operation due to degraded environmental conditions resulting from accidents in the PRA model has not been performed for events like steam line breaks and feed line breaks (Ref: PRATracker C-	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				03-0055). The Fire PRA considers the impact of fire on the environment in the HGL analysis. High energy line breaks are not relevant to the Fire PRA. Since Peer Review F&Os DE-04, TH-06, and SY-06 are still open, this ASME SR is Not Met.	
AS-B5	DEVELOP the accident sequence models to a level of detail sufficient to identify intersystem dependencies and train level interfaces, either in the event trees or through a combination of event tree and fault tree models and associated logic.	Dispositioned	QU-02: The IE's for certain support system failures (RN, KC) are not input in the top event logic as a Boolean equation, but rather as a point estimate whose value is derived by solution of the IE fault tree. However, failures that cause the IE may also affect the mitigating system, such that there is a dependency between the initiating event and the available mitigation. Examples are an electrical bus that failed one train of KC and could fail one train of mitigating equipment. Another example is the operator error in the loss of KC to start the standby train of KC (KKCSTNBDHE). The HRA notebook states this event has dependencies with HYDBACKDHE. AS-07: The success criteria for AFW for SGTR is 1 CA pump to 2 steam generators. The ruptured SG is assumed to be one of the two steam generators that supply steam to the turbine-driven AFW pump. In the Catawba Rev. 2b fault tree model, however, the dependency of the TDP	The NEI SRs applicable to this ASME SR are AS-10, AS-11, DE-4, DE-5, DE-6, and QU-25, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-11 and DE-6 as "3" and AS-10, DE-4, and DE-5 as "3 with contingencies." QU-25 was found not applicable. AS-10 has one level "B" F&O: DE-04; DE-4 has one level "B" F&O: DE-04; DE-5 has two level "B" F&Os: QU-02 and AS-07. Of the F&Os, QU-02 and AS-07 appear to be related to this ASME SR, i.e., intersystems dependencies. F&O QU-02: System level initiators represented as fully developed sub-tree structures are not in the Rev 3 model and Duke Energy does not intend to include them in the new model, Rev. 4, internal events fault tree structure. These initiators will be quantified and incorporated into the Rev. 4 model as point estimates. Duke	System level initiators modeled directly as fault trees will have little effect on the Fire PRA or NFPA 805; Fire PRA considers fire-induced failures during scenario development.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			on the SGTR initiator is not modeled. Thus, the TDP supply is not degraded by the initiating event in the model logic, so the model is incorrect. (This item is already on the list of corrective actions for the Catawba PRA, and Duke has indicated that it will be implemented in the Rev. 3 PRA.)	Energy feels that it is acceptable to not develop system level initiators as long as a review for dependencies takes place in the cut set file. This process has been proceduralized and is contained in Section 4 of Workplace Guideline XSAA-103, Guidelines For Determining Risk Significance. F&O AS-07 is only applicable to SGTR events. The CA notebook was updated to reflect the correct success criteria due to SGTR loss of AFW pump, so AS-07 is considered resolved.	
SC-A1	USE the definition of "core damage" provided in Section 1-2 of this Standard. If core damage has been defined differently than in Section 1-2, (a) IDENTIFY any substantial differences from the Section 1-2 definition (b) PROVIDE the bases for the selected definition	Dispositioned	TH-02: The original definition of core damage used in the Catawba PRA was the eutectic melting point of the fuel (4040 degF). This has been informally revised (i.e., not in a Workplace Procedure but known to the Duke PRA analysts associated with performing success criteria) based on a McGuire PRA Peer Review observation, to "success criteria is defined as the hottest core node remained below 2000 degF" as predicted by MAAP or other T/H code. The reference used by Duke for this definition is EPRI document NP-6328, "Release of Volatile Fission Products From Irradiated LWR Fuel: Mass Spectrometry Studies", Final Report, April 1989. The revised criterion is more in line	The NEI SRs applicable to this ASME SR are AS-20 and AS-22, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-20 as "3" and AS-22 as "3 with contingencies." AS-22 has one level "C" F&O: TH-02, but a similar F&O for MNS was level "B" so it is retained here. An evaluation was performed in DPC-1535.00-00-0010 which provides the definition of core damage for PRA applications using the MAAP analysis code, determined to be 2500 F. This criterion is used in the development of success criteria and timing of operator actions.	Changing the success criteria for core damage to a temperature provided in examples in ASME/ANS PRA Standard SR SC-A2 for Cat II/III is expected to have minimal impact on system time windows used in the human reliability analysis, and should not impact the amount of equipment required for successful mitigation of sequences. The impact on the Fire PRA and NFPA 805 should be negligible.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			with industry practice. In specific instances, it is possible that the 2000 degF criterion could be pushing the limit of acceptability for the code used, and investigation of the sensitivity of the results to a lower temperature value might be warranted (e.g., the ASME PRA Standard suggests 1800 degF for a code like MAAP, or even 1200 degF if there is prolonged core uncovery).	This evaluation meets the requirements of Section 1-2.2 of the Standard, and thus F&O TH-02 is resolved. The ASME SR is considered Met as reported in Duke self-assessments CNC-1535.00-00-0155 and DPC-1535.00-00-0013. More recently, MNS success criteria calculations have been revised to define success criteria as core temperature remains below 2000 Deg F. As noted in MCC-1535.00-00-0172, the difference in time to core damage is not significant when using either 2000 Deg F or 4000 Deg F because the exothermic nature of the zircaloy-water reaction rapidly increases the fuel temperature. Therefore, the revised success criterion does not have a significant impact on the time available for human recoveries or other non-recovery events such as loss of offsite power recoveries. Even though the CNS success criteria have not been revised, the conclusions from MNS are considered applicable to CNS due to the similarities between the plants.	
SC-A2	SPECIFY the plant parameters (e.g., highest node temperature, core	Dispositioned	F&O TH-02 - The original definition of core damage used in the Catawba PRA was the eutectic melting point of the fuel (4040 oF). This has been	The NEI SRs applicable to this ASME SR are TH-4, TH-5, TH-7, and AS-22. There are no industry self assessment actions and no	Changing the success criteria for core damage to a temperature provided in examples in ASME/ANS

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	collapsed liquid level) and associated acceptance criteria (e.g., temperature limit) to be used in determining core damage. SELECT these parameters such that determination of core damage is as realistic as practical, in a manner consistent with current best practice. DEFINE computer code-predicted acceptance criteria with sufficient margin on the code-calculated values to allow for limitations of the code, sophistication of the models, and uncertainties in the results, in a manner consistent with the requirements specified under HLR-SC-B. Examples of measures for core damage suitable for Capability Category II/III, that have been used in PRAs, include (a) collapsed liquid level less than 1/3 core height or code-predicted peak		informally revised (i.e., not in a Workplace Procedure but known to the Duke PRA analysts associated with performing success criteria) based on a McGuire PRA Peer Review observation, to "success criteria is defined as the hottest core node remained below 2000 oF" as predicted by MAAP or other T/H code. The reference used by Duke for this definition is EPRI document NP-6328, "Release of Volatile Fission Products From Irradiated LWR Fuel: Mass Spectrometry Studies", Final Report, April 1989. The revised criterion is more in line with industry practice. In specific instances, it is possible that the 2000 oF criterion could be pushing the limit of acceptability for the code used, and investigation of the sensitivity of the results to a lower temperature value might be warranted (e.g., the ASME PRA Standard suggests 1800 oF for a code like MAAP, or even 1200 oF if there is prolonged core uncovery). F&O TH-03 - Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5	NRC objections. The original Peer Review rated all of these NEI SRs as "3 with contingencies", except TH-5, which is rated a "2". TH-4 has one level "B" F&O: TH-03; TH-5 has two level "B" F&Os: HR-05 and TH-05; TH-7 has one level "B" F&O: TH-01; and AS-22 has one level "C" F&O: TH-02, but a similar F&O for MNS was level "B" so it is retained here. An evaluation was performed in DPC-1535.00-00-0010 which provides the definition of core damage for PRA applications using the MAAP analysis code, determined to be 2500 F. This criterion is used in the development of success criteria and timing of operator actions. This evaluation meets the requirements of Section 1-2.2 of the Standard, and thus F&O TH-02 is resolved. The ASME SR is considered Met as reported in Duke self-assessments CNC-1535.00-00-0155 and DPC-1535.00-00-0013. More recently, MNS success criteria calculations have been revised to define success criteria as core temperature remains below 2000 Deg F. As noted in MCC-1535.00-00-0172, the difference in time to core damage is not significant when using either	PRA Standard SR SC-A2 for Cat II/III is expected to have minimal impact on system time windows used in the human reliability analysis, and should not impact the amount of equipment required for successful mitigation of sequences. The impact on the Fire PRA and NFPA 805 should be negligible. Peer Review F&O TH-05 is still open. While updated success criteria and timing data has been developed from MAAP 4.0.7 analyses, it has not been incorporated into the model of record. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. Fire-induced Anticipated Transient Without Scram (ATWS) events are not postulated, and thus there is no impact on the Fire PRA results or NFPA 805. As a result, the overall impact on the Fire PRA results and NFPA 805 is expected to be negligible. Peer Review F&O TH-01 is

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	core temperature >2,500°F (BWR) (b) collapsed liquid level below top of active fuel for a prolonged period, or code-predicted core peak node temperature >2,200°F using a code with detailed core modeling; or code-predicted core peak node temperature >1,800°F using a code with simplified (e.g., single-node core model, lumped parameter) core modeling; or code-predicted core exit temperature >1,200°F for 30 min using a code with simplified core modeling (PWR).		inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. F&O HR-05 - In the Catawba HRA notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an	2000 Deg F or 4000 Deg F because the exothermic nature of the zircaloy-water reaction rapidly increases the fuel temperature. Therefore, the revised success criterion does not have a significant impact on the time available for human recoveries or other non-recovery events such as loss of offsite power recoveries. Even though the CNS success criteria have not been revised, the conclusions from MNS are considered applicable to CNS due to the similarities between the plants. TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. HR-05 - Success criteria, plant parameters and associated	still open. While the success criteria has been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios. F&O TH-01 - Success Criteria (Level 1 and Level 2) for some systems and sequences are supported by MAAP runs with MAAP 3b, Version 16. This version of MAAP has been found to have limitations which can impact conclusions and results. In particular for the Catawba PRA, the simple pressurizer model likely impacts the analyses that involve RCS cooldown and depressurization using SG heat removal by permitting RCS depressurization to match RCS cooldown for transients, without the possible need for pressurizer PORVs, spray or aux spray. F&O TH-05 -The HEP worksheets do not clearly refer to success criteria analyses to support timing for operator actions. Although most worksheets include an estimate of the time available for completion of an action, and some refer generally to	acceptance criteria derived from the success criteria analyses are used to support the timing analysis used in the PRA HRA. References to MAAP analysis that support the timing actions are included in the HRA spreadsheets. This is considered to resolve the elements of this F&O related to this SR, and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. TH-01 - An updated success criteria calculation was completed using MAAP 4.0.7 (Section 2.2) and is documented into the updated CNS Success Criteria Notebook. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met. TH-05 - Operator actions are considered as part of the CNP success criteria analyses with expected operator actions included for SLOCA (Section 3.3), SGTR (Section 3.4), and transient F&B (Section 3.6). Specific timing	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			information from MAAP analyses, specific references to MAAP (or other analysis) cases are not provided.	information from MAAP analyses can be found in Appendices A through F MAAP. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met.	
SC-A3	SPECIFY success criteria for each of the key safety functions identified per SR AS-A2 for each modeled initiating event [Note (2)].	Open	F&O TH-03 - Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but	The NEI SRs applicable to this ASME SR are AS-7, AS-17, AS-18, SY-17, TH-9, IE-6, SY-8 and DE-5. There are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-17, IE-6 , and SY-8 as "3" and all of the other NEI SRs as "3 with contingencies." AS-18 has one level "B" F&O: TH-03; SY-17 has two level "B" F&Os: SY-03 and TH-03; TH-9 has two level "B" F&Os: TH-05 and TH-06; and DE-5 has two level "B" F&Os: AS-07 and QU-02. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria	Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal. Peer Review F&O TH-05 is still open. While updated success criteria and timing data has been developed

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. This finding was made against NEI SR AS-18 with grade 3 and SY-17 with a grade 3 being contingent on its resolution. F&O QU-02 - The IE's for certain support system failures (RN, KC) are not input in the top event logic as a Boolean equation, but rather as a point estimate whose value is derived by solution of the IE fault tree. However, failures that cause the IE may also affect the mitigating system, such that there is a dependency between the initiating event and the available mitigation. Examples are an electrical bus that failed one train of KC and could fail one train of mitigating equipment. Another example is the operator error in the loss of KC to start the standby train of KC (KKCSTNBDHE). The HRA notebook states this event has dependencies with HYDBACKDHE. F&O AS-07 - The success criteria for AFW for SGTR is 1 CA pump to 2 steam generators. The ruptured SG is assumed to be one of the two steam generators that supply steam to the turbine-driven AFW pump. In the Catawba Rev. 2b fault tree model, however, the dependency of the TDP	sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O QU-02: System level initiators represented as fully developed sub-tree structures are not in the Rev 3 model and Duke Energy does not intend to include them in the new model, Rev. 4, internal events fault tree structure. These initiators will be quantified and incorporated into the Rev. 4 model as point estimates. Duke Energy feels that it is acceptable to not develop system level initiators as long as a review for dependencies takes place in the cut set file. This process has been proceduralized and is contained in Section 4 of Workplace Guideline XSAA-103, Guidelines For Determining Risk Significance. F&O AS-07 is only applicable to SGTR events. The CA notebook was updated to reflect the correct success criteria due to SGTR loss of AFW pump, so AS-07 is	from MAAP 4.0.7 analyses, it has not been incorporated into the model of record. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. Fire-induced ATWS events are not postulated, and thus there is no impact on the Fire PRA results or NFPA 805. As a result, the overall impact on the Fire PRA results and NFPA 805 is expected to be negligible. Peer Review F&O SY-03 is still open. While the success criteria has been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. For fire scenarios specifically, the LOCA success criteria is not important for fire since LOCA for Fire are transient initiated, (PORVs and RCP seal failures). The success criteria for these scenarios are well defined.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			on the SGTR initiator is not modeled. Thus, the TDP supply is not degraded by the initiating event in the model logic, so the model is incorrect. (This item is already on the list of corrective actions for the Catawba PRA, and Duke has indicated that it will be implemented in the Rev. 3 PRA.) This finding was made against NEI SR DE-5 with grade 3 being contingent on its resolution. F&O SY-03 - System success criteria are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific	considered resolved. F&O TH-04 - Feed and bleed success criteria changes were implement in Rev. 3 of the Transient Analysis Notebook and supported with MAAP analyses. The MAAP-code acceptance criteria applied are identified in Appendix H, Section 3.4 of the CNS PRA Rev. 3 Transient Analysis Notebook. This is considered to resolve the finding and achieve grade 3 of NEI SR / meet CAT II of the ASME SR. F&O SY-03 - Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to these system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met. F&O TH-05 - Operator actions are considered as part of the CNP success criteria analyses with expected operator actions included for SLOCA (Section 3.3), SGTR (Section 3.4), and transient F&B (Section 3.6). Specific timing information from MAAP analyses	Additionally the success criteria for MNS, (sister plant for CNS), has been updated and no change in mitigation equipment was identified.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			basis. This finding was made against NEI SR SY-17 with grade 3 being contingent on its resolution. F&O TH-05 -The HEP worksheets do not clearly refer to success criteria analyses to support timing for operator actions. Although most worksheets include an estimate of the time available for completion of an action, and some refer generally to information from MAAP analyses, specific references to MAAP (or other analysis) cases are not provided. This finding was made against NEI SR TH-5 with grade 2. F&O TH-06 - There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. This finding was made against NEI SR TH-9 with grade 3 being contingent on its resolution.	can be found in Appendices A through F MAAP. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN F&Os TH-06 is not resolved because the loss of switchgear HVAC initiating event is not included in the PRA, and room heatup calculations for loss of ventilation are not performed for that and other locations. Room heatup calculations should be performed in all locations in which HVAC can be lost to justify not modeling those systems and/or determine timing of operator coping actions and equipment damage. If no room heatup calculation is performed, it should be assumed that the HVAC system is required in those locations. The appropriate dependencies should be included in the PRA model, including possible initiating events. A recent evaluation was performed (PIP C-	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application.	
SC-A4	IDENTIFY mitigating systems that are shared between units, and the manner in which the sharing is performed should both units experience a common initiating event (e.g., LOOP).	Dispositioned	F&O AS-07 - The success criteria for AFW for SGTR is 1 CA pump to 2 steam generators. The ruptured SG is assumed to be one of the two steam generators that supply steam to the turbine-driven AFW pump. In the Catawba Rev. 2b fault tree model, however, the dependency of the TDP on the SGTR initiator is not modeled. Thus, the TDP supply is not degraded by the initiating event in the model logic, so the model is incorrect. (This item is already on the list of corrective actions for the Catawba PRA, and Duke has indicated that it will be implemented in the Rev. 3 PRA.) This finding was made against NEI SR DE-5 with grade 3 being contingent on its resolution. F&O QU-02 - The IE's for certain support system failures (RN, KC) are not input in the top event logic as a Boolean equation, but rather as a point estimate whose value is derived by solution of the IE fault tree. However,	The NEI SRs applicable to this ASME SR are IE-6 and DE-5. There are no NRC objections, but since the explicit requirement for shared mitigating systems between units was not contained in NEI 00-02, this should be demonstrated. The original Peer Review rated IE-6 as "3" and DE-5 as "3 with contingencies." DE-5 has two level "B" F&Os: AS-07 and QU-02. F&O AS-07 is only applicable to SGTR events. The CA notebook was updated to reflect the correct success criteria due to SGTR loss of AFW pump, so AS-07 is considered resolved. F&O QU-02: System level initiators represented as fully developed sub-tree structures are not in the Rev 3 model. Duke Energy feels that it is acceptable to not develop system level	There is no impact to the Fire PRA or NFPA 805; Fire PRA considers fire-induced failures during scenario development.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			failures that cause the IE may also affect the mitigating system, such that there is a dependency between the initiating event and the available mitigation. Examples are an electrical bus that failed one train of KC and could fail one train of mitigating equipment. Another example is the operator error in the loss of KC to start the standby train of KC (KKCSTNBDHE). The HRA notebook states this event has dependencies with HYDBACKDHE. This finding was made against NEI SR DE-5 with grade 3 being contingent on its resolution.	initiators as long as a review for dependencies takes place in the cut set file. This process has been proceduralized and is contained in Section 4 of Workplace Guideline XSAA-103, Guidelines For Determining Risk Significance.	
SC-A6	CONFIRM that the bases for the success criteria are consistent with the features, procedures, and operating philosophy of the plant.	Open	F&O TH-03 - Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining	The NEI SRs applicable to this ASME SR are AS-5, AS-18, AS-19, TH-4, TH-5, TH-6, TH-8, ST-4, ST-5, ST-7, ST-9 and SY-5. There are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-5 , AS-19, ST-4 and SY-5 as "3" and AS-18, TH-4, TH-6 and ST-9 as "3 with contingencies." TH-8 and St-5 were unrated. TH-5 is rated a "2 ." AS-18 has one level "B" F&O: TH-03; TH-4 has one level "B" F&O: TH-03; TH-5 has two level "B" F&Os: HR-05 and TH-05; and TH-8 has one level "B" F&O: TH-06. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to	Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal. Peer Review F&O TH-05 is still open. While updated success criteria and timing

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. This finding was made against NEI SR AS-18 and TH-4 with grade 3 being contingent on its resolution. F&O TH-05 -The HEP worksheets do not clearly refer to success criteria analyses to support timing for operator actions. Although most worksheets include an estimate of the time available for completion of an action, and some refer generally to information from MAAP analyses, specific references to MAAP (or other analysis) cases are not provided. This finding was made against NEI SR TH-5 with grade 2. F&O HR-05 - In the Catawba HRA notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP	ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O TH-05 - Operator actions are considered as part of the CNP success criteria analyses with expected operator actions included for SLOCA (Section 3.3), SGTR (Section 3.4), and transient F&B (Section 3.6). Specific timing information from MAAP analyses can be found in Appendices A through F MAAP. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met.	data has been developed from MAAP 4.0.7 analyses, it has not been incorporated into the model of record. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. Fire-induced ATWS events are not postulated, and thus there is no impact on the Fire PRA results or NFPA 805. As a result, the overall impact on the Fire PRA results and NFPA 805 is expected to be negligible.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios. This finding was made against NEI SR HR-5 with grade 2. F&O TH-06 - There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. This finding was made against NEI SR TH-9 with grade 3 being contingent on its resolution.	F&O HR-05 - Success criteria, plant parameters and associated acceptance criteria derived from the success criteria analyses are used to support the timing analysis used in the PRA HRA. References to MAAP analysis that support the timing actions are included in the HRA spreadsheets. This is considered to resolve the elements of this F&O related to this SR, and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN The loss of HVAC was screened as an initiating event in the CNP model based on judgment that sufficient time would allow for diagnosis of the loss of HVAC and recovery of standby equipment and/or alternate means of cooling. Rev. 4 of the PRA model will address HVAC dependencies and re-consider the HVAC initiating event. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				the NFPA 805 application.	
SC-B1	USE appropriate realistic generic analyses/evaluations that are applicable to the plant for thermal/hydraulic, structural, and other supporting engineering bases in support of success criteria requiring detailed computer modeling. (See SC-B4.) Realistic models or analyses may be supplemented with plant-specific/generic FSAR or other conservative analysis applicable to the plant, but only if such supplemental analyses do not affect the determination of which combinations of systems and trains of systems are required to respond to an initiating event.	Open	F&O TH-03 - Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. This finding was made against NEI SR AS-18, SY-17 and TH-4 with grade 3 being contingent on its resolution. F&O SY-03 - System success criteria are specified in the system notebooks	The NEI SRs applicable to this ASME SR are AS-18, SY-17, TH-4, TH-6 and TH-7. There are no industry self assessment actions and no NRC objections. The original Peer Review rated all of these NEI SRs as "3 with contingencies". AS-18 has one level "B" F&O: TH-03; SY-17 has two level "B" F&Os: SY-03 and TH-03; TH-4 has one level "B" F&O: TH-03; and TH-7 has one level "B" F&O: TH-01. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O SY-03 - Although XSAA-115	Peer Review F&Os SY-03 and TH-01 are still open. While the success criteria has been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. For fire scenarios specifically, the LOCA success criteria is not important for fire since LOCA for Fire are transient initiated, (PORVs and RCP seal failures). The success criteria for these scenarios are well defined. Additionally the success criteria for McGuire, (sister plant for Catawba), has been updated and no change in mitigation equipment was identified.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis. This finding was made against NEI SR SY-17 with grade 3 being contingent on its resolution. F&O TH-01 - Success Criteria (Level 1 and Level 2) for some systems and sequences are supported by MAAP runs with MAAP 3b, Version 16. This version of MAAP has been found to have limitations which can impact conclusions and results. In particular for the Catawba PRA, the simple pressurizer model likely impacts the analyses that involve RCS cooldown	(PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to these system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met. F&O TH-01 - An updated success criteria calculation was completed using MAAP 4.0.7 (Section 2.2) and is documented into the updated CNS Success Criteria Notebook. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			and depressurization using SG heat removal by permitting RCS depressurization to match RCS cooldown for transients, without the possible need for pressurizer PORVs, spray or aux spray. This finding was made against NEI SR TH-7 with grade 3 being contingent on its resolution.		
SC-B2	DO NOT USE expert judgment except in those situations in which there is lack of available information regarding the condition or response of a modeled SSC, or a lack of analytical methods upon which to base a prediction of SSC condition or response. USE the requirements in 1.-4.3 when implementing an expert judgment process.	Open	F&O TH-03 - Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. This finding	The NEI SRs applicable to this ASME SR are TH-4 and TH-8. There are no NRC objections, but the requirement to assess the availability of documentation was not contained in NEI 00-02, this should be demonstrated. The original Peer Review rated TH-4 as "3 with contingencies". TH-8 is unrated. TH-4 has one level "B" F&O: TH-03; and TH-8 has one level "B" F&O: TH-06. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to	Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			was made against NEI SR AS-18 and TH-4 with grade 3 being contingent on its resolution. F&O TH-06 - There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. This finding was made against NEI SR TH-9 with grade 3 being contingent on its resolution.	resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN The loss of HVAC was screened as an initiating event in the CNP model based on judgment that sufficient time would allow for diagnosis of the loss of HVAC and recovery of standby equipment and/or alternate means of cooling. Rev. 4 of the PRA model will address HVAC dependencies and re-consider the HVAC initiating event. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application.	
SC-B3	When defining success criteria, USE thermal/hydraulic, structural, or other analyses/evaluations appropriate to the event being analyzed, and accounting for a level of detail consistent with	Open	F&O TH-03 - Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that	The NEI SRs applicable to this ASME SR are AS-18, TH-4, TH-6 and TH-7. There are no industry self assessment actions and no NRC objections. The original Peer Review rated all of these NEI SRs as "3 with contingencies", except TH-5, which is rated a "2". AS-18 has one level "B" F&O: TH-03;	Peer Review F&O TH-05 is still open. While updated success criteria and timing data has been developed from MAAP 4.0.7 analyses, it has not been incorporated into the model of record. However, there are no significant changes to the

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	the initiating event grouping (HLR-IE-B) and accident sequence modeling (HLR-AS-A and HLR-AS-B).		are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. This finding was made against NEI SR AS-18 and TH-4 with grade 3 being contingent on its resolution. F&O TH-05 -The HEP worksheets do not clearly refer to success criteria analyses to support timing for operator actions. Although most worksheets include an estimate of the time available for completion of an action, and some refer generally to information from MAAP analyses, specific references to MAAP (or other analysis) cases are not provided. This finding was made against NEI SR TH-5 with grade 2. F&O HR-05 - In the Catawba HRA	TH-4 has one level "B" F&O: TH-03; TH-5 has two level "B" F&Os: HR-05 and TH-05; and TH-7 has one level "B" F&O: TH-01. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O TH-05 - Operator actions are considered as part of the CNP success criteria analyses with expected operator actions included for SLOCA (Section 3.3), SGTR (Section 3.4), and transient F&B (Section 3.6). Specific timing information from MAAP analyses can be found in Appendices A through F MAAP. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR.	success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. Fire-induced ATWS events are not postulated, and thus there is no impact on the Fire PRA results or NFPA 805. As a result, the overall impact on the Fire PRA results and NFPA 805 is expected to be negligible. Peer Review F&O TH-01 is still open. While the success criteria has been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios. This finding was made against NEI SR TH-5 with grade 2. F&O TH-01 - Success Criteria (Level 1 and Level 2) for some systems and sequences are supported by MAAP runs with MAAP 3b, Version 16. This version of MAAP has been found to	However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met. F&O HR-05 - Success criteria, plant parameters and associated acceptance criteria derived from the success criteria analyses are used to support the timing analysis used in the PRA HRA. References to MAAP analysis that support the timing actions are included in the HRA spreadsheets. This is considered to resolve the elements of this F&O related to this SR, and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O TH-01 - An updated success criteria calculation was completed using MAAP 4.0.7 (Section 2.2) and is documented into the updated CNS Success Criteria Notebook. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			have limitations which can impact conclusions and results. In particular for the Catawba PRA, the simple pressurizer model likely impacts the analyses that involve RCS cooldown and depressurization using SG heat removal by permitting RCS depressurization to match RCS cooldown for transients, without the possible need for pressurizer PORVs, spray or aux spray. This finding was made against NEI SR TH-7 with grade 3 being contingent on its resolution.	reflect the updated information and as a result the ASME SR is considered Not Met.	
SC-B4	USE analysis models and computer codes that have sufficient capability to model the conditions of interest in the determination of success criteria for CDF, and that provide results representative of the plant. A qualitative evaluation of a relevant application of codes, models, or analyses that has been used for a similar class of plant (e.g., Owner's Group generic studies) may be used. USE computer codes and models only within known limits of applicability.	Open	F&O TH-03 - Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the	The NEI SRs applicable to this ASME SR are AS-18, TH-4, TH-6, and TH-7. There are no industry self assessment actions and no NRC objections. The original Peer Review rated all of these NEI SRs as "3 with contingencies". AS-18 has one level "B" F&O: TH-03; TH-4 has one level "B" F&O: TH-03; and TH-7 has one level "B" F&O: TH-01. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other	Peer Review F&O TH-01 is still open. While the success criteria has been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. This finding was made against NEI SR AS-18 and TH-4 with grade 3 being contingent on its resolution. F&O TH-01 - Success Criteria (Level 1 and Level 2) for some systems and sequences are supported by MAAP runs with MAAP 3b, Version 16. This version of MAAP has been found to have limitations which can impact conclusions and results. In particular for the Catawba PRA, the simple pressurizer model likely impacts the analyses that involve RCS cooldown and depressurization using SG heat removal by permitting RCS depressurization to match RCS cooldown for transients, without the possible need for pressurizer PORVs, spray or aux spray. This finding was made against NEI SR TH-7 with grade 3 being contingent on its resolution.	industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O TH-01 - An updated success criteria calculation was completed using MAAP 4.0.7 (Section 2.2) and is documented into the updated CNS Success Criteria Notebook. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met.	
SC-B5	CHECK the reasonableness and acceptability of the results of the thermal/hydraulic, structural, or other supporting engineering bases used to support	Open	F&O TH-01 - Success Criteria (Level 1 and Level 2) for some systems and sequences are supported by MAAP runs with MAAP 3b, Version 16. This version of MAAP has been found to have limitations which can impact conclusions and results. In particular for the Catawba PRA, the simple	The NEI SRs applicable to this ASME SR are TH-7 and TH-9. There are no industry self assessment actions and no NRC objections. The original Peer Review rated both of these NEI SRs as "3 with contingencies". TH-7 has one level "B" F&O: TH-	Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	the success criteria. Examples of methods to achieve this include: (a) comparison with results of the same analyses performed for similar plants, accounting for differences in unique plant features (b) comparison with results of similar analyses performed with other plant-specific codes (c) check by other means appropriate to the particular analysis		pressurizer model likely impacts the analyses that involve RCS cooldown and depressurization using SG heat removal by permitting RCS depressurization to match RCS cooldown for transients, without the possible need for pressurizer PORVs, spray or aux spray. This finding was made against NEI SR TH-7 with grade 3 being contingent on its resolution. F&O TH-05 -The HEP worksheets do not clearly refer to success criteria analyses to support timing for operator actions. Although most worksheets include an estimate of the time available for completion of an action, and some refer generally to information from MAAP analyses, specific references to MAAP (or other analysis) cases are not provided. This finding was made against NEI SR TH-5 with grade 2. F&O TH-06 - There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. This finding was made against NEI SR TH-9 with grade 3 being contingent on its	01; and TH-9 has two level "B" F&Os: TH-05 and TH-06. F&O TH-01 - An updated success criteria calculation was completed using MAAP 4.0.7 (Section 2.2) and is documented into the updated CNS Success Criteria Notebook. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met. F&O TH-05 - Operator actions are considered as part of the CNP success criteria analyses with expected operator actions included for SLOCA (Section 3.3), SGTR (Section 3.4), and transient F&B (Section 3.6). Specific timing information from MAAP analyses can be found in Appendices A through F MAAP. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the	ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal. Peer Review F&O TH-05 is still open. While updated success criteria and timing data has been developed from MAAP 4.0.7 analyses, it has not been incorporated into the model of record. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. Fire-induced ATWS events are not postulated, and thus there is no impact on the Fire PRA results or NFPA 805. As a result, the overall impact on the Fire PRA results and NFPA 805 is expected to be negligible. Peer Review F&O TH-01 is still open. While the success criteria have been updated, it has not been incorporated into the PRA model.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			resolution.	current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN The loss of HVAC was screened as an initiating event in the CNP model based on judgment that sufficient time would allow for diagnosis of the loss of HVAC and recovery of standby equipment and/or alternate means of cooling. Rev. 4 of the PRA model will address HVAC dependencies and re-consider the HVAC initiating event. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application.	However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible.
SC-C1	DOCUMENT the success criteria in a manner that facilitates PRA applications, upgrades, and peer review.	Open	F&O TH-03 - Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of	The NEI SRs applicable to this ASME SR are ST-13, SY-10, SY-17, SY-27, TH-8, TH-9, TH-10, AS-17, AS-18, AS-24 and HR-30. There are no industry self assessment actions and no NRC objections. The original Peer Review rated ST-13, TH-10, AS-	Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. This finding was made against NEI SR AS-18 and SY-17 with grade 3 being contingent on its resolution. F&O HR-05 - In the Catawba HRA notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even	17, and AS-24 as "3" and SY-17, ST-27, TH-9, and AS-18 as "3 with contingencies." TH-8 and HR-30 were unrated. SY-10 is rated a "2." SY-10 has one level "B" F&O: TH-06; SY-17 has two level "B" F&Os: SY-03 and TH-03; SY-27 has one level "B" F&O: SY-03; TH-8 has one level "B" F&O: TH-06; TH-9 has two level "B" F&Os: TH-05 and TH-06; AS-18 has one level "B" F&O: TH-03; and HR-30 has one level "B" F&O: HR-05. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O HR-05 - Success criteria, plant parameters and associated acceptance criteria derived from the success criteria analyses are	ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal. Peer Review F&O SY-03 is still open. While the success criteria has been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. For fire scenarios specifically, the LOCA success criteria is not important for fire since LOCA for Fire are transient initiated, (PORVs and RCP seal failures). The success criteria for these scenarios are well defined. Additionally the success criteria for MNS, (sister plant for CNS), has been updated and no change in mitigation equipment was identified.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios. This finding was made against NEI SR HR-30 with grade 2. F&O TH-06 - There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. This finding was made against NEI SR TH-9 with grade 3 being contingent on its resolution. F&O SY-03 - System success criteria	used to support the timing analysis used in the PRA HRA. References to MAAP analysis that support the timing actions are included in the HRA spreadsheets. This is considered to resolve the elements of this F&O related to this SR, and achieve grade 3 of the NEI SR / meet cat II of the ASME SR. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN The loss of HVAC was screened as an initiating event in the CNP model based on judgment that sufficient time would allow for diagnosis of the loss of HVAC and recovery of standby equipment and/or alternate means of cooling. Rev. 4 of the PRA model will address HVAC dependencies and re-consider the HVAC initiating event. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application. F&O SY-03 - Although XSAA-115 (PRA Modeling Guidelines) has	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis. This finding was made against NEI SR SY-17 with grade 3 being contingent on its resolution.	been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to these system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met.	
SC-C2	DOCUMENT the processes used to develop overall PRA success criteria and the supporting engineering bases, including the inputs, methods, and results. For example, this documentation	Open	F&O TH-03 - Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that	The NEI SRs applicable to this ASME SR are ST-13, SY-10, SY-17, SY-27, TH-8, TH-9, TH-10, AS-17, AS-18, AS-24 and HR-30. There are no NRC objections, but the requirement to assess the availability of documentation was not explicitly contained in NEI 00-02, this should be demonstrated.	Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	typically includes: (a) the definition of core damage used in the PRA including the bases for any selected parameter value used in the definition (e.g., peak cladding temperature or reactor vessel level) (b) calculations (generic and plant-specific) or other references used to establish success criteria, and identification of cases for which they are used (c) identification of computer codes or other methods used to establish plant-specific success criteria (d) a description of the limitations (e.g., potential conservatisms or limitations that could challenge the applicability of computer models in certain cases) of the calculations or codes (e) the uses of expert judgment within the PRA, and rationale for		are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. This finding was made against NEI SR AS-18 and SY-17 with grade 3 being contingent on its resolution. F&O HR-05 - In the Catawba HRA notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP	The original Peer Review rated ST-13, TH-10, AS-17, and AS-24 as "3" and SY-17, ST-27, TH-9, and AS-18 as "3 with contingencies." TH-8 and HR-30 were unrated. SY-10 is rated a "2." SY-10 has one level "B" F&O: TH-06; SY-17 has two level "B" F&Os: SY-03 and TH-03; SY-27 has one level "B" F&O: SY-03; TH-8 has one level "B" F&O: TH-06; TH-9 has two level "B" F&Os: TH-05 and TH-06; AS-18 has one level "B" F&O: TH-03; and HR-30 has one level "B" F&O: HR-05. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O HR-05 - Success criteria, plant parameters and associated	to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal. Peer Review F&O SY-03 is still open. While the success criteria have been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. For fire scenarios specifically, the LOCA success criteria is not important for fire since LOCA for Fire are transient initiated, (PORVs and RCP seal failures). The success criteria for these scenarios are well defined. Additionally the success criteria for MNS, (sister plant for CNS), has been updated and no change in mitigation equipment was identified.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	such uses (f) a summary of success criteria for the available mitigating systems and human actions for each accident initiating group modeled in the PRA (g) the basis for establishing the time available for human actions (h) descriptions of processes used to define success criteria for grouped initiating events or accident sequences		worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios. This finding was made against NEI SR HR-30 with grade 2. F&O TH-06 - There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. This finding was made against NEI SR TH-9 with grade 3 being contingent on its resolution. F&O SY-03 - System success criteria are specified in the system notebooks	acceptance criteria derived from the success criteria analyses are used to support the timing analysis used in the PRA HRA. References to MAAP analysis that support the timing actions are included in the HRA spreadsheets. This is considered to resolve the elements of this F&O related to this SR, and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN The loss of HVAC was screened as an initiating event in the CNP model based on judgment that sufficient time would allow for diagnosis of the loss of HVAC and recovery of standby equipment and/or alternate means of cooling. Rev. 4 of the PRA model will address HVAC dependencies and re-consider the HVAC initiating event. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis. This finding was made against NEI SR SY-17 with grade 3 being contingent on its resolution.	F&O SY-03 - Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to these system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met.	
SY-A4	PERFORM plant walkdowns and interviews with knowledgeable plant personnel (e.g., engineering, plant operations, etc.) to confirm that the systems analysis correctly reflects the as-	Dispositioned	None	NEI 00-02 does not have a precise equivalent to SY-A4. System analysis subelements DE-11, SY-10, and SY footnote 5 provide partial coverage. DE-11 requires walkdowns but specifies walkdowns to examine spatial dependencies, not, as SY-A4 requires, to confirm that the systems analysis correctly reflects	Self assessment Table E assesses the impact as follows: To support system model development, walkdowns and plant personnel interviews were performed. However, documentation of an up-to date system walkdown is not included with each system

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	built, as-operated plant.			the as-built, as-operated plant. Likewise, SY-10 including Footnote 5 and F&O TH-06 specifically concern spatial or environmental dependencies, which are assessed as part of SRs SY-A21 and SY-A22. F&O TH-06 does not apply to SR SY-A4. Therefore the Grade 3 given to DE-11 and the Grade 2 given to SY-10 by the peer review team do not apply to SR SY-A4. Compliance with SR-A4 is assessed by reference to the peer review teams notes on SY-10 and DE-11. The 2002 peer review's notes show that the peer review team specifically reviewed walkdown notes oriented to confirming that the systems analysis correctly reflects the as-built, as-operated plant (see notes R4 and R19 below). Therefore, SY-A4 is considered met. The proposed resolution in Table C of the self-assessment suggests an enhancement to system documentation (see below). Completion of the enhancement will solidify the assessment that SR SY-A4 is met. Self assessment Table C indicates the following resolution under SY-A4: Enhance the system documentation to include an up-to-date system walkdown checklist and system engineer review for	notebook. This documentation issue does not impact the Fire PRA.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				each system. Consider revising workplace procedure XSAA-106 to require that such documentation be revisited with each major PRA revision.	
SY-A5	INCLUDE the effects of both normal and alternate system alignments, to the extent needed for CDF and LERF determination.	Dispositioned	None	SY-A5 corresponds to NEI 00-02 subelements SY-8, SY-11, QU-12, and QU-13, which provide partial coverage. Because subelement SY-11 and associated F&O SY-06 are limited to consideration of system performance in degraded environments, they are not closely related to this SR, and are assessed as part of SRs SY-A21, SY-A22, and SY-B14. QU-12 and especially QU-13 refer to model asymmetry, which does not cover the effects of normal and alternate alignments. QU-12 and QU-13 were given a Grade 3 by the peer review team. SY-8 is also related to modeling normal and alternate alignments to the extent that it mentions test and maintenance availabilities, but does not fully cover the requirement to model normal and alternate alignments. SY-8 was given a Grade 3 by the peer review team. By self-assessment, it was determined that normal and alternate system alignments are included to the extent necessary for CDF and LERF determination.	Based on the disposition, the requirements of Cat II are considered met. There is no impact on the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				Fault tree top events are included for CDF and LERF. This is considered sufficient to meet CAT II of the ASME/ANS PRA Standard.	
SY-A10	INCORPORATE the effect of variable success criteria (i.e., success criteria that change as a function of plant status) into the system modeling. Example causes of variable system success criteria are: (a) different accident scenarios. Different success criteria are required for some systems to mitigate different accident scenarios (e.g., the number of pumps required to operate in some systems is dependent upon the modeled initiating event); (b) dependence on other components. Success criteria for some systems are also dependent on the	Open	F&O DE-04: HVAC cooling of the essential switchgear rooms is stated as being required. The IPE quantitative analysis does not provide adequate success criteria. For example, the following are not specified: temperature limits of equipment, minimum number of Air Handling Units, or minimum number of chillers. The evaluation also states there is no concern within 24 hours provided that only those loads needed to provide core cooling are operated. There is no discussion of electrical load shedding for those loads not required, and of the human interface to execute load shedding. The human interface can be complex, involving both a discovery process (control room annunciators, or in the case of a local AHU failure, discovery through operator walkaround), and procedures and training to direct operation actions. F&O AS-01: SAAG 427 describes the ATWS event tree analysis. Section 4, event B, describes how main feedwater is recovered after an ATWS. The probabilities used for main feedwater recovery are .05, following a T2 (Loss of Load) and .2 following a T4 (Loss of MFW). In the non-ATWS	SY-A10 corresponds to NEI 00-02 system analysis subelements SY-12, SY-13, SY-17, and SY-23 and accident sequence subelements AS-10, AS-13, AS-16, AS-17, and AS-18. The 2002 peer review team assigned unconditional Grade 3 to AS-13, AS-17, SY-12, SY-13, and SY-13, and a contingent Grade 3 to AS-10, AS-16, AS-18 and SY-17 with level "B" F&Os: DE-04, AS-01, SY-03 and TH-03. F&O DE-04 (PRATracker Item C-03-0052) and TH-03 (PRATracker Item C-03-0050) are both open. F&O DE-04 is not resolved because the loss of switchgear HVAC initiating event is not included in the PRA. The exclusion of the initiating event is not fully justified. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a	Peer Review F&O DE-04 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal. Peer Review F&O SY-03 is still open. While the success criteria has been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. For fire scenarios specifically, the LOCA

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	success of another component in the system (e.g., operation of additional pumps in some cooling water systems is required if non-critical loads are not isolated); (c) time dependence. Success criteria for some systems are time-dependent (e.g., two pumps are required to provide the needed flow early following an accident initiator, but only one is required for mitigation later following the accident); (d) sharing of a system between units. Success criteria may be affected when both units are challenged by the same initiating event (e.g., LOOP).		analysis, the following non-recoveries (From SAAG 427) are: T1 non-rec = .05 T4 - non-rec = .1 Considering that the critical time for FW to come on line in an ATWS event involving a loss of main feedwater is very short, even for conditions of favorable MTC, the use of non-recovery probabilities of this magnitude does not appear to be justified without supporting analyses. F&O TH-03: Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA	significant impact on the Fire PRA results or results for the NFPA 805 application. However, further evaluation of the issue is planned to ensure that all significant PRA scenarios are addressed and documented. Because of further action, this issue remains open until all evaluations are complete. For Fire PRA, CNC-1535.00-00-113, "FPRA Application Calculation," Section 6.2.1 "Control Complex Cooling" addresses impact of un-modeled HVAC dependencies and provides additional documentation to support concerns with maintaining cooling to electrical components (i.e., from a component length of life standpoint and not from a concern of inducing immediate failure) thus concluding the Control Complex HVAC dependencies to have minimal impact on the Fire PRA. F&O AS-01 - Credit for Main Feedwater has been removed from the ATWS model, which resolves this F&O. Recovery for MFW in ATWS events initiated by a loss of feedwater has no impact on Fire PRA. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to	success criteria is not important for fire since LOCA for Fire are transient initiated, (PORVs and RCP seal failures). The success criteria for these scenarios are well defined. Additionally the success criteria for MNS, (sister plant for CNS), has been updated and no change in mitigation equipment was identified.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. F&O SY-03: System success criteria are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis.	ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O SY-03 – Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to the system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met.	
SY-A11	INCLUDE in the system model those failures of the equipment and	Open	None	The peer review found that the NEI 00-02 subelements SY-6, SY-7, SY-8, SY-9, SY-12, SY-13, and	Fire is not expected to cause failure of passive equipment such as tanks, expansion

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	components that would affect system operability (as identified in the system success criteria), except when excluded using the criteria in SY-A15. This equipment includes both active components (e.g., pumps, valves, and air compressors) and passive components (e.g., piping, heat exchangers, and tanks) required for system operation.			SY-14 were met at Grade 3. However, RG 1.200, Rev. 2 indicates that the subelements listed provide only partial coverage. As evidenced by the note below from the peer review report, the peer review team considered the modeling of passive failures. Because the requirement for including passive failures is different in subelement SY-7 and SY-A11, this SR is considered not met. With respect to passive failure, the peer review report notes that: (R11) Passive failures were found in the model for check valves leaks and ruptures, heat exchanger leaks and fouling, orifice plugging, and valves transferring closed. An event for Service Water (RN) failure due to clams was also noted. Per Duke self-assessment, the system models include multiple failure modes for most components, and all modeled components and associated failure modes are documented in the system notebooks. Assumptions regarding components or failure modes excluded from the model are documented in the assumptions section of the system write-ups. Passive failures such as tanks and heat exchangers are	joints, check valves, and mechanical relief valves. Multiple spurious operations are considered in the Fire PRA. There is no impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				modeled, although passive piping failures are generally not modeled since they are probabilistically insignificant. (A few exceptions: basic event BWSTPTHDEX, "Pipe Rupture Fails Flow From the BWST;" SUMPRECDEX, "Pipe Rupture Fails Flow From the RE Emergency Sump;" WSSPIPEDEX, "Random Pipe Break in SSW System.")	
SY-A12	DO NOT INCLUDE in a system model component failures that would be beneficial to system operation, unless omission would distort the results. Example of a beneficial failure: A failure of an instrument in such a fashion as to generate a required actuation signal.	Dispositioned	None	According to RG 1.200, Rev. 2, this SR is not fully covered by NEI 00-02. Partial coverage is provided by subelements SY-6, SY-7, SY-8, SY-9, SY-12, SY-13, SY-14 which were all met at Grade 3. The peer review report does not provide evidence that beneficial failures were excluded. Therefore, this SR was not fully evaluated in the 2003 peer review. The two CNS PRA Quality Self-Assessments (DPC-1535.00-00-0013 and CNC-1535.00-00-0155) found that this SR is met, and noted that beneficial failures are not included in the system models. By the nature of the system analysis methodology (fault trees), such failures are not easily included, because lower level failures result in failure of higher level functions.	Based on the disposition, the requirements of Cat II are considered met. There is no impact on the Fire PRA or NFPA 805.
SY-A13	INCLUDE those failures that can cause flow	Dispositioned	F&O: SY-04: In the KC System Notebook (SAAG File No. 294), there	SY-A13 corresponds to NEI 00-02 subelements SY-15 and SY-17.	Fire impacts that can cause flow diversion, including

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	diversion pathways that result in failure to meet the system success criteria.		is no basis provided in Section 11.3 for excluding the failure to isolate the Non-Essential Reactor Building Header from the fault trees. In discussion with the PRA engineer responsible for the notebook update, it was determined that three valves need to fail to close for flow diversion to take place, but there could be a common cause failure of these valves that was not justified to be excluded. F&O SY-03: System success criteria are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific	F&Os SY-04 and TH-03 are also associated with this SR. Although neither subelement SY-15 nor SY-17 specifically requires diversion pathways to be considered, F&O SY-04 makes it clear that the peer reviewers evaluated the sufficiency of the modeling of flow diversions. The F&O has been addressed by justifying excluding the potential diversion flowpath in the system notebook. In order for an open flow path to the non-essential header to starve flow to required components there would have to be failures of multiple components (pumps and valves). The following assumption has been added to the KC system notebook: "The reactor building non-essential headers are not included in the fault tree as potential diversion pathways. In addition to failure of the reactor non-essential headers valves (KC3, -18, -228, and -230), valves KC338, -424, and -425, which receive an Sp signal to close, would have to fail. Common cause failure of all of the involved valves is considered probabilistically insignificant." CNC-1535.00-00-0038, Section K.11.3 "Assumptions" provides some qualitative consideration based upon the number of valves that would be required to fail. In	multiple spurious operations, are considered in the Fire PRA. There is no impact on Fire PRA or NFPA 805. Peer Review F&O SY-03 is still open. While the success criteria has been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. For fire scenarios specifically, the LOCA success criteria is not important for fire since LOCA for Fire are transient initiated, (PORVs and RCP seal failures). The success criteria for these scenarios are well defined. Additionally the success criteria for MNS, (sister plant for CNS), has been updated and no change in mitigation equipment was identified.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			basis. F&O TH-03: Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs.	addition CNC-1535.00-00-0011, Section 3.1, provides discussion regarding consideration of the loss of KC due to flow diversion pathway. F&O SY-04 is closed by the clarification in the system notebook. The F&O itself is evidence that the peer review assessed to some extent whether diversion flow paths were adequately modeled. However, because NEI 00-02 does not explicitly require flow diversion pathways to be considered, the SR is considered not met at Category II. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				F&O SY-03 – Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to the system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met.	
SY-A15	In meeting SY-A11 and SY-A14, contributors to system unavailability and unreliability (i.e., components and specific failure modes) may be excluded from the model if one of the following screening criteria is met (a) A component may be excluded from the system model if the total failure probability of the component failure modes resulting in the same effect on system operation is at least two orders of magnitude lower than the highest failure probability of the other components in the	Dispositioned	None	This SR is not covered in NEI 00-02. Therefore, this SR was not evaluated in the 2002 peer review. The CNS PRA Quality Self-Assessment (CNC-1535.00-00-0155) found that this SR is met. The earlier self-assessment noted that some failure modes are excluded in a qualitative fashion rather than by using quantitative criteria. It was noted that it was an issue of not documenting the quantitative evaluations for screening.	Based on the disposition, the requirements of Cat II are considered met. There is no impact on the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	same system train that results in the same effect on system operation. (b) One or more failure modes for a component may be excluded from the systems model if the contribution of them to the total failure rate or probability is less than 1% of the total failure rate or probability for that component, when their effects on system operation are the same				
SY-A18	INCLUDE in either the system model or accident sequence modeling those conditions that cause the system to isolate or trip, or those conditions that once exceeded cause the system to fail, or SHOW that their exclusion does not impact the results. For example, conditions that isolate or trip a system include: (a) system-related parameters such as a high temperature within the system	Open	F&O SY-06: For Catawba, there was no evaluation of the ability of non-qualified (non-EQ) equipment to survive in a degraded environment following an accident such as a steam line of feedwater line break outside of containment. F&O TH-03: Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to	SY-A18 corresponds to NEI 00-02 AS-13, SY-10, SY-11, SY-13, and SY-17. The peer review gave Grade 2 to SY-10 and SY-11, which have to do with the proper consideration of spatial dependencies and adverse environmental conditions (notes R19 and R20 below are given by the peer review team in support of Grade 2.) SY-17, which treats the bases for success criteria, received a contingent Grade 3 due to level "B" F&Os TH-03 and SY-03. This SR is considered not met at Category II because the corresponding NEI 00-02 subelements are not given Grade 3 or better.	Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal. F&O SY-06: The Fire PRA

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(b) external parameters used to protect the system from other failures [e.g., the high reactor pressure vessel (RPV) water level isolation signal used to prevent water intrusion into the turbines of the RCIC and HPCI pumps of a BWR] (c) adverse environmental conditions (see SY-A22)		large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. F&O SY-03: System success criteria are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components	R19. Evidence of plant walkdowns being performed was found in the design-basis calculation performed for the flooding analysis. The only spatial information in the system notebooks is a basic description of equipment locations. No discussion of room cooling dependence for systems was found in the system notebooks and heatup calculations were not retrievable (see F&O TH-06). R20. The PRA staff confirmed that there was no search performed for non-qualified equipment that was credited in the PRA to perform in degraded environments. See F&O SY-06. F&O SY-06 is not resolved because an evaluation of potential adverse effects on equipment operation due to degraded environmental conditions resulting from accidents in the PRA model has not been performed for events like steam line breaks and feed line breaks (Ref: PRATracker C-03-0055). The Fire PRA considers the impact of fire on the environment in the HGL analysis. High energy line breaks are not relevant to the Fire PRA. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed	considers the impact of fire on the environment in the HGL analysis. High energy line breaks are not relevant to the Fire PRA. There is no impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis. F&O TH-06: There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. (Duke is already aware of this issue.)	over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O SY-03 – Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to the system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN The loss of HVAC was screened as an initiating event in the CNP model based on judgment that sufficient time would allow for diagnosis of the loss of HVAC and	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				recovery of standby equipment and/or alternate means of cooling. Rev. 4 of the PRA model will address HVAC dependencies and re-consider the HVAC initiating event. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application.	
SY-A20	INCLUDE events representing the simultaneous unavailability of redundant equipment when this is a result of planned activity (see DA-C14).	Dispositioned	None	This SR is not covered in NEI 00-02. Therefore, this SR was not evaluated in the 2003 peer review. The CNS PRA Quality Self-Assessments (DPC-1535.00-00-0013 and CNC-1535.00-00-0155) found that this SR is met noting that maintenance events are generally treated as independent within the PRA model, however, after the model is solved, cut sets involving coincident maintenance are deleted where such combinations are prohibited by the technical specifications, as documented in the model integration notebook. Cut sets involving coincident maintenance combinations prohibited by the online risk assessment tool are	Based on the disposition, the requirements of Cat II of the ASME/ANS Standard are considered to be met. There is no impact on the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				retained, but have their probability reduced.	
SY-A21	IDENTIFY system conditions that cause a loss of desired system function, (e.g., excessive heat loads, excessive electrical loads, excessive humidity, etc.).	Dispositioned	F&O TH-03: Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. F&O TH-06: There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no	RG 1.200 Rev. 2 maps several NEI 00-02 subelements to this SR: AS-18, DE-10, SY-11, SY-13, SY-17, and TH-8. The 2002 peer review report associates the following level "B" F&Os to one or more of these subelements: TH-03, TH-06, SY-03, and SY-06. F&O DE-06 is also associated with DE-10 but has been superseded by the more recent focus-scope peer review for the Flooding PRA model. Based on the 2002 peer review report's assignment of Grade 2 to subelement SY-11, and contingent Grade 3 to subelements SY-17, AS-18, and DE-10 the SR is considered not met at SR Category II. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code	F&O SY-06: The Fire PRA considers the impact of fire on the environment in the HGL analysis. High energy line breaks are not relevant to the Fire PRA. There is no impact on Fire PRA or NFPA 805. Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal. Peer Review F&O SY-03 is still open. While the success criteria has been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. (Duke is already aware of this issue.) F&O SY-03: System success criteria are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis.	limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN The loss of HVAC was screened as an initiating event in the CNP model based on judgment that sufficient time would allow for diagnosis of the loss of HVAC and recovery of standby equipment and/or alternate means of cooling. Rev. 4 of the PRA model will address HVAC dependencies and re-consider the HVAC initiating event. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application. F&O SY-03 – Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to the system notebooks. As a result, this F&O	success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. For fire scenarios specifically, the LOCA success criteria is not important for fire since LOCA for Fire are transient initiated, (PORVs and RCP seal failures). The success criteria for these scenarios are well defined. Additionally the success criteria for MNS, (sister plant for CNS), has been updated and no change in mitigation equipment was identified.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			F&O SY-06: For Catawba, there was no evaluation of the ability of non-qualified (non-EQ) equipment to survive in a degraded environment following an accident such as a steam line of feedwater line break outside of containment.	remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met. F&O SY-06 is not resolved because an evaluation of potential adverse effects on equipment operation due to degraded environmental conditions resulting from accidents in the PRA model has not been performed for events like steam line breaks and feed line breaks (Ref: PRATracker C-03-0055). The Fire PRA considers the impact of fire on the environment in the HGL analysis. High energy line breaks are not relevant to the Fire PRA.	
SY-A22	TAKE CREDIT for system or component operability only if an analysis exists to demonstrate that rated or design capabilities are not exceeded.	Dispositioned	F&O: SY-04: In the KC System Notebook (SAAG File No. 294), there is no basis provided in Section 11.3 for excluding the failure to isolate the Non-Essential Reactor Building Header from the fault trees. In discussion with the PRA engineer responsible for the notebook update, it was determined that three valves need to fail to close for flow diversion to take place, but there could be a common cause failure of these valves that was not justified to be excluded. F&O SY-06: For Catawba, there was no evaluation of the ability of non-qualified (non-EQ) equipment to	RG 1.200 Rev. 2 maps several NEI 00-02 subelements to this SR: AS-19, SY-5, SY-11, SY-13, SY-22, and TH-8. The 2002 peer review report assigns Grade 2 to subelement SY-11 and contingent Grade 3 to subelement SY-22. In addition NEI 00-02 only provides partial coverage of this SR. Therefore, the SR is considered not met at SR Category II. The 2002 peer review report associates the following level "B" F&Os to one or more of these subelements: TH-06, SY-04, and SY-06.	Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			survive in a degraded environment following an accident such as a steam line of feedwater line break outside of containment. F&O TH-06: There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. (Duke is already aware of this issue.)	F&O SY-04 has been addressed by justifying excluding the potential diversion flowpath in the system notebook. The following assumption has been added to the KC system notebook: "The reactor building non-essential headers are not included in the fault tree as potential diversion pathways. In addition to failure of the reactor non-essential headers valves (KC3, -18, -228, and -230), valves KC338, -424, and -425, which receive an Sp signal to close, would have to fail. Common cause failure of all of the involved valves is considered probabilistically insignificant." F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN The loss of HVAC was screened as an initiating event in the CNP model based on judgment that sufficient time would allow for diagnosis of the loss of HVAC and recovery of standby equipment and/or alternate means of cooling. Rev. 4 of the PRA model will address HVAC dependencies and re-consider the HVAC initiating event. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any	impact would be minimal. F&O SY-06: The Fire PRA considers the impact of fire on the environment in the HGL analysis. High energy line breaks are not relevant to the Fire PRA. There is no impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application. F&O SY-06 is not resolved because an evaluation of potential adverse effects on equipment operation due to degraded environmental conditions resulting from accidents in the PRA model has not been performed for events like steam line breaks and feed line breaks (Ref: PRATracker C-03-0055). The Fire PRA considers the impact of fire on the environment in the HGL analysis. High energy line breaks are not relevant to the Fire PRA.	
SY-B5	ACCOUNT explicitly for the modeled system's dependency on support systems or interfacing systems in the modeling process. This may be accomplished in one of the following ways: (a) for the fault tree linking approach by modeling the dependencies as a link to an appropriate event or gate in the support system fault tree;	Open	F&O DE-04: HVAC cooling of the essential switchgear rooms is stated as being required. The IPE quantitative analysis does not provide adequate success criteria. For example, the following are not specified: temperature limits of equipment, minimum number of Air Handling Units, or minimum number of chillers. The evaluation also states there is no concern within 24 hours provided that only those loads needed to provide core cooling are operated. There is no discussion of electrical load shedding for those loads not required, and of the human interface to	This SR is covered by NEI 00-02 subelements DE-4, DE-5, DE-6, and SY-12. The 2002 peer review report assigns Grade 3 to subelements DE-6 and SY-12 and contingent Grade 3 to subelements DE-4 and DE-5. Level "B" F&Os associated with subelements DE-4 and DE-5 are DE-04, QU-02, and AS-07. F&O DE-04 is not resolved because the loss of switchgear HVAC initiating event is not included in the PRA. A recent evaluation was performed (PIP C-	Peer Review F&O DE-04 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(b) for the linked event tree approach, by using event tree logic rules, or calculating a probability for each split fraction conditional on the scenario definition.		execute load shedding. The human interface can be complex, involving both a discovery process (control room annunciators, or in the case of a local AHU failure, discovery through operator walkaround), and procedures and training to direct operation actions. F&O QU-02: The IE's for certain support system failures (RN, KC) are not input in the top event logic as a boolean equation, but rather as a point estimate whose value is derived by solution of the IE fault tree. However, failures that cause the IE may also affect the mitigating system, such that there is a dependency between the initiating event and the available mitigation. Examples are an electrical bus that failed one train of KC and could fail one train of mitigating equipment. Another example is the operator error in the loss of KC to start the standby train of KC (KKCSTNBDHE). The HRA notebook states this event has dependencies with HYDBACKDHE. F&O AS-07: The success criteria for AFW for SGTR is 1 CA pump to 2 steam generators. The ruptured SG is assumed to be one of the two steam generators that supply steam to the turbine-driven AFW pump. In the Catawba Rev. 2b fault tree model, however, the dependency of the TDP on the SGTR initiator is not modeled. Thus, the TDP supply is not degraded	13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA-805 application. F&O QU-02: System level initiators represented as fully developed sub-tree structures are not in the Rev 3 model. Duke Energy feels that it is acceptable to not develop system level initiators as long as a review for dependencies takes place in the cut set file. This process has been proceduralized and is contained in Section 4 of Workplace Guideline XSAA-103, Guidelines For Determining Risk Significance. F&O AS-07 is only applicable to SGTR events. The CA notebook was updated to reflect the correct success criteria due to SGTR loss of AFW pump, so AS-07 is considered resolved.	the model, the Fire PRA impact would be minimal. System level initiators modeled directly as fault trees will have little effect on the Fire PRA or NFPA 805; Fire PRA considers fire-induced failures during scenario development.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			by the initiating event in the model logic, so the model is incorrect. (This item is already on the list of corrective actions for the Catawba PRA, and Duke has indicated that it will be implemented in the Rev. 3 PRA.)		
SY-B7	BASE support system modeling on realistic success criteria and timing, unless a conservative approach can be justified (i.e., if their use does not impact risk significant contributors.)	Dispositioned	F&O: SY-03: System success criteria are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis. F&O TH-01: Success Criteria (Level 1 and Level 2) for some systems and	This SR is covered by NEI 00-02 subelements AS-18, SY-13, SY-17, TH-7, and TH-8. The 2002 peer review gave contingent Grade 3 to subelements SY-17 and TH-7. Therefore, this SR is not met at Category II. Associated level "B" F&Os are: TH-01, TH-03, TH-06 and SY-03. F&O SY-03 – Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to the system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met. TH-01 - An updated success criteria calculation was completed using MAAP 4.0.7 (Section 2.2) and is documented into the updated CNS Success Criteria Notebook. This F&O is	Peer Review F&O SY-03 is still open. While the success criteria have been updated, it has not been incorporated into the PRA model. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. For fire scenarios specifically, the LOCA success criteria is not important for fire since LOCA for Fire are transient initiated, (PORVs and RCP seal failures). The success criteria for these scenarios are well defined. Additionally the success criteria for MNS, (sister plant for CNS), has been updated and no change in mitigation equipment was identified. Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			sequences are supported by MAAP runs with MAAP 3b, Version 16. This version of MAAP has been found to have limitations which can impact conclusions and results. In particular for the Catawba PRA, the simple pressurizer model likely impacts the analyses that involve RCS cooldown and depressurization using SG heat removal by permitting RCS depressurization to match RCS cooldown for transients, without the possible need for pressurizer PORVs, spray or aux spray. F&O TH-03: Success Criteria analyses were not done for the range of possible plant conditions to which they are applied. For example, MLOCA success criteria analyses are done for a 3.5 inch break (file SAAG 96), while the MLOCA is defined as a 2 to 5 inch break. The combinations of systems and operator recoveries that are defined as success at 3.5 inches may not be success at 2 inches or at 5 inches. This issue also applies to large LOCA (8.25 ft2 break analyzed in SAAG 97) vs a break range down to 6 inches, and small LOCA (1 inch break analyzed, SAAG 95) vs. break sizes from 3/8 to 2 inches. Further, it was not clear that the MLOCA MAAP runs adequately match the accident sequence being modeled in the PRA. Cases in SAAG 96 do not appear to disable accumulators when defining the minimum ECC	dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met. F&O TH-03 - As part of establishing success criteria, a series of analyses were performed over a range of applications to ensure that computer codes employed provided realistic results. Success criteria sensitivities included analyses for a range of possible conditions, including the LOCA break sizes and availability of accumulators. In addition, a review of other industry design-basis calculations using alternate methods was employed to consider code limitations. This is considered to resolve the finding and achieve grade 3 of the NEI SR/ meet cat II of the ASME SR. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN F&Os TH-06 are not resolved because the loss of switchgear HVAC initiating event is not included in the PRA, and room	the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			requirements, but accumulators are not required by the resulting MLOCA success criteria. Also, MAAP is not an appropriate code to use in performing analyses for rapid blowdown events such as large and some medium LOCAs. F&O TH-06: There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. (Duke is already aware of this issue.)	heatup calculations for loss of ventilation are not performed for that and other locations. Room heatup calculations should be performed in all locations in which HVAC can be lost to justify not modeling those systems and/or determine timing of operator coping actions and equipment damage. If no room heatup calculation is performed, it should be assumed that the HVAC system is required in those locations. The appropriate dependencies should be included in the PRA model, including possible initiating events. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application.	
SY-B8	IDENTIFY spatial and environmental hazards that may impact multiple systems or redundant components in the same system, and ACCOUNT for them in the system fault tree or	Open	F&O TH-06 : There is no room heatup analysis notebook / evaluation of loss of HVAC to equipment rooms for the Catawba PRA, and apparently no retrievable room heatup calculations or documentation to support the assumption that room cooling need not be modeled in the PRA. Other PRAs	This SR is covered by NEI 00-02 subelements DE-11 and SY-10. This SR covers the same requirement as NEI 00-02 subelement SY-10, but is more specific. The 2002 peer review gave Grade 2 to SY-10. Therefore, this SR is not met at	Peer Review F&O TH-06 is still open. PIP C-13-05664 documents the basis that a loss of HVAC is immaterial to the Fire PRA risk or NFPA 805 application. Functional testing conducted in 2009 demonstrated SGR

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	the accident sequence evaluation. Example: Use results of plant walkdowns as a source of information regarding spatial/environmental hazards, for resolution of spatial/environmental issues, or evaluation of the impacts of such hazards.		have found that room cooling is required for some rooms such as electrical equipment rooms and small rooms housing critical pumps. (Duke is already aware of this issue.)	Category II. F&O TH-06 - CNP PRA Tracker ID C-03-0052 for TH-06 - OPEN F&Os TH-06 are not resolved because the loss of switchgear HVAC initiating event is not included in the PRA, and room heatup calculations for loss of ventilation are not performed for that and other locations. Room heatup calculations should be performed in all locations in which HVAC can be lost to justify not modeling those systems and/or determine timing of operator coping actions and equipment damage. If no room heatup calculation is performed, it should be assumed that the HVAC system is required in those locations. The appropriate dependencies should be included in the PRA model, including possible initiating events. A recent evaluation was performed (PIP C-13-05664) to determine the impact on the Fire PRA of not including switchgear room and battery HVAC modeling. The evaluation concluded that any additional risk added by including the VC/YC systems in the PRA model would be small and would not have a significant impact on the Fire PRA results or results for the NFPA 805 application.	ventilation was not required to maintain VC/YC operability. Prior to completion of the PIP, cable routing sensitivities performed using existing fire scenarios demonstrated that, even if HVAC was added to the model, the Fire PRA impact would be minimal.
SY-B10	MODEL those systems	Dispositioned	None	This SR is covered by NEI 00-02	Based on the disposition, the

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	that are required for initiation and actuation of a system. In the model quantification, INCLUDE the presence of the conditions needed for automatic actuation (e.g., low vessel water level). INCLUDE permissive and lockout signals that are required to complete actuation logic.			subelements SY-8, SY-12 and SY-13. Even though the 2002 peer review gave unconditional Grade 3 to all of these NEI 00-02 subelements, NEI 00-02 does not explicitly address permissives and control logic. The reviewers' notes in the peer review report do not show that they assessed the model with respect to permissives and control logic. Therefore, the peer review cannot be used to fully assess compliance with this requirement. The CNS PRA Quality Self-Assessments (DPC-1535.00-00-0013 and CNC-1535.00-00-0155) determined that this SR is met, noting that systems required for initiation and actuation of other systems (e.g., ESFAS) are explicitly modeled, and the presence of conditions needed for automatic actuation and permissive and lockout signals required to complete actuation logic are included.	requirements of Cat II of the ASME/ANS Standard are considered to be met. There is no impact on the Fire PRA or NFPA 805.
SY-B12	DO NOT USE proceduralized recovery actions as the sole basis for eliminating a support system from the model; however, INCLUDE these recovery actions in the model quantification. For example, it is not acceptable to not model	Dispositioned	None	This SR is not covered in NEI 00-02. Therefore, this SR was not evaluated in the 2002 peer review, and is considered not met. The CNS PRA Quality Self-Assessments (DPC-1535.00-00-0013 and CNC-1535.00-00-0155) found that this SR is met, noting that no systems are excluded based on proceduralized recovery actions. In addition, proceduralized	Based on the disposition, the requirements of Cat II of the ASME/ANS Standard are considered to be met. There is no impact on the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	a system such as HVAC or CCW on the basis that there are procedures for dealing with losses of these systems.			recovery actions are modeled for some support systems (e.g., manually actuate systems after ESFAS failure).	
SY-B13	Some systems use components and equipment that are required for operation of other systems. INCLUDE components that, using the criteria in SY-A15, may be screened from each system model individually, if their failure affects more than one system (e.g., a common suction pipe feeding two separate systems).	Dispositioned	None	NEI 00-02 does not fully address this SR; subelements DE-6 and AS-6 partially address it. Therefore, compliance with this SR was not completely evaluated in the 2002 peer review. However, the peer review gave unconditional Grade 3 to both of these NEI 00-02 subelements, The CNS PRA Quality Self-Assessments (DPC-1535.00-00-0013 and CNC-1535.00-00-0155) found that this SR is met, noting that the system notebooks include assumptions regarding components or failure modes excluded from the model. Piping and other passive failures are not modeled if they are probabilistically insignificant. However, some pipe breaks and passive failure of tanks and heat exchangers are modeled.	Based on the disposition, the requirements of Cat II of the ASME/ANS Standard are considered to be met. There is no impact on the Fire PRA or NFPA 805.
SY-B14	IDENTIFY SSCs that may be required to operate in conditions beyond their environmental qualifications. INCLUDE dependent failures of multiple	Open.	F&O: SY-06: For Catawba, there was no evaluation of the ability of non-qualified (non-EQ) equipment to survive in a degraded environment following an accident such as a steam line of feedwater line break outside of containment.	This SR is covered by NEI 00-02 subelement SY-11. Subelement SY-11 received a Grade 3 contingent on resolution of F&O SY-06. F&O SY-06 is not resolved because an evaluation of potential	The Fire PRA considers the impact of fire on the environment in the HGL analysis. Steam line ruptures and other failures of passive equipment due to plugging, mechanical valve failures, or pipe ruptures are

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	SSCs that result from operation in these adverse conditions. Examples of degraded environments include (a) LOCA inside containment with failure of containment heat removal (b) safety relief valve operability (small LOCA, drywell spray, severe accident) (for BWRs) (c) steam line breaks outside containment (d) debris that could plug screens/filters (both internal and external to the plant) (e) heating of the water supply (e.g., BWR suppression pool, PWR containment sump) that could affect pump operability (f) loss of NPSH for pumps (g) steam binding of pumps			adverse effects on equipment operation due to degraded environmental conditions resulting from accidents in the PRA model has not been performed for events like steam line breaks and feed line breaks (Ref: PRATracker C-03-0055). The Fire PRA considers the impact of fire on the environment in the HGL analysis. High energy line breaks are not relevant to the Fire PRA. The SR is not met at Category II because the peer review gave Grade 2 to subelement SY-11.	not expected to be caused by fire (NUREG/CR-6850, Section 2.5.1). Some kinds of instrument air tubing may be damaged by fire; however, IA is not credited in the Fire PRA model except in a few areas where it was verified that IA is not routed.
SY-C1	DOCUMENT the	Dispositioned	F&O SY-03: System success criteria	SY-C1 corresponds to NEI-00-02	No impact from

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	systems analysis in a manner that facilitates PRA applications, upgrades, and peer review.		are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis.	subelements SY-5, SY-6, SY-9, SY-18, SY-23, SY-25, SY-26, SY-27. The 2002 peer review report gives Grade 3 to these subelements except SY-27 which is contingent on resolution of F&O SY-03. Based on the 2002 peer review report's contingent Grade 3 for subelement SY-27, the SR is considered not met at SR Category II. F&O SY-03 – Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to the system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met.	documentation changes.
SY-C2	DOCUMENT the system functions and boundary, the associated success criteria, the modeled components and failure modes including human actions, and a description of modeled dependencies including	Dispositioned	F&O SY-03: System success criteria are specified in the system notebooks in sufficient detail to describe the overall fault tree top events, but no basis is provided in the system notebooks for the number of pumps or flow rate requirements. The Reference section 18.1 does not contain a link to an appropriate success criteria calculation. For example, in the KC	The peer review found that the NEI-00-02 subelements corresponding to SR SY-C2 (SY-5, SY-6, SY-9, SY-18, SY-23, SY-25, SY-26, and SY-27), according to RG 1.200, Rev. 2, were met at Grade 3 (with a contingent grade for SY-27 corresponding to F&O SY-03). In addition, RG 1.200 Rev. 2 indicates that the	No impact from documentation changes.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	support system and common cause failures, including the inputs, methods, and results. For example, this documentation typically includes: (a) system function and operation under normal and emergency operations (b) system model boundary (c) system schematic illustrating all equipment and components necessary for system operation (d) information and calculations to support equipment operability considerations and assumptions (e) actual operational history indicating any past problems in the system operation (f) system success criteria and relationship to accident sequence models		notebook, it is stated without a source reference that both pumps and the associated heat exchanger in a train are required for success when the ND (RHR) heat exchanger is required. Similarly, in Section 12 of the RN notebook, it is stated that the top events simply represent "failure to provide sufficient flow" to components requiring cooling without defining a flow rate or number of pumps (in Section 13 of the notebook it does state that failure to provide flow requires failure of all four pump trains). The CA notebook has a similar statement without a tie to a specific basis. F&O DE-01: No specific guidance is given regarding modeling of system dependencies in the system notebooks; however, a highly knowledgeable analyst could reproduce the given results. A dependency matrix is provided but contains little detailed explanation of how dependencies were determined. The Internal Flood Analysis does not seem to provide the detail required to reproduce the results except by a highly knowledgeable analyst.	corresponding NEI-00-02 subelements only partially cover the current requirements in the SR. Therefore, the SR is considered not met. F&O SY-03 – Although XSAA-115 (PRA Modeling Guidelines) has been revised to require success criteria reference to be provided, references to the appropriate system success criteria have not been added to the system notebooks. As a result, this F&O remains open due to incomplete documentation. This F&O remains open with grade 3 of NEI SR / meet CAT II of the ASME SR being not met. F&O DE-01: PRA Modeling Guidelines XSAA-115 was revised to provide guidance regarding modeling of system dependencies.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(g) human actions necessary for operation of system (h) reference to system-related test and maintenance procedures (i) system dependencies and shared component interface (j) component spatial information (k) assumptions or simplifications made in development of the system models (l) the components and failure modes included in the model and justification for any exclusion of components and failure modes (m) a description of the modularization process (if used) (n) records of resolution of logic loops developed during fault tree linking (if used)				

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(o) results of the system model evaluations (p) results of sensitivity studies (if used) (q) the sources of the above information (e.g., completed checklist from walkdowns, notes from discussions with plant personnel) (r) basic events in the system fault trees so that they are traceable to modules and to cutsets. (s) the nomenclature used in the system models.				
HR-B1	If screening is performed, ESTABLISH rules for screening individual activities from further consideration. Example: Screen maintenance and test activities from further consideration only if (a) equipment is automatically re-aligned on system demand, or	Dispositioned	F&O HR-02: A screening value of 3E-3 was initially used for all pre-initiator HEPs. There were 7 HEPs quantified in more detail, because the HEP importance was too high. However, there were 7 Latent Human Error events with a 3E-3 probability in the top 100 importance events in the CR2b quantification. This observation does not necessarily have a large impact on the PRA results. However, per the HR subtier criteria, screening HEPs should not be used for actions appearing in important	The NEI SRs applicable to this ASME SR are HR-5 and HR-6, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated HR-5 as "3" but HR-6 as "2" with associated level "B" F&Os HR-02 and TH-05. TH-05 does not seem relevant to this SR because pre-initiator HEPs are not based on thermal-hydraulics timing. Both Self Assessments identified	There is no impact to the Fire PRA or NFPA 805 since pre-initiator (Type A) human actions are not modified for the Fire PRA. In addition, the important contributors/ sequences in the Fire PRA did not use screening values.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(b) following maintenance activities, a post-maintenance functional test is performed that reveals misalignment, or (c) equipment position is indicated in the control room, status is routinely checked, and realignment can be affected from the control room, or (d) equipment status is required to be checked frequently (i.e., at least once a shift)		contributors.	this element as N/A on the basis that "Screening is not performed." Section 2.1 of the revised HRA Calc CNC-1535.00-00-0030 states that "The screening values permitted those pre-initiator actions that could be important with respect to the frequencies of core-damage sequences to be highlighted during the quantification process. Interactions that were not important to any of the core-damage sequences based on use of the screening values were not modeled or quantified further. Those interactions that surfaced as potentially important during the sequence quantification process were then evaluated in more detail in the second stage." As a result, Table 2. Summary of Pre-Initiator (Type A) Human Interactions shows that 23 of the 56 pre-initiators were quantified with detailed analysis. F&O HR-02: F&O HR-02 remains open (Ref: PRATracker C-03-0058) to provide detailed quantification of the dominant pre-initiator HEPs. Detailed evaluations have been performed for 24 of 58 (41%) of the pre-initiator human error events (LHEs). Different LHEs may be more significant for fire than for	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				internal event sequences since a fire can fail multiple components. However, cut sets that contain the screening value LHEs would be expected to decrease in importance since detailed evaluations tend to lower the probabilities assigned to the LHEs. Review of the cutsets data verified incorporation of mean LHE values into the database.	
HR-B2	DO NOT screen activities that could simultaneously have an impact on multiple trains of a redundant system or diverse systems (HR-A3).	Dispositioned	F&O HR-02: A screening value of 3E-3 was initially used for all pre-initiator HEPs. There were 7 HEPs quantified in more detail, because the HEP importance was too high. However, there were 7 Latent Human Error events with a 3E-3 probability in the top 100 importance events in the CR2b quantification. This observation does not necessarily have a large impact on the PRA results. However, per the HR subtier criteria, screening HEPs should not be used for actions appearing in important contributors.	The NEI SRs applicable to this ASME SR are DA-5, DA-6, HR-5, HR-6, HR-7, and HR-26, and there are no NRC objections. There is an industry action to ensure single actions with multiple train consequences are evaluated in pre-initiators, since the screening rules in HR-6 do not preclude screening of activities that can affect multiple trains of a system. The original Peer Review rated DA-5, HR-5, HR-7, and HR-26 as "3", but HR-6 as "2" with associated level "B" F&Os HR-02 and TH-05, and DA-6 was "N/A". TH-05 does not seem relevant to this SR because pre-initiator HEPs are not based on thermal-hydraulics timing. DA-5 also has one level "B" F&Os: DA-01, but this F&O is not related to this SR, since the F&O is on component boundaries. Both Self Assessments identified	There is no impact to the Fire PRA or NFPA 805 since pre-initiator (Type A) human actions are not modified for the Fire PRA. In addition, the important contributors/ sequences in the Fire PRA did not use screening values.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				this element as N/A on the basis that "Screening is not performed." CNC-1535.00-00-0030, Appendix F Catawba Nuclear Station Miscalibration Human Reliability Analysis discusses HR-B2 in Section 3, Screening. It states that "According to the ASME PRA Standard supporting requirement HR-B2, activities that could simultaneously impact multiple trains of redundant or diverse equipment are not to be screened out. The simultaneous impact does not mean that an activity simultaneously impacts redundant trains while the activity is being performed, but that the activity or activities performed in a procedure can render redundant or diverse trains unavailable simultaneously. For example, a calibration procedure would sequentially step through the calibrations of redundant channels measuring the same parameter. Although only one channel is calibrated at a time, more than one channel may be miscalibrated – impacting redundant channels simultaneously. In general, calibration activities performed on redundant channels should therefore not be screened out." F&O HR-02: F&O HR-02 remains open (Ref: PRATracker C-03-	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				0058) to provide detailed quantification of the dominant pre-initiator HEPs. Detailed evaluations have been performed for 24 of 58 (41%) of the pre-initiator human error events (LHEs). Different LHEs may be more significant for fire than for internal event sequences since a fire can fail multiple components. However, cut sets that contain the screening value LHEs would be expected to decrease in importance since detailed evaluations tend to lower the probabilities assigned to the LHEs. Review of the cutsets data verified incorporation of mean LHE values into the database.	
HR-D1	ESTIMATE the probabilities of human failure events using a systematic process. Acceptable methods include THERP [2-5] and ASEP [2-6].	Dispositioned	F&O HR-02: A screening value of 3E-3 was initially used for all pre-initiator HEPs. There were 7 HEPs quantified in more detail, because the HEP importance was too high. However, there were 7 Latent Human Error events with a 3E-3 probability in the top 100 importance events in the CR2b quantification. This observation does not necessarily have a large impact on the PRA results. However, per the HR subtier criteria, screening HEPs should not be used for actions appearing in important contributors.	The NEI SR applicable to this ASME SR is HR-6, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated HR-6 as "2" with associated level "B" F&Os HR-02 and TH-05. TH-05 does not seem relevant to this SR because pre-initiator HEPs are not based on thermal-hydraulics timing. Section 2.1 of the revised HRA Calc CNC-1535.00-00-0030 states that "The screening values permitted those pre-initiator actions that could be important with respect to the frequencies of	There is no impact to the Fire PRA or NFPA 805 since pre-initiator (Type A) human actions are not modified for the Fire PRA. In addition, the important contributors/ sequences in the Fire PRA did not use screening values.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				core-damage sequences to be highlighted during the quantification process. Interactions that were not important to any of the core-damage sequences based on use of the screening values were not modeled or quantified further. Those interactions that surfaced as potentially important during the sequence quantification process were then evaluated in more detail in the second stage." As a result, Table 2. Summary of Pre-Initiator (Type A) Human Interactions shows that 23 of the 56 pre-initiators were quantified with detailed analysis. F&O HR-02: F&O HR-02 remains open (Ref: PRATracker C-03-0058) to provide detailed quantification of the dominant pre-initiator HEPs. Detailed evaluations have been performed for 24 of 58 (41%) of the pre-initiator human error events (LHEs). Different LHEs may be more significant for fire than for internal event sequences since a fire can fail multiple components. However, cut sets that contain the screening value LHEs would be expected to decrease in importance since detailed evaluations tend to lower the probabilities assigned to the LHEs. Review of the cutsets data verified	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				incorporation of mean LHE values into the database.	
HR-D2	For significant HFEs, USE detailed assessments in the quantification of pre-initiator HEPs. USE screening values based on a simple model, such as ASEP in the quantification of the pre-initiator HEPs for non-significant human failure basic events. When bounding values are used, ENSURE they are based on limiting cases from models such as ASEP [2-6].	Dispositioned	F&O HR-02: A screening value of 3E-3 was initially used for all pre-initiator HEPs. There were 7 HEPs quantified in more detail, because the HEP importance was too high. However, there were 7 Latent Human Error events with a 3E-3 probability in the top 100 importance events in the CR2b quantification. This observation does not necessarily have a large impact on the PRA results. However, per the HR subtier criteria, screening HEPs should not be used for actions appearing in important contributors.	The NEI SR applicable to this ASME SR is HR-6, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated HR-6 as "2" with associated level "B" F&Os HR-02 and TH-05. TH-05 does not seem relevant to this SR because pre-initiator HEPs are not based on thermal-hydraulics timing. Section 2.1 of the revised HRA Calc CNC-1535.00-00-0030 states that "The screening values permitted those pre-initiator actions that could be important with respect to the frequencies of core-damage sequences to be highlighted during the quantification process. Interactions that were not important to any of the core-damage sequences based on use of the screening values were not modeled or quantified further. Those interactions that surfaced as potentially important during the sequence quantification process were then evaluated in more detail in the second stage." As a result, Table 2. Summary of Pre-Initiator (Type A) Human Interactions shows that 23 of the 56 pre-initiators were quantified with	There is no impact to the Fire PRA or NFPA 805 since pre-initiator (Type A) human actions are not modified for the Fire PRA. In addition, the important contributors/ sequences in the Fire PRA did not use screening values.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				detailed analysis. F&O HR-02: F&O HR-02 remains open (Ref: PRATracker C-03-0058) to provide detailed quantification of the dominant pre-initiator HEPs. Detailed evaluations have been performed for 24 of 58 (41%) of the pre-initiator human error events (LHEs). Different LHEs may be more significant for fire than for internal event sequences since a fire can fail multiple components. However, cut sets that contain the screening value LHEs would be expected to decrease in importance since detailed evaluations tend to lower the probabilities assigned to the LHEs. Review of the cutsets data verified incorporation of mean LHE values into the database.	
HR-D3	For each detailed human error probability assessment, INCLUDE in the evaluation process the following plant-specific relevant information: (a) the quality of written procedures (for performing tasks) and administrative controls (for independent review)	Dispositioned	None	NEI 00-02 does not explicitly address this SR and states "This item is implicitly included in the peer review of HRA by virtue of the assessment of the crew's ability to implement the procedure in an effective and controlled manner. The pre-initiator HRA adequacy is determined reasonable and representative considering the procedure quality." CNC-1535.00-00-0030, Rev. 2, July 2012, HRA Calc, section 3.1	There is no impact to the Fire PRA or NFPA 805 since pre-initiator (Type A) human actions are not modified for the Fire PRA.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(b) the quality of the human-machine interface, including both the equipment configuration, and instrumentation and control layout			Quantification of Type A Interactions states that "Once each pre-initiator human interaction was further defined in terms of the specific failures of interest, the conditions that would affect their probabilities of occurrence were identified. These conditions, which were drawn from Table 5-2 of the ASEP methodology, include the following [Ref. 6]: (1) Whether status of the unavailable component would be indicated by a compelling signal in the control room. (2) Whether component status would be positively verified by a post-maintenance or post-calibration test. (3) Whether there would be a requirement for an independent verification of the status of the component after test or maintenance activities. (4) Whether there would be a check of the component status each shift or each day, using a written checklist. An event tree was constructed to provide a framework for applying these conditions in evaluating individual pre-initiator interactions."	
HR-D4	When taking into account self-recovery or recovery from other	Dispositioned	F&O HR-02: A screening value of 3E-3 was initially used for all pre-initiator HEPs. There were 7 HEPs quantified	The NEI SR applicable to this ASME SR is HR-6, and there are no NRC objections. There is an	There is no impact to the Fire PRA or NFPA 805 since pre-initiator (Type A) human

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	crew members in estimating HEPs for specific HFEs, USE pre-initiator recovery factors in a manner consistent with selected methodology. If recovery of pre-initiator errors is credited (a) ESTABLISH the maximum credit that can be given for multiple recovery opportunities (b) USE the following information to assess the potential for recovery of pre-initiator: (1) post-maintenance or post-calibration tests required and performed by procedure (2) independent verification, using a written check-off list, that verifies component status following maintenance/testing (3) a separate check of component status made at a later time, using a written check-off list, by the original performer		in more detail, because the HEP importance was too high. However, there were 7 Latent Human Error events with a 3E-3 probability in the top 100 importance events in the CR2b quantification. This observation does not necessarily have a large impact on the PRA results. However, per the HR subtier criteria, screening HEPs should not be used for actions appearing in important contributors.	industry action to use the ASME/ANS PRA Standard for requirements, since NEI 00-02 does not explicitly cite the treatment of recovery actions for pre-initiators. The original Peer Review rated HR-6 as "2" with associated level "B" F&Os HR-02 and TH-05. TH-05 does not seem relevant to this SR because pre-initiator HEPs are not based on thermal-hydraulics timing. The Type A operator action quantification spreadsheets addressed post maintenance testing, independent verification and separate checks using an event tree approach. F&O HR-02: F&O HR-02 remains open (Ref: PRATracker C-03-0058) to provide detailed quantification of the dominant pre-initiator HEPs. Detailed evaluations have been performed for 24 of 58 (41%) of the pre-initiator human error events (LHEs). Different LHEs may be more significant for fire than for internal event sequences since a fire can fail multiple components. However, cut sets that contain the screening value LHEs would be expected to decrease in importance since detailed evaluations tend to lower the probabilities assigned to the LHEs.	actions are not modified for the Fire PRA. In addition, the important contributors/ sequences in the Fire PRA did not use screening values.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(4) work shift or daily checks of component status, using a written check-off list.			Review of the cutsets data verified incorporation of mean LHE values into the database.	
HR-D6	PROVIDE an assessment of the uncertainty in the HEPs in a manner consistent with the quantification approach. USE mean values when providing point estimates of HEPs.	Dispositioned	None	NEI 00-02 does not address this supporting requirement. DPC-1535.00-00-013, Rev. 2. 2008 Self Assessment identified this in Table 3 as Not Met and in Table C as an Open Item. DPC-1535.00-00-013, Rev. 2., 2008 Self Assessment Table 1 states that "The Type A HEPs are not identified to be mean values and error factors are not provided in the summary table of the HR notebook (Table 2)." This is not uncommon in HRA. CNC-1535.00-00-0155, Rev. 0, 2013 Self Assessment states that this is Met and cites the CNS Rev. 3b PRA Database as a reference.	There is no impact to the Fire PRA or NFPA 805 since pre-initiator (Type A) human actions are not modified for the Fire PRA.
HR-E1	When identifying the key human response actions REVIEW: (a) the plant-specific emergency operating procedures, and other relevant procedures (e.g., AOPs, annunciator response procedures) in the	Dispositioned	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis. The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps	The NEI SRs applicable to this ASME SR are HR-9, HR-10, HR-16, AS-19, and SY-5, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated HR-9, AS-19, and SY-5 as "3", but HR-10 and HR-16 as "2" with associated level "B" F&Os HR-05 and HR-04, respectively.	The resolution of VFDRs considers details on the feasibility of actions given the time available and the impacts of fire on travel paths and action performance. The issues raised by the peer review were addressed through added discussion in the HRA Calc. The Fire HRA was

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	context of the accident scenarios (b) system operation such that an understanding of how the system(s) functions and the human interfaces with the system is obtained		are not mentioned. In some places, the reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1. F&O HR-05: In the Catawba HRA notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios.	F&Os HR-04 and HR-05: While these F&Os remain open (PRATracker items C-03-0059 and C-03-0060); CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the self assessment and the discussion from CNC-1535.00-00-0030. DPC-1535.00-00-013, Rev. 2., 2008 Self Assessment Table 1 considers this SR to be met on the following basis: "Based on a review of the HR and SY notebooks, the identification of key human response actions employed reviews of the plant-specific operating procedures, including the emergency procedures (EPs) and the various abnormal procedures, as well as human interfaces with systems operation." Section 2.2 of Rev. 2 of the HRA Calc CNC-1535.00-00-0030 states that, "To delineate system response to particular types of upset events, it can be as important to understand the intended response of the operating crew in using the system as it is to understand the design of the system itself. Thus, in defining the sequence delineation for particular initiating events, it was	completed using this internal events documentation and was demonstrated to be sufficient by successful peer review. There is no impact on the Fire PRA and NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				necessary to review carefully the operating procedures, including the emergency procedures and the various abnormal procedures. This review was aimed at identifying any operator-driven considerations that would affect the modeling process, such as the priorities that might come into play when multiple options were available for maintaining core cooling, or the cues that might indicate the need to change operating modes. These procedure reviews were augmented by obtaining input from operators. This was done by having current and former operators review the sequence logic and system fault trees; through extensive discussions with operators regarding specific scenarios; and, to the extent possible, by observing simulator exercises."	
HR-E2	IDENTIFY those actions (a) required to initiate (for those systems not automatically initiated), operate, control, isolate, or terminate those systems and components used in preventing or mitigating core damage as defined by the success criteria	Dispositioned	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis. The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps are not mentioned. In some places, the	The NEI SRs applicable to this ASME SR are HR-8, HR-9, HR-10, HR-21, HR-22, HR-23, and HR-25, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated HR-8, HR-9, HR-21 and HR-25 as "3" and HR-22 and HR-23 as "3 with contingencies." HR-10 was rated "2" with associated level "B" F&O HR-05. Also, NEI SRs HR-22 and HR-23	The resolution of VFDRs considers details on the feasibility of actions given the time available and the impacts of fire on travel paths and action performance. The issues raised by the peer review were addressed through added discussion in the HRA Calc. The Fire HRA was completed using this internal

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(e.g., operator initiates RHR) (b) performed by the control room staff either in response to procedural direction or as skill-of-the-craft to diagnose and then recover a failed function, system, or component that is used in the performance of a response action as identified in HR-H1.		reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1. F&O HR-05: In the Catawba HRA notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios.	have F&Os HR-04 and HR-05, respectively. F&Os HR-04 and HR-05: While these F&Os remain open (PRATracker items C-03-0059 and C-03-0060); CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the self assessment and the discussion from CNC-1535.00-00-0030. DPC-1535.00-00-013, Rev. 2., 2008 Self Assessment Table 1 considers this SR to be met on the following basis: "The identification of human response actions included those actions required to initiate, operate, control, isolate, or terminate those systems and components modeled by the PRA, as well as those actions performed by the control room staff either in response to procedural direction or as skill-of-the-craft to recover a failed function, system or component." Section 2.2 of Rev. 2 of the HRA Calc CNC-1535.00-00-0030 states that " To delineate system response to particular types of upset events, it can be as important to understand the intended response of the operating crew in using the system	events documentation and was demonstrated to be sufficient by successful peer review. There is no impact on the Fire PRA and NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				as it is to understand the design of the system itself. Thus, in defining the sequence delineation for particular initiating events, it was necessary to review carefully the operating procedures, including the emergency procedures and the various abnormal procedures. This review was aimed at identifying any operator-driven considerations that would affect the modeling process, such as the priorities that might come into play when multiple options were available for maintaining core cooling, or the cues that might indicate the need to change operating modes. These procedure reviews were augmented by obtaining input from operators. This was done by having current and former operators review the sequence logic and system fault trees; through extensive discussions with operators regarding specific scenarios; and, to the extent possible, by observing simulator exercises."	
HR-E3	TALK THROUGH (i.e., review in detail) with plant operations and training personnel the procedures and sequence of events to confirm that interpretation of the	Dispositioned	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis.	The NEI SRs applicable to this ASME SR are HR-10, HR-14, and HR-20, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated all of these NEI SRs as "2" with associated level "B" F&Os HR-04 and HR-05.	Based on the disposition, the requirements of Cat II are considered met. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	procedures is consistent with plant observations and training procedures.		The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps are not mentioned. In some places, the reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1. F&O HR-05: In the Catawba HRA notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the	F&Os HR-04 and HR-05: While these F&Os remain open (PRATracker items C-03-0059 and C-03-0060); CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the self assessment and the discussion from CNC-1535.00-00-0030. DPC-1535.00-00-013, Rev. 2. 2008 Self Assessment Table 1 considers this SR to be met on the following basis: "As documented in the HR notebook, talk-throughs with plant operations have been performed to confirm that interpretation of the procedures is consistent with plant observations and training procedures. This was done by having operators review the sequence logic and system fault trees, through extensive discussions with operators regarding specific scenarios." Section 4 of Rev. 2 of the HRA Calc CNC-1535.00-00-0030 states that: "The quantification of the human interactions required input from operations personnel, who often provided input on timing and qualitative insights that led to changes in the definition or application of specific events. The assessment for each event was	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			ability to verify and reproduce the results, and to determine their applicability in specific scenarios.	reviewed in detail by at least one other PRA analyst. Review of the overall reasonableness of the events and their treatment was also gained during the final review of the sequence cut sets. This review process included both other members of the PRA project team and CNS operations personnel."	
HR-E4	USE simulator observations or talk-throughs with operators to confirm the response models for scenarios modeled.	Dispositioned	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis. The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps are not mentioned. In some places, the reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1.	The NEI SRs applicable to this ASME SR are HR-14 and HR-16, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated both of these NEI SRs as "2" with associated level "B" F&O HR-04. F&O HR-04: While this F&O remains open (PRATracker items C-03-0059), CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the self assessment and the discussion from CNC-1535.00-00-0030. DPC-1535.00-00-013, Rev. 2. 2008 Self Assessment Table 1 considers this SR to be met on the following basis: "As documented in the HR notebook, talk-throughs with plant operations have been performed to confirm the response models for scenarios modeled. This was done by having	Based on the disposition, the requirements of Cat II are considered met. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				operators review the sequence logic and system fault trees, through extensive discussions with operators regarding specific scenarios, and, to the extent possible, by observing simulator exercises." Section 2.2 of Rev. 2 of the HRA Calc CNC-1535.00-00-0030 states that: "To delineate system response to particular types of upset events, it can be as important to understand the intended response of the operating crew in using the system as it is to understand the design of the system itself. Thus, in defining the sequence delineation for particular initiating events, it was necessary to review carefully the operating procedures, including the emergency procedures and the various abnormal procedures. This review was aimed at identifying any operator-driven considerations that would affect the modeling process, such as the priorities that might come into play when multiple options were available for maintaining core cooling, or the cues that might indicate the need to change operating modes. These procedure reviews were augmented by obtaining input from operators. This was done by having current and former	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				operators review the sequence logic and system fault trees; through extensive discussions with operators regarding specific scenarios; and, to the extent possible, by observing simulator exercises."	
HR-F1	DEFINE human failure events (HFEs) that represent the impact of the human failures at the function, system, train, or component level as appropriate. Failures to correctly perform several responses may be grouped into one HFE if the impact of the failures is similar or can be conservatively bounded.	Dispositioned	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis. The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps are not mentioned. In some places, the reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1.	The NEI SRs applicable to this ASME SR are HR-16, AS-19, and SY-5, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-19 and SY-5 as "3", but HR-16 as "2" with associated level "B" F&O HR-04. F&O HR-04: While this F&O remains open (PRATracker items C-03-0059), CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the self assessment. DPC-1535.00-00-013, Rev. 2. 2008 Self Assessment Table 1 considers this SR to be met on the following basis: "Based on a review of the PRA documentation, the PRA defines human failure events at the appropriate level: function, system, train, or component level." Section 2.2 of Rev. 2 of the HRA Calc CNC-1535.00-00-0030 states that:	Based on the disposition, the requirements of Cat II are considered met. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				"Type CP interactions in the logic models were included at the highest level consistent with their effects. For example, the failure to initiate feed-and-bleed cooling following a total loss of feedwater is included in the supporting logic for the corresponding events in the event trees, rather than being broken down into individual faults associated with each piece of equipment in the system fault trees. This treatment helps to highlight the events, and focuses consideration on cognitive aspects of the response to upset conditions."	
HR-F2	COMPLETE THE DEFINITION of the HFEs by specifying (a) accident sequence specific timing of cues, and time window for successful completion (b) accident sequence specific procedural guidance (e.g., AOPs, and EOPs) (c) the availability of cues and other indications for detection and evaluation errors (d) the specific high	Open	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis. The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps are not mentioned. In some places, the reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1. F&O HR-05: In the Catawba HRA notebook for PRA Rev 2b (and similarly in the Catawba Rev 3 HRA	The NEI SRs applicable to this ASME SR are HR-11, HR-16, HR-17, HR-19, HR-20, AS-19, and SY-5, and there are no NRC objections. There is an industry action to determine whether the requirements of the ASME/ANS PRA Standard are met. The original Peer Review rated AS-19 and SY-5 as "3", but HR-16, HR-17, HR-19, and HR-20 as "2", with associated level "B" F&Os HR-04, HR-05, TH-05, and HR-04, respectively. HR-11 was assessed as "NA". F&O TH-05 - Operator actions are considered as part of the CNP success criteria analyses with expected operator actions	Peer Review F&O TH-05 is still open. While updated success criteria and timing data has been developed from MAAP 4.0.7 analyses, it has not been incorporated into the model of record. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. Fire-induced ATWS events are not postulated, and thus there is no impact on the Fire PRA results or NFPA 805. As a result, the overall impact on the Fire PRA results and NFPA 805 is

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	level tasks (e.g., train level) required to achieve the goal of the response		notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios. F&O TH-05: The HEP worksheets do not clearly refer to success criteria analyses to support timing for operator actions. Although most worksheets include an estimate of the time available for completion of an action, and some refer generally to information from MAAP analyses,	included for SLOCA (Section 3.3), SGTR (Section 3.4), and transient F&B (Section 3.6). Specific timing information from MAAP analyses can be found in Appendices A through F MAAP. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met. The date stamp on the HEP Excel Spreadsheets is still 2005 so it is not apparent that any updates have been made. No Thermal-hydraulic analyses are referenced as the basis for the accident sequence specific timing for cues or overall time window, as required by the SR. F&O HR-05: While this F&O remains open (PRATracker item C-03-0060) for documentation issues, success criteria, plant parameters and associated acceptance criteria derived from the success criteria analyses are used to support the timing analysis used in the PRA HRA. References to MAAP analysis that support the	expected to be negligible.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			specific references to MAAP (or other analysis) cases are not provided.	timing actions are included in the HRA spreadsheets. F&O HR-04: While this F&O remains open (PRATracker item C-03-0059), CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the discussion from CNC-1535.00-00-0030. Section 2.2 of Rev. 2 of the HRA Calc CNC-1535.00-00-0030 states that: "To delineate system response to particular types of upset events, it can be as important to understand the intended response of the operating crew in using the system as it is to understand the design of the system itself. Thus, in defining the sequence delineation for particular initiating events, it was necessary to review carefully the operating procedures, including the emergency procedures and the various abnormal procedures. This review was aimed at identifying any operator-driven considerations that would affect the modeling process, such as the priorities that might come into play when multiple options were available for maintaining core cooling, or the cues that might indicate the need to change operating modes. These	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				procedure reviews were augmented by obtaining input from operators. This was done by having current and former operators review the sequence logic and system fault trees; through extensive discussions with operators regarding specific scenarios; and, to the extent possible, by observing simulator exercises."	
HR-G1	PERFORM detailed analyses for the estimation of HEPs for significant HFEs. USE screening values for HEPs for non-significant human failure basic events.	Dispositioned	F&O HR-05: In the Catawba HRA notebook for PRA Rev 2b (and similarly in the Catawba Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive	The NEI SRs applicable to this ASME SR are HR-15, HR-17, and HR-18, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated HR-15 as "3", but HR-17 as "2", with associated level "B" F&O HR-05. HR-18 was assessed as "N/A" (F&Os of HR-05, HR-09 and TH-05 were cited but they are not directly relevant to this SR). DPC-1535.00-00-013, Rev. 2. 2008 Self Assessment Table 1 considers this SR to be met on the following basis: "The Type C HRA uses detailed analyses for the estimation of HEPs for significant HFEs. The human cognitive reliability model or the caused-based approach was used to quantify cognition errors, and an abbreviated version of THERP to quantify execution errors. Screening values have been used	Based on the disposition, the requirements of Cat II are considered met. There is no impact to the Fire PRA or transition to NFPA 805. Detailed analysis has been performed for significant HFEs.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios.	for HEPs for non-significant human failure basic events."	
HR-G3	When estimating HEPs EVALUATE the impact of the following plant-specific and scenario-specific performance shaping factors: (a) quality [type (classroom or simulator) and frequency] of the operator training or experience (b) quality of the written procedures and administrative controls (c) availability of instrumentation needed to take corrective actions (d) degree of clarity of the cues/indications (e) human-machine interface (f) time available and time required to complete the response	Dispositioned	F&O HR-05: In the Catawba HRA notebook for PRA Rev 2b (and similarly in the McGuire Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their	The NEI SRs applicable to this ASME SR are HR-17 and HR-18, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated HR-17 as "2", with associated level "B" F&O HR-05. HR-18 was assessed as "N/A" (F&Os of HR-05, HR-09 and TH-05 were cited but they are not directly relevant to this SR). Reg Guide 1.200, Rev. 2, Table B-4 states that "NEI 00-02 does not explicitly enumerate the same level of detail that is included in the ASME standard. However, by invoking the standard HRA methodologies the performance shape factors are necessarily evaluated. The peer review team experience is relied upon to investigate the PRA given general guidance and criteria." CNC-1535.00-00-0030, Rev. 2, July 2012, HRA Calc., Section 3.2 Quantification of Type Cp Interactions provides more detailed explanations for the HRA methods used and the PSFs that	The resolution of VFDRs considers details on the feasibility of actions given the time available and the impacts of fire on travel paths and action performance. The issues raised by the peer review were addressed through added discussion in the HRA Calc. The Fire HRA was completed using this internal events documentation and was demonstrated to be sufficient by successful peer review. There is no impact on the Fire PRA and NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(g) complexity of the required response (h) environment (e.g., lighting, heat, radiation) under which the operator is working (i) accessibility of the equipment requiring manipulation (j) necessity, adequacy, and availability of special tools, parts, clothing, etc.		applicability in specific scenarios. This finding was made against NEI SR HR-17 with an assignment of grade 2.	were considered using the HCR and Cause Based methods.	
HR-G4	BASE the time available to complete actions on appropriate realistic generic thermal-hydraulic analyses, or simulation from similar plants (e.g., plant of similar design and operation). SPECIFY the point in time at which operators are expected to receive relevant indications.	Open	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis. The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps are not mentioned. In some places, the reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1. F&O TH-05: The HEP worksheets do not clearly refer to success criteria analyses to support timing for operator	The NEI SRs applicable to this ASME SR are HR-18, HR-19, HR-20, and AS-13, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated AS-13 as "3", but HR-19 and HR-20 as "2", with associated level "B" F&Os TH-05 and HR-04, respectively. HR-18 was assessed as "N/A" (F&Os of HR-05, HR-09 and TH-05 were cited but they are not directly relevant to this SR). F&O TH-05 - Operator actions are considered as part of the CNP success criteria analyses with expected operator actions included for SLOCA (Section 3.3),	Peer Review F&O TH-05 is still open. While updated success criteria and timing data has been developed from MAAP 4.0.7 analyses, it has not been incorporated into the model of record. However, there are no significant changes to the success criteria, so the impact on the Fire PRA results and NFPA 805 is expected to be negligible. Fire-induced ATWS events are not postulated, and thus there is no impact on the Fire PRA results or NFPA 805. As a result, the overall impact on the Fire PRA results and NFPA 805 is

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			actions. Although most worksheets include an estimate of the time available for completion of an action, and some refer generally to information from MAAP analyses, specific references to MAAP (or other analysis) cases are not provided.	SGTR (Section 3.4), and transient F&B (Section 3.6). Specific timing information from MAAP analyses can be found in Appendices A through F MAAP. This F&O is dispositioned based on the resolution of the finding and achieve grade 3 of the NEI SR. However, the CNS Assessment of Peer Review Open Items (May 2013) identifies this F&O as remaining open because the current model of record does not reflect the updated information and as a result the ASME SR is considered Not Met. The date stamp on the HEP Excel Spreadsheets is still 2005 so it is not apparent that any updates have been made. No Thermal-hydraulic analyses are referenced as the basis for the accident sequence specific timing for cues or overall time window, as required by the SR. F&O HR-04: While this F&O remains open (PRATracker items C-03-0059), CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the self assessment and the discussion from CNC-1535.00-00-0030. DPC-1535.00-00-013, Rev. 2.	expected to be negligible.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				2008 Self Assessment considers this SR to be met. Section 4 of Rev. 2 of the HRA Calc CNC-1535.00-00-0030 states that "The quantification of the human interactions required input from operations personnel, who often provided input on timing and qualitative insights that led to changes in the definition or application of specific events. The assessment for each event was reviewed in detail by at least one other PRA analyst. Review of the overall reasonableness of the events and their treatment was also gained during the final review of the sequence cut sets. This review process included both other members of the PRA project team and Catawba operations personnel." CNC-1535.00-00-0030, Rev. 2, July 2012, HRA Calc., Section 3.2.1 The Human Cognitive Reliability Model states: "Ideally, the response and execution times would be collected from simulator exercises and actual plant events. In most cases, however, it was not practical to collect sufficient information, so the estimates of the SROs were used. The total time available was generally obtained from thermal-hydraulic calculations for the accidents of interest (e.g., from MAAP	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				analyses, hand calculations, or other sources). Once the type of cognitive processing was determined and the time estimates were available, the correlation was quantified for failure to accomplish the action of interest within the available time window, TW, which represents the net time available to formulate the response to an event."	
HR-G5	When needed, BASE the required time to complete actions for significant HFEs on action time measurements in either walkthroughs or talk-throughs of the procedures or simulator observations.	Open	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis. The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps are not mentioned. In some places, the reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1. F&O HR-09: Define the four time parameters for all HEPs. Document the basis for all four times for each HEP. Make similar HEPs consistent with each other. Requantify HEP with new time data.	The NEI SRs applicable to this ASME SR are HR-16, HR-18, and HR-20, and there are no NRC objections. There is an industry action to evaluate proper inputs per the ASME/ANS PRA Standard or cite peer review documentation/conclusions or examples from your model. The original Peer Review rated HR-16 and HR-20 as "2", with associated level "B" F&O HR-04. HR-18 was assessed as "NA" (F&Os of HR-05, HR-09 and TH-05 were cited but they are not directly relevant to this SR). F&O HR-09: Addressed in Catawba Human Reliability Analysis CNC-1535.00-00-0030. F&O remains open (PRATracker C-03-0066) with action to define and document the four time parameters for all HEPs. Any changes to the HEPs are expected to be small. The internal events	The resolution of VFDRs considers details on the feasibility of actions given the time available and the impacts of fire on travel paths and action performance. The issues raised by the peer review were addressed through added discussion in the HRA Calc. The Fire HRA was completed using this internal events documentation and was demonstrated to be sufficient by successful peer review. Based on the disposition and discussion above, there is no impact on the Fire PRA and NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				PRA human actions have been conservatively modified for application in the Fire PRA. F&O HR-04: While this F&O remains open (PRATracker items C-03-0059), CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the self assessment and the discussion from CNC-1535.00-00-0030. DPC-1535.00-00-013, Rev. 2. 2008 Self Assessment considers this SR to be met. Section 4 of Rev. 2 of the HRA Calc CNC-1535.00-00-0030 states that" "The quantification of the human interactions required input from operations personnel, who often provided input on timing and qualitative insights that led to changes in the definition or application of specific events. The assessment for each event was reviewed in detail by at least one other PRA analyst. Review of the overall reasonableness of the events and their treatment was also gained during the final review of the sequence cut sets. This review process included both other members of the PRA project team and Catawba operations personnel."	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				CNC-1535.00-00-0030, Rev. 2, July 2012, HRA Calc., Section 3.2.1 The Human Cognitive Reliability Model states: "Ideally, the response and execution times would be collected from simulator exercises and actual plant events. In most cases, however, it was not practical to collect sufficient information, so the estimates of the SROs were used. The total time available was generally obtained from thermal-hydraulic calculations for the accidents of interest (e.g., from MAAP analyses, hand calculations, or other sources). Once the type of cognitive processing was determined and the time estimates were available, the correlation was quantified for failure to accomplish the action of interest within the available time window, TW, which represents the net time available to formulate the response to an event."	
HR-G6	CHECK the consistency of the post-initiator HEP quantifications. REVIEW the HFEs and their final HEPs relative to each other to check their reasonableness given the scenario context, plant history, procedures, operational	Dispositioned	F&O QU-05: Event NDORWSTDHE: This is a recovery action to terminate the NV and NI pumps in the event of failure of ND to provide recirculation after a SL. The event was quantified on the basis of tripping the pumps within 18 minutes. RWST refill was assumed to occur (from undescribed source) and pumps were restarted to continue injection. This recovery event	The NEI SRs applicable to this ASME SR is HR-12, and there are no NRC objections. There is an industry action to ensure they are met by citing peer review documentation/conclusions or examples from your model. The original Peer Review rated HR-12 as "3", with associated level "B" F&O QU-05.	HFEs are reviewed by knowledgeable site personnel to assure high quality. Recent update of the Oconee PRA model demonstrated that the HRA methodology for operator actions used at the time of the CNS peer review produced conservative

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	practices, and experience.		is applied to a) loss of KC pumps b) SNSDRNVLHE - drain plug blockage c) CCF of ND pumps. The recovery event is intended to provide injection flow for the long term commensurate with the RWST make-up capability. The time of some of these failure is 20 minutes, when injection requirements are beyond the make-up capability of the RWST. Secondly, there are cutsets representing heat removal that can not be recovered by continued injection of HHSI. The sequence needs continuous injection of HHSI and heat removal from containment.	F&O QU-05: Event NDORWSTDHE has been redefined and failure probability recalculated for the CNS Rev 3a PRA Model Integration Notebook. In DPC-1535.00-00-013, it is noted that the PRA notebooks do not document a review of the HFEs and their final HEPs relative to each other to check reasonableness given the scenario context, plant history, procedures, operational practices, and experience, and this SR is considered Not Met. Self-assessment, CNC-1535.00-00-0155, also lists this SR as Not Met. It is noted that, as part of model integration and results review, the probabilities associated with human error events and their reasonableness given the scenarios in which they occur are reviewed. To fully meet this SR, it is recommended that a meeting be held with the PRA model integrator, the HRA specialist and plant operators to perform a formal consistency check of the post-initiator human error probability quantifications.	results, largely due to overestimation of the impact of dependencies. This issue is not expected to affect the overall conclusions of the NFPA 805 LAR submittal. However, this review needs to be better documented. No impact on the Fire PRA is expected.
HR-G8	Characterize the uncertainty in the estimates of the HEPs	Dispositioned	None	NEI 00-02 does not address this supporting requirement. DPC-1535.00-00-013, Rev. 2. 2008 Self	Uncertainties in the internal events HEPs are fed into the fire HRA. No impact to Fire

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	in a manner consistent with the quantification approach, and PROVIDE mean values for use in the quantification of the PRA results.			Assessment identified this in Table 3 as Not Met and in Table C as an Open Item. CNC-1535.00-00-0155, Rev. 0, 2013 Self Assessment states that this is Met and cites the CNS Rev. 3b PRA Database as a reference, which includes uncertainty parameters and mean values for use in quantification.	PRA.
HR-H1	INCLUDE operator recovery actions that can restore the functions, systems, or components on an as-needed basis to provide a more realistic evaluation of significant accident sequences.	Dispositioned	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis. The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps are not mentioned. In some places, the reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1. F&O HR-05: In the Catawba HRA notebook for PRA Rev 2b (and similarly in the Catawba Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental	The NEI SRs applicable to this ASME SR are HR-21, HR-22, and HR-23, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated HR-21 as "3" and HR-22 and HR-23 as "3 with contingencies." NEI SRs HR-22 and HR-23 have level "B" F&Os HR-04 and HR-05, respectively. F&Os HR-04 and HR-05: While these F&Os remain open (PRATracker items C-03-0059 and C-03-0060); CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the discussion from CNC-1535.00-00-0030. CNC-1535.00-00-0030, Rev. 2, July 2012, HRA Calc, Section 3.3 Quantification for Non-Recovery (Type CR) Interactions says: "The consideration of actions that would constitute non-recovery events is	The resolution of VFDRs considers details on the feasibility of actions given the time available and the impacts of fire on travel paths and action performance. The issues raised by the peer review were addressed through added discussion in the HRA Calc. The Fire HRA was completed using this internal events documentation and was demonstrated to be sufficient by successful peer review. There is no impact on the Fire PRA and NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios.	outlined in Section 2.5. As noted, there, some of the non-recovery events assessed in this study represented failures to respond to the loss of a system or function in a manner that was not explicitly directed by procedures. These events were added to the sequence-level minimal cut sets after the solution process. This process was originally accomplished by adding events to the cut sets on an individual basis. More recently, the addition of the events has been automated through the use of the QRECOVER program, which allows the analyst to define a set of rules which, if satisfied, cause the event to be added. The rules are formulated in terms of the combinations of events that must appear in a cut set (and, in some cases, the events that must not be present) for a particular recovery action to be valid."	
HR-H2	CREDIT operator recovery actions only if, on a plant-specific basis, the following occur: (a) a procedure is available and operator training has included the action as part of crew's training, or	Open	F&O HR-04: The operating staff at the plant had some input to the HRA in the beginning, but it is not obvious a thorough review of the dominant operator actions by the plant staff had been done, nor was it obvious there had been any feedback of their comments into the analysis. The level of detail and relation to the operating procedures is sparse. In some instances, the procedural steps	The NEI SRs applicable to this ASME SR are HR-22 and HR-23, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated both of these NEI SRs as "3 with contingencies". NEI SRs HR-22 and HR-23 have level "B" F&Os HR-04 and HR-05, respectively.	The resolution of VFDRs considers details on the feasibility of actions given the time available and the impacts of fire on travel paths and action performance. The issues raised by the peer review were addressed through added discussion in the HRA Calc. The Fire HRA was

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	justification for the omission for one or both is provided (b) "cues" (e.g., alarms) that alert the operator to the recovery action provided procedure, training, or skill of the craft exist (c) attention is given to the relevant performance shaping factors provided in HR-G3 (d) there is sufficient manpower to perform the action.		are not mentioned. In some places, the reference to the procedure is incorrect, such as the emergency primary depressurization reference to ES 1.3, which actually occurs in FRC.1. F&O HR-05: In the Catawba HRA notebook for PRA Rev 2b (and similarly in the Catawba Rev 3 HRA notebook), the documentation of the bases for the HEPs is not sufficiently specified to assure that the analysis is reproducible. Specifically, the sequence context (e.g., previous failures in the event sequence, concurrent activities, environmental factors, etc.) and procedural steps applicable to each HEP are not consistently provided. Thus, even though there is evidence that the HEP worksheet information is being reviewed by plant Operations personnel, it is not clear that they would have sufficient supporting information with which to make an effective assessment of the HRA. Similarly, the timing, PSF, stress level, and all other contributing factors to the HEP were printed, but the basis was not provided. It would not have been possible for another analyst to determine the same factors and derive the same number. The lack of such information in the documentation of the HRA limits the ability to verify and reproduce the results, and to determine their applicability in specific scenarios.	F&Os HR-04 and HR-05: While these F&Os remain open (PRATracker items C-03-0059 and C-03-0060); CNC-1535.00-00-0030 contains the information needed to ascertain that the requirements for this SR are met, as noted below in the discussion from CNC-1535.00-00-0030. CNC-1535.00-00-0030, Rev. 2, July 2012, HRA Calc, Section 3.3 Quantification for Non-Recovery (Type CR) Interactions says: "The consideration of actions that would constitute non-recovery events is outlined in Section 2.5. As noted, there, some of the non-recovery events assessed in this study represented failures to respond to the loss of a system or function in a manner that was not explicitly directed by procedures. These events were added to the sequence-level minimal cut sets after the solution process. This process was originally accomplished by adding events to the cut sets on an individual basis. More recently, the addition of the events has been automated through the use of the QRECOVER program, which allows the analyst to define a set of rules which, if satisfied, cause the event to be added. The rules are formulated in terms of the combinations of events that must	completed using this internal events documentation and was demonstrated to be sufficient by successful peer review. There is no impact on the Fire PRA and NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				appear in a cut set (and, in some cases, the events that must not be present) for a particular recovery action to be valid."	
DA-A1	IDENTIFY from the systems analysis the basic events for which probabilities are required. Examples of basic events include: (a) independent or common cause failure of a component or system to start or change state on demand (b) independent or common cause failure of a component or system to continue operating or provide a required function for a defined time period (c) equipment unavailable to perform its required function due to being out of service for maintenance (d) equipment unavailable to perform its required function due to being in test mode	Dispositioned	F&O DA-02: Some of the generic data from SAROS is quite dated, including WASH-1400, NUREG/CR-2815, Zion PRA, and NUREG/CR-4550. More recent generic data should be pursued. Component failures should be defined such that they encompass only those failures that would disable the component over the PRA mission time. It appears that this has not been considered. Specific examples of less than adequate reliability data characterization were identified through review of Tables 1 and 3 in SAAG-655, Catawba PRA Rev. 3 Failure Rate and Maintenance Unavailability Data. First, repeat events in a short duration, where there was insufficient component repair should be counted as one event. An example is PIP nos. 2-C97-2481 and 2-C97-2637 on 7/29/97 and 8/12/97 for incoming breaker 2CXI-5C. The first failure occurred "for no apparent reason", but the second failure was attributed to a failed relay. The first event should be omitted as a component failure as the component was left in the degraded condition. Second, component degradation that results in failure to meet normal criteria	The CNS PRA model includes events of all of the types shown (other than component repair, which is not considered in the model). The 2009 ASME/ANS Cat II requirements for DA-A1 were evaluated in part under NEI technical elements DA-4, DA-5, DA-15, SY-8, and SY-15 in the 2002 CNS Peer Review. The peer review team assigned PSA grade of 3 to DA-5, SY-8, and SY-14. DA-4 and DA-15 were assigned a PSA grade of 3 contingent on resolution of F&Os DA-02, DA-05, and DA-06. F&O DA-02 is related to generic data sources; see SR DA-C1 for disposition. F&O DA-05 is related to specific component unavailabilities; see SR DA-C14 for disposition. F&O DA-06 concerns MOV rupture error factors; see SR DA-D3 for disposition.	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this SR. For Fire PRA, the risk is dominated by fire impacts. Minor changes to the random failure rate of the components is not significant in the fire risk evaluations. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(e) failure to recover a function or system (e.g., failure to recover offsite-power) (f) failure to repair a component, system, or function in a defined time period		(e.g., to avoid component life degradation), may not impact the component mission for the PRA. For example, PIP no. 0-C98-2057 involved a 6/7/98 event for trouble alarms for VI compressor F, and the compressor motor was found smoking. The evaluation addressed concern with overheating and insulation breakdown, but did not address whether run to failure would survive PRA mission. Similar pump failures due to routine vibration testing exceeding limits were found (LPR 2B & 1A, WO 93020502 & PIP 1-C93-1124). F&O DA-05: The unavailabilities computed for the basic events for PORV block valve closure, RNC031BDEX, 033ADEX, and 035BDEX, assume that each PORV is closed one week per quarter. However, there is no history of PORV closures for any extended period of time in the last few years. While this does use plant-specific data, the benefit derived from it is limited due to the highly conservative assumption regarding PORV out of service time. F&O DA-06: In SAAG 342, there is development of a failure probability for the rupture of an MOV. The type code for this event is MVR. This type code is used in the calculation of the ISLOCA frequency. In the SAROS database, this distribution is composed of three equally weighted distributions.		

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			The three distributions have error factors of close to 10.0. The error factor assigned to MVR is ~2.6. This is impossible – the error factor should be close to ten. The following provides additional explanation of this issue. Often it is useful to develop a distribution based on combining several distributions. That is f(λ) = Σi wi fi(λ), i =1...n. Such an operation often does not possess a closed solution and Monte Carlo (MC) simulations are required. However, care must be taken in implementing the MC solution. People are often tempted to set up a MC process where one iteration for I is based on taking samples from the weighted sum of samples from each of the fi(λ)'s. This is incorrect. This, in effect, loses data and results in a unimodal function. In the case of two equally weighted functions A and B where every point on A is less than any point on B, the lower points of A and the higher points of B would not be in the resulting distribution. While the mean is preserved, the variance is understated and is incorrect. The proper method is to obtain samples for A, weight them, and put them in a pool. Then obtain samples for B, weight them, and put them in the pool. The points in the pool are MC distribution and, in this case, would be bi-modal. Note that page 5-38 of NUREG/CR-2300 uses the above equation and notes that it		

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			may produce a non-unimodal distribution.		
DA-A2	ESTABLISH definitions of SSC boundaries, failure modes, and success criteria in a manner consistent with corresponding basic event definitions in Systems Analysis (SY-A5, SY-A7, SY-A8, SY-A9 through SY-A14 and SY-B4) for failure rates and common cause failure parameters, and ESTABLISH boundaries of unavailability events in a manner consistent with corresponding definitions in Systems Analysis (SY-A19).	Dispositioned	None	NEI 00-02 did not address this supporting requirement. A review of the CNS Computer Aided Fault Tree Analysis (CAFTA) Model of Record was completed to define existing failure modes (both in type-code and/or basic event file). The process was used to define a complete set of required data, which was used to define the failure modes. The boundaries are set by the data source and/or system modeling. The database development calculation (DPC-1535.00-00-0016) includes a listing of each of the specific component type/failure mode combinations that are considered, along with component boundaries definitions.	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this SR. For Fire PRA, the risk is dominated by fire impacts. Minor changes to the random failure rate of the components is not significant in the fire risk evaluations. There is no impact to the Fire PRA or NFPA 805.
DA-A3	USE an appropriate probability model for each basic event. Examples include (a) binomial distributions for failure on demand (b) Poisson distributions for standby and operating failures and initiating events	Dispositioned	None	NEI 00-02 did not address this supporting requirement. A review of the CNS CAFTA Model of Record was completed to define existing failure modes (both in type-code and/or basic event file). The process was used to define a complete set of required data, which includes failures per demand and time-dependent failures. Appropriate failure models are used for each event type.	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this SR. For Fire PRA, the risk is dominated by fire impacts. Minor changes to the random failure rate of the components is not significant in the fire risk evaluations. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
DA-A4	IDENTIFY the parameter to be estimated and the data required for estimation. Examples are as follows: (a) For failures on demand, the parameter is the probability of failure, and the data required are the number of failures given a number of demands. (b) For standby failures, operating failures, and initiating events, the parameter is the failure rate, and the data required are the number of failures in the total (standby or operating) time. (c) For unavailability due to test or maintenance, the parameter is the unavailability on demand, and the alternatives for the data required include (1) the total time of unavailability OR a list of the maintenance events with their	Dispositioned	F&O DA-02: Some of the generic data from SAROS is quite dated, including WASH-1400, NUREG/CR-2815, Zion PRA, and NUREG/CR-4550. More recent generic data should be pursued. Component failures should be defined such that they encompass only those failures that would disable the component over the PRA mission time. It appears that this has not been considered. Specific examples of less than adequate reliability data characterization were identified through review of Tables 1 and 3 in SAAG-655, Catawba PRA Rev. 3 Failure Rate and Maintenance Unavailability Data. First, repeat events in a short duration, where there was insufficient component repair should be counted as one event. An example is PIP nos. 2-C97-2481 and 2-C97-2637 on 7/29/97 and 8/12/97 for incoming breaker 2CXI-5C. The first failure occurred "for no apparent reason", but the second failure was attributed to a failed relay. The first event should be omitted as a component failure as the component was left in the degraded condition. Second, component degradation that results in failure to meet normal criteria (e.g., to avoid component life degradation), may not impact the component mission for the PRA. For example, PIP no. 0-C98-2057 involved a 6/7/98 event for trouble alarms for VI	The appropriate parameters necessary for each type of basic event have been identified and the required data has been collected and documented in calculation CNC-1535.00-00-0029 and its attached spreadsheets, and in the generic database, DPC-1535.00-00-0016. The 2009 ASME/ANS Cat II requirements for DA-A4 were evaluated in part under NEI technical elements DA-4, DA-5, DA-6, DA-7, and SY-8 in the 2002 CNS Peer Review. The peer review team assigned PSA grade of 3 to DA-5, DA-7 and SY-8. DA-6 was found to be not applicable to CNS. DA-4 was assigned a PSA grade of 3 contingent on resolution of F&Os DA-02, DA-04, and DA-06. F&O DA-02 is related to generic data sources; see SR DA-C1 for disposition. DA-04 is Level C and does not need to be addressed. F&O DA-06 concerns MOV rupture error factors; see SR DA-D3 for disposition.	Update of the generic data addressed concerns of the peer review team. For Fire PRA, the risk is dominated by fire impacts. Minor changes to the random failure rate of the components is not significant in the fire risk evaluations. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	durations, together with the total time required to be available; OR (2) the number of maintenance or test acts, their average duration, and the total time required to be available.		compressor F, and the compressor motor was found smoking. The evaluation addressed concern with overheating and insulation breakdown, but did not address whether run to failure would survive PRA mission. Similar pump failures due to routine vibration testing exceeding limits were found (LPR 2B & 1A, WO 93020502 & PIP 1-C93-1124). F&O DA-06: In SAAG 342, there is development of a failure probability for the rupture of an MOV. The type code for this event is MVR. This type code is used in the calculation of the ISLOCA frequency. In the SAROS database, this distribution is composed of three equally weighted distributions. The three distributions have error factors of close to 10.0. The error factor assigned to MVR is ~2.6. This is impossible – the error factor should be close to ten. The following provides additional explanation of this issue. Often it is useful to develop a distribution based on combining several distributions. That is $f(\lambda) = \Sigma_i w_i f_i(\lambda)$, i =1…n. Such an operation often does not possess a closed solution and Monte Carlo (MC) simulations are required. However, care must be taken in implementing the MC solution. People are often tempted to set up a MC process where one iteration for I is based on taking samples from the weighted sum of		

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			samples from each of the fi(λ)'s. This is incorrect. This, in effect, loses data and results in a unimodal function. In the case of two equally weighted functions A and B where every point on A is less than any point on B, the lower points of A and the higher points of B would not be in the resulting distribution. While the mean is preserved, the variance is understated and is incorrect. The proper method is to obtain samples for A, weight them, and put them in a pool. Then obtain samples for B, weight them, and put them in the pool. The points in the pool are MC distribution and, in this case, would be bi-modal. Note that page 5-38 of NUREG/CR-2300 uses the above equation and notes that it may produce a non-unimodal distribution.		
DA-B1	For parameter estimation, GROUP components according to type (e.g., motor-operated pump, air-operated valve) and according to the characteristics of their usage to the extent supported by data: (a) mission type (e.g., standby, operating) (b) service condition (e.g., clean vs.	Dispositioned	F&O DA-01: Workplace Procedure XSAA-110 is the primary data gathering procedure. It is supplemented by SAAG-655, Catawba PRA Revision 3 Failure Rate And Maintenance Unavailability Data, and SAAG-670, the CCF analysis report. Also, noteworthy is attachment 3, which includes the CCF checklist. Additional details are provided by SAAG File 579 (Rev. 2b Summary Report) and the Rev 2 Summary Report. The data guidance is generally adequate; however it does not address component boundaries. Component	The 2009 ASME/ANS Cat II requirements for DA-B1 were evaluated under NEI technical element DA-5 in the 2002 CNS Peer Review. The peer review team assigned PSA grade of 3 to DA-5, however, one Level B F&O was issued related to DA-5. F&O DA-01 was addressed in the referenced generic database development. Specifically, component boundaries are defined, time-dependent events for components such as motor-operated valves and check valves are developed, restrictions on the	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this SR. For Fire PRA, the risk is dominated by fire impacts. Minor changes to the random failure rate of the components is not significant in the fire risk evaluations. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	untreated water, air)		boundaries are apparent from the data as in the specific example in F&O DA-02, i.e., the incoming breaker and panelboard BLF. However, these should be defined in the guidance.	use of demand failures are provided, and data for standby vs. alternating and clean vs. water components are developed.	
DA-B2	DO NOT INCLUDE outliers in the definition of a group (e.g., do not group valves that are never tested and unlikely to be operated with those that are tested or otherwise manipulated frequently)	Dispositioned	F&O DA-01: Workplace Procedure XSAA-110 is the primary data gathering procedure. It is supplemented by SAAG-655, Catawba PRA Revision 3 Failure Rate And Maintenance Unavailability Data, and SAAG-670, the CCF analysis report. Also, noteworthy is attachment 3, which includes the CCF checklist. Additional details are provided by SAAG File 579 (Rev. 2b Summary Report) and the Rev 2 Summary Report. The data guidance is generally adequate; however it does not address component boundaries. Component boundaries are apparent from the data as in the specific example in F&O DA-02, i.e., the incoming breaker and panelboard BLF. However, these should be defined in the guidance.	The 2009 ASME/ANS Cat II requirements for DA-B2 were evaluated under NEI technical elements DA-5 and DA-6 in the 2002 CNS Peer Review. DA-6 was found to be not applicable to CNS. The peer review team assigned PSA grade of 3 to DA-5, however, one Level B F&O was issued related to DA-5. F&O DA-01 was addressed in the referenced generic database development as noted in DA-B1 disposition. No outlier components were inappropriately included in the established groupings. For unique failure modes (e.g. pressurizer safety valves and PORVs), unique failure probabilities are developed.	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this SR. For Fire PRA, the risk is dominated by fire impacts. Minor changes to the random failure rate of the components is not significant in the fire risk evaluations. There is no impact to the Fire PRA or NFPA 805.
DA-C1	OBTAIN generic parameter estimates from recognized sources. ENSURE that the parameter definitions and boundary conditions are consistent with those established in response to DA-A1 to DA-A4.	Open	F&O DA-02: Some of the generic data from SAROS is quite dated, including WASH-1400, NUREG/CR-2815, Zion PRA, and NUREG/CR-4550. More recent generic data should be pursued. Component failures should be defined such that they encompass only those failures that would disable the component over the PRA mission time. It appears that this has not been	NUREG/CR-6928 updated through 2010 is the primary data source. The 2009 ASME/ANS Cat II requirements for DA-C1 were evaluated under NEI technical elements DA-4, DA-7, DA-9, DA-19, and DA-20 in the 2002 CNS Peer Review. The peer review team assigned PSA grade of 3 to DA-7, DA-9, DA-19 and DA-20.	Minor changes to the random failure rate of the components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(Example: some sources include the breaker within the pump boundary, whereas others do not.) DO NOT INCLUDE generic data for unavailability due to test, maintenance, and repair unless it can be established that the data is consistent with the test and maintenance philosophies for the subject plant. Examples of parameter estimates and associated sources include (a) component failure rates and probabilities: NUREG/CR-4639 [2-7], NUREG/CR-4550 [2-3], NUREG-1715 [2-21], NUREG/CR-6928 [2-20] (b) common cause failures: NUREG/CR-5497 [2-8], NUREG/CR-6268 [2-9] (c) AC off-site power recovery: NUREG/CR-5496 [2-10], NUREG/CR-5032 [2-11]		considered. Specific examples of less than adequate reliability data characterization were identified through review of Tables 1 and 3 in SAAG-655, Catawba PRA Rev. 3 Failure Rate and Maintenance Unavailability Data. First, repeat events in a short duration, where there was insufficient component repair should be counted as one event. An example is PIP nos. 2-C97-2481 and 2-C97-2637 on 7/29/97 and 8/12/97 for incoming breaker 2CXI-5C. The first failure occurred "for no apparent reason", but the second failure was attributed to a failed relay. The first event should be omitted as a component failure as the component was left in the degraded condition. Second, component degradation that results in failure to meet normal criteria (e.g., to avoid component life degradation), may not impact the component mission for the PRA. For example, PIP no. 0-C98-2057 involved a 6/7/98 event for trouble alarms for VI compressor F, and the compressor motor was found smoking. The evaluation addressed concern with overheating and insulation breakdown, but did not address whether run to failure would survive PRA mission. Similar pump failures due to routine vibration testing exceeding limits were found (LPR 2B & 1A, WO 93020502 & PIP 1-C93-1124).	DA-4 was assigned a PSA grade of 3 contingent on resolution of Level B F&Os DA-02 and DA-06. F&Os DA-02 was addressed by development and compilation of equipment failure rates for generic components as documented in DPC-1535.00-00-0016. The report, however, is limited to random independent failures for demand and time-dependent failures. F&O DA-02 remains open and is tracked as open item C-03-0057. F&O DA-06 concerns MOV rupture error factors; see SR DA-D3 for disposition.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(d) component recovery . See NUREG/CR-6823 [2-1] for a listing of additional data sources.		F&O DA-06: In SAAG 342, there is development of a failure probability for the rupture of an MOV. The type code for this event is MVR. This type code is used in the calculation of the ISLOCA frequency. In the SAROS database, this distribution is composed of three equally weighted distributions. The three distributions have error factors of close to 10.0. The error factor assigned to MVR is ~2.6. This is impossible – the error factor should be close to ten. The following provides additional explanation of this issue. Often it is useful to develop a distribution based on combining several distributions. That is f(λ) = Σi wi fi(λ), i =1…n. Such an operation often does not possess a closed solution and Monte Carlo (MC) simulations are required. However, care must be taken in implementing the MC solution. People are often tempted to set up a MC process where one iteration for I is based on taking samples from the weighted sum of samples from each of the fi(λ)'s. This is incorrect. This, in effect, loses data and results in a unimodal function. In the case of two equally weighted functions A and B where every point on A is less than any point on B, the lower points of A and the higher points of B would not be in the resulting distribution. While the mean is preserved, the variance is understated		

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			and is incorrect. The proper method is to obtain samples for A, weight them, and put them in a pool. Then obtain samples for B, weight them, and put them in the pool. The points in the pool are MC distribution and, in this case, would be bi-modal. Note that page 5-38 of NUREG/CR-2300 uses the above equation and notes that it may produce a non-unimodal distribution.		
DA-C2	COLLECT plant-specific data for the basic event/parameter grouping corresponding to that defined by requirement DA-A1, DA-A3, DA-A4, DA-B1, and DA-B2.	Open	F&O DA-01: Workplace Procedure XSAA-110 is the primary data gathering procedure. It is supplemented by SAAG-655, Catawba PRA Revision 3 Failure Rate And Maintenance Unavailability Data, and SAAG-670, the CCF analysis report. Also, noteworthy is attachment 3, which includes the CCF checklist. Additional details are provided by SAAG File 579 (Rev. 2b Summary Report) and the Rev 2 Summary Report. The data guidance is generally adequate; however it does not address component boundaries. Component boundaries are apparent from the data as in the specific example in F&O DA-02, i.e., the incoming breaker and panelboard BLF. However, these should be defined in the guidance. F&O DA-02: Some of the generic data from SAROS is quite dated, including WASH-1400, NUREG/CR-2815, Zion PRA, and NUREG/CR-4550. More	The plant-specific equipment failure data collected is captured in Maintenance Rule Experience Documents thru 2005 (SAAG 866). The events, failure modes, and parameters for which data are collected appear to be consistent with those used in the system models, and are collected for groups of components. The 2009 ASME/ANS Cat II requirements for DA-C2 were evaluated under NEI technical elements DA-4, DA-5, DA-6, DA-7, DA-14, DA-15, DA-19, and DA-20 in the 2002 CNS Peer Review. The peer review team assigned PSA grade of 3 to DA-5, DA-7, DA-9, DA-19 and DA-20. DA-4 was assigned a PSA grade of 3 contingent on resolution of Level B F&Os DA-02 and DA-06. DA-6 and DA-14 were found to be not applicable to CNS. F&O DA-01: F&O was issued related to	Minor changes to the random failure rate of the components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			recent generic data should be pursued. Component failures should be defined such that they encompass only those failures that would disable the component over the PRA mission time. It appears that this has not been considered. Specific examples of less than adequate reliability data characterization were identified through review of Tables 1 and 3 in SAAG-655, Catawba PRA Rev. 3 Failure Rate and Maintenance Unavailability Data. First, repeat events in a short duration, where there was insufficient component repair should be counted as one event. An example is PIP nos. 2-C97-2481 and 2-C97-2637 on 7/29/97 and 8/12/97 for incoming breaker 2CXI-5C. The first failure occurred "for no apparent reason", but the second failure was attributed to a failed relay. The first event should be omitted as a component failure as the component was left in the degraded condition. Second, component degradation that results in failure to meet normal criteria (e.g., to avoid component life degradation), may not impact the component mission for the PRA. For example, PIP no. 0-C98-2057 involved a 6/7/98 event for trouble alarms for VI compressor F, and the compressor motor was found smoking. The evaluation addressed concern with overheating and insulation breakdown,	component boundaries (see SR DA-B1 for disposition). F&O DA-02 is related to generic data sources; see SR DA-C1 for disposition. F&O DA-02 remains open and is tracked as open item C-03-0057. See SR DA-D3 for DA-06 disposition. F&O DA-05 is related to specific component unavailabilities; see SR DA-C14 for disposition. F&O DA-06 concerns MOV rupture error factors; see SR DA-D3 for disposition.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			but did not address whether run to failure would survive PRA mission. Similar pump failures due to routine vibration testing exceeding limits were found (LPR 2B & 1A, WO 93020502 & PIP 1-C93-1124). F&O DA-05: The unavailabilities computed for the basic events for PORV block valve closure, RNC031BDEX, 033ADEX, and 035BDEX, assume that each PORV is closed one week per quarter. However, there is no history of PORV closures for any extended period of time in the last few years. While this does use plant-specific data, the benefit derived from it is limited due to the highly conservative assumption regarding PORV out of service time. F&O DA-06: In SAAG 342, there is development of a failure probability for the rupture of an MOV. The type code for this event is MVR. This type code is used in the calculation of the ISLOCA frequency. In the SAROS database, this distribution is composed of three equally weighted distributions. The three distributions have error factors of close to 10.0. The error factor assigned to MVR is ~2.6. This is impossible – the error factor should be close to ten. The following provides additional explanation of this issue. Often it is useful to develop a distribution based on combining		

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			several distributions. That is f(λ) = Σi wi fi(λ), i =1…n. Such an operation often does not possess a closed solution and Monte Carlo (MC) simulations are required. However, care must be taken in implementing the MC solution. People are often tempted to set up a MC process where one iteration for I is based on taking samples from the weighted sum of samples from each of the fi(λ)'s. This is incorrect. This, in effect, loses data and results in a unimodal function. In the case of two equally weighted functions A and B where every point on A is less than any point on B, the lower points of A and the higher points of B would not be in the resulting distribution. While the mean is preserved, the variance is understated and is incorrect. The proper method is to obtain samples for A, weight them, and put them in a pool. Then obtain samples for B, weight them, and put them in the pool. The points in the pool are MC distribution and, in this case, would be bi-modal. Note that page 5-38 of NUREG/CR-2300 uses the above equation and notes that it may produce a non-unimodal distribution.		
DA-C3	COLLECT plant-specific data, in a manner consistent with uniformity in design, operational practices, and experience.	Dispositioned	None.	The scope of NEI 00-02 only partially addresses this supporting requirement. For NEI technical elements that are partially related to this SR, the F&Os from the 2002 CNS peer review are more	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this SR. In addition, any minor changes to the random failure rate of the

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	JUSTIFY the rationale for screening or disregarding plant-specific data (e.g., plant design modifications, changes in operating practices).			closely associated other SRs and are addressed as part of SR DA-B1 and DA-C1. The plant-specific equipment failure data collected is captured in Maintenance Rule Experience Documents thru 2005 (SAAG 866). The events, failure modes, and parameters for which data are collected appear to be consistent with those used in the system models, and are collected for groups of components. The data is collected for groups of components. The Maintenance Rule Experience data tables identify those failures which apply to PRA components and failure modes, and those which are not PRA components (and therefore excluded).	components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.
DA-C4	When evaluating maintenance or other relevant records to extract plant-specific component failure event data, DEVELOP a clear basis for the identification of events as failures. DISTINGUISH between those degraded states for which a failure, as modeled in the PRA, would have occurred	Dispositioned	None	The scope of NEI 00-02 did not address this supporting requirement. The Workplace Procedure for Developing PRA Data (XSAA-110) provides specific guidelines for counting failures and demands for PRA purposes. In particular, a failure is counted only if the component would have failed to perform its function as defined in the PRA, under conditions applicable to the PRA. Numerous examples are provided. The plant-specific equipment failure data collected is captured in	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this SR. In addition, any minor changes to the random failure rate of the components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	during the mission and those for which a failure would not have occurred (e.g., slow pick-up to rated speed). INCLUDE all failures that would have resulted in a failure to perform the mission as defined in the PRA.			Maintenance Rule Experience Documents thru 2005 (SAAG 866). The Maintenance Rule Experience data tables identify those failures which apply to PRA components and those which are not PRA components, as well as the specific applicable failure mode.	
DA-C5	COUNT repeated plant-specific component failures occurring within a short time interval as a single failure if there is a single, repetitive problem that causes the failures. In addition, COUNT only one demand.	Dispositioned	None	The scope of NEI 00-02 did not address this supporting requirement. The Workplace Procedure for Developing PRA Data (XSAA-110) specifies that repeated component failures occurring within a short period of time be counted as a single failure if there is a single, repetitive problem that causes the failures. In addition, only one demand is to be counted. The plant-specific equipment failure data collected is captured in Maintenance Rule Experience Documents thru 2005 (SAAG 866).	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this SR. In addition, any minor changes to the random failure rate of the components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.
DA-C8	When required, USE plant-specific operational records to determine the time that components were configured in their standby status.	Open	None	The scope of NEI 00-02 did not address this supporting requirement. The denominators for calculation of plant-specific equipment failure data are determined in SAAG 492 by estimating the number of demands, run hours, or exposure hours for each component in the	This is a documentation issue that does not impact the PRA model. In addition, any minor changes to the random failure rates of components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				PRA. Each PRA system analyst reviewed each basic event in their system to determine the average annual number of demands, or the average number of operating hours or exposure hours for each component. However, other than some very brief analyst comments, there is no documented basis for the estimates provided and no determination of the time components are configured in standby. The documentation should be revised to clearly indicate how the time components are configured in their standby status is determined.	to the Fire PRA or NFPA 805.
DA-C9	ESTIMATE operational time from surveillance test practices for standby components, and from actual operational data.	Open	F&O DA-02: Some of the generic data from SAROS is quite dated, including WASH-1400, NUREG/CR-2815, Zion PRA, and NUREG/CR-4550. More recent generic data should be pursued. Component failures should be defined such that they encompass only those failures that would disable the component over the PRA mission time. It appears that this has not been considered. Specific examples of less than adequate reliability data characterization were identified through review of Tables 1 and 3 in SAAG-655, Catawba PRA Rev. 3 Failure Rate and Maintenance Unavailability Data. First, repeat events in a short duration, where there	The Workplace Procedure for Developing PRA Data (XSAA-110) specifies that equipment demands are counted based on actual operating experience, surveillance tests, preventive maintenance tests and unplanned demands. The denominators for calculation of plant-specific equipment failure data are determined in SAAG 492 by estimating the number of demands, run hours, or exposure hours for each component in the PRA. Each PRA system analyst reviewed each basic event in their system to determine the average annual number of demands, or the average number of operating hours or exposure hours for each component. Other than some very	This is a documentation issue that does not impact the PRA model. In addition, any minor changes to the random failure rates of components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			was insufficient component repair should be counted as one event. An example is PIP nos. 2-C97-2481 and 2-C97-2637 on 7/29/97 and 8/12/97 for incoming breaker 2CXI-5C. The first failure occurred "for no apparent reason", but the second failure was attributed to a failed relay. The first event should be omitted as a component failure as the component was left in the degraded condition. Second, component degradation that results in failure to meet normal criteria (e.g., to avoid component life degradation), may not impact the component mission for the PRA. For example, PIP no. 0-C98-2057 involved a 6/7/98 event for trouble alarms for VI compressor F, and the compressor motor was found smoking. The evaluation addressed concern with overheating and insulation breakdown, but did not address whether run to failure would survive PRA mission. Similar pump failures due to routine vibration testing exceeding limits were found (LPR 2B & 1A, WO 93020502 & PIP 1-C93-1124). F&O DA-06: In SAAG 342, there is development of a failure probability for the rupture of an MOV. The type code for this event is MVR. This type code is used in the calculation of the ISLOCA frequency. In the SAROS database, this distribution is composed of three equally weighted distributions. The three distributions have error	brief analyst comments, there is no documented basis for the estimates provided and no relationship shown between the surveillance test practices and operational data and the values in the denominator notebook. The documentation should be revised to clearly indicate the relationship between the surveillance test practices and operational data and the values in the denominator notebook. The 2009 ASME/ANS Cat II requirements for DA-C9 were evaluated under NEI technical elements DA-4, DA-6, and DA-7 in the 2002 Catawba Peer Review. The peer review team assigned PSA grade of 3 to DA-7. DA-4 was assigned a PSA grade of 3 contingent on resolution of Level B F&Os DA-02 and DA-06. Element DA-6 was found to be not applicable to CNS. F&O DA-02 is related to generic data sources; see SR DA-C1 for disposition. F&O DA-02 remains open and is tracked as open item C-03-0057. F&O DA-06 concerns MOV rupture error factors; see SR DA-D3 for disposition.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			factors of close to 10.0. The error factor assigned to MVR is ~2.6. This is impossible – the error factor should be close to ten. The following provides additional explanation of this issue. Often it is useful to develop a distribution based on combining several distributions. That is f(λ) = Σi wi fi(λ), i =1...n. Such an operation often does not possess a closed solution and Monte Carlo (MC) simulations are required. However, care must be taken in implementing the MC solution. People are often tempted to set up a MC process where one iteration for I is based on taking samples from the weighted sum of samples from each of the fi(λ)'s. This is incorrect. This, in effect, loses data and results in a unimodal function. In the case of two equally weighted functions A and B where every point on A is less than any point on B, the lower points of A and the higher points of B would not be in the resulting distribution. While the mean is preserved, the variance is understated and is incorrect. The proper method is to obtain samples for A, weight them, and put them in a pool. Then obtain samples for B, weight them, and put them in the pool. The points in the pool are MC distribution and, in this case, would be bi-modal. Note that page 5-38 of NUREG/CR-2300 uses the above equation and notes that it may produce a non-unimodal		

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			distribution.		
DA-C10	When using surveillance test data, REVIEW the test procedure to determine whether a test should be credited for each possible failure mode. COUNT only completed tests or unplanned operational demands as success for component operation. If the component failure mode is decomposed into sub-elements (or causes) that are fully tested, then USE tests that exercise specific sub-elements in their evaluation. Thus, one sub-element sometimes has many more successes than another. [Example: a diesel generator is tested more frequently than the load sequencer. IF the sequencer were to be included in the diesel generator boundary, the number of valid tests would be significantly decreased.]	Dispositioned	None	The scope of NEI 00-02 did not address this supporting requirement. The Workplace Procedure for Developing PRA Data (XSAA-110) specifies that equipment demands are counted based on actual operating experience, surveillance tests, preventive maintenance tests and unplanned demands. The denominators for calculation of plant-specific equipment failure data are determined in SAAG 492 by estimating the number of demands, run hours, or exposure hours for each component in the PRA.	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this SR. In addition, any minor changes to the unavailability of the components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.
DA-C11	When using data on	Open	None	The scope of NEI 00-02 did not	This is a documentation

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	maintenance and testing durations to estimate unavailabilities at the component, train, or system level, as required by the system model, only INCLUDE those maintenance or test activities that could leave the component, train, or system unable to perform its function when demanded.			address this supporting requirement. The plant-specific equipment failure data collected is captured in Maintenance Rule Experience Documents thru 2005 (SAAG 866). Plant-specific unavailabilities are presented for about 25 component/trains. The unavailability data is based on that collected for performance reporting for INPO. Unavailabilities are listed in the system notebooks, however the basis for these unavailability values is not provided (only a list or summary description of applicable maintenance practices or procedures is provided). The documentation should be revised to provide a clearer basis for the unavailability values.	issue that does not impact the PRA model. In addition, any minor changes to the unavailability of components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.
DA-C12	When an unavailability of a front line system component is caused by an unavailability of a support system, COUNT the unavailability towards that of the support system and not the front line system, in order to avoid double counting and to capture the support system dependency properly.	Open	None	The scope of NEI 00-02 did not address this supporting requirement. The plant-specific equipment failure data collected is captured in Maintenance Rule Experience Documents thru 2005 (SAAG 866). Plant-specific unavailabilities are presented for about 25 component/trains. The unavailability data is based on that collected for performance reporting for INPO. Unavailabilities are listed in the system notebooks, the basis for these unavailability values is not provided (only a list or summary description of	This is a documentation issue that does not impact the PRA model. In addition, any minor changes to the unavailability of components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				applicable maintenance practices or procedures is provided). The documentation should be revised to provide a clearer basis for the unavailability values.	
DA-C13	EVALUATE the duration of the actual time that the equipment was unavailable for each contributing activity. Since maintenance outages are a function of the plant status, INCLUDE only outages occurring during plant at power. Special attention should be paid to the case of a multi-plant site with shared systems, when the Specifications (TS) requirements can be different depending on the status of both plants. Accurate modeling generally leads to a particular allocation of outage data among basic events to take this mode dependence into account. In the case that reliable estimates or the start and finish times are not available, INTERVIEW the knowledgeable plant	Open	None	The scope of NEI 00-02 did not address this supporting requirement. The plant-specific equipment failure data collected is captured in Maintenance Rule Experience Documents thru 2005 (SAAG 866). Plant-specific unavailabilities are presented for about 25 component/trains. The unavailability data is based on that collected for performance reporting for INPO. There is no documentation of the duration due to each contributing activity or of the treatment for shared components. In addition, the unavailabilities for the remaining systems are either based on screening values or left to be calculated by the system analyst. The documentation should be revised to provide a clearer basis for the unavailability values.	This is a documentation issue that does not impact the PRA model. In addition, any minor changes to the unavailability of components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	personnel (e.g., engineering, plant operations, etc.) to generate estimates of ranges in the unavailable time per maintenance act for components, trains, or systems for which the unavailabilities are significant basic events.				
DA-C14	EXAMINE coincident unavailability due to maintenance for redundant equipment (both intrasystem and intersystem) that is a result of a planned, repetitive activity based on actual plant experience. CALCULATE coincident maintenance unavailabilities that are a result of a planned, repetitive activity that reflect actual plant experience. Such coincident maintenance unavailability can arise, for example, for plant systems that have "installed spares" (i.e., plant systems that have more redundancy than is addressed by tech specs). For example	Dispositioned	F&O DA-05: The unavailabilities computed for the basic events for PORV block valve closure, RNC031BDEX, 033ADEX, and 035BDEX, assume that each PORV is closed one week per quarter. However, there is no history of PORV closures for any extended period of time in the last few years. While this does use plant-specific data, the benefit derived from it is limited due to the highly conservative assumption regarding PORV out of service time.	The scope of NEI 00-02 did not address this supporting requirement. However, level "B" F&O DA-05 is considered to be most closely related to SR DA-C14. Maintenance restrictions imposed by the Tech. Specs. or the Maintenance Rule a(4) program are addressed by the model solution process as follows. The maintenance basic events are generally treated as independent within the PRA model. After the model is solved, cut sets involving coincident maintenance are deleted where such combinations are prohibited by the technical specifications, as documented in the model integration notebook. Cut sets involving coincident maintenance combinations allowed by the technical specifications but prohibited by the online risk assessment tool are retained, but have their probability reduced.	Based on disposition, the CNS PRA model meets the requirements of Cat II for this SR. In addition, any minor changes to the unavailability of components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(intrasystem case), the charging system in some plants has a third train that may be out of service for extended periods of time coincident with one of the other trains and yet is in compliance with tech specs. Examples of intersystem unavailability include plants that routinely take out multiple components on a "train schedule" (such as AFW train A and HPI train A at a PWR, or RHR train A and LPCS train A at a BWR).			Maintenance tasks that require a component to be out of service are performed under the same work window. For example, a pump lubrication PM could be bundled with the PM for its supply breaker. However, this type of maintenance coordination does not involve more than one train of equipment, and does not result in the plant taking on more risk. From SAAG 655, F&O DA-05 was addressed by revising unavailabilities of PORV block valves to more realistic values.	
DA-C16	Data on recovery from loss of offsite power, loss of service water, etc. are rare on a plant-specific basis. If available, for each recovery, COLLECT the associated recovery time with the recovery time being the period from identification of the system or function failure until the system or function is returned to service.	Dispositioned	F&O IE-04: The initiating event frequency for a stuck open PORV or safety valve is taken from NUREG/CR-5750 but is conservative for the following reasons. The NUREG assigned a value to these events based on a non-informative prior updated with 0 events and the total number of critical reactor years in the study. In the case of a spurious opening of a primary safety valve, the model should address the potential for the valve to close as the pressure decreased, effectively terminating the loss of coolant. The evaluation of the subsequent reclosure of the PORV is not as straightforward. The cause of	CNS uses the EPRI report, Losses of Off-Site Power at U. S. Nuclear Power Plants Data, which includes the recovery time associated with each event. No plant specific recovery data is collected. The 2009 ASME/ANS Cat II requirements for DA-C16 were evaluated under NEI technical elements IE-13, IE-15, IE-16, AS-16, DA-15, SY-24, and QU-18 in the 2002 Catawba Peer Review. Level B F&Os associated with these elements are F&O IE-04, AS-01, DA-05, and QU-05.	There were no F&Os with "A" level of significance at CNS and there are no open Level B F&Os related to this SR. The CNS PRA model meets the requirements of Cat II for this SR. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			the opening PORV would need to be addressed. However, either the PORV could be closed or the block valve could be closed. F&O AS-01: SAAG 427 describes the ATWS event tree analysis. Section 4, event B, describes how main feedwater is recovered after an ATWS. The probabilities used for main feedwater recovery are .05, following a T2 (Loss of Load) and .2 following a T4 (Loss of MFW). In the non-ATWS analysis, the following non-recoveries (From SAAG 427) are: T1 non-rec = .05, T4 - non-rec = .1. Considering that the critical time for FW to come on line in an ATWS event involving a loss of main feedwater is very short, even for conditions of favorable MTC, the use of non-recovery probabilities of this magnitude does not appear to be justified without supporting analyses. F&O DA-05: The unavailabilities computed for the basic events for PORV block valve closure, RNC031BDEX, 033ADEX, and 035BDEX, assume that each PORV is closed one week per quarter. However, there is no history of PORV closures for any extended period of time in the last few years. While this does use plant-specific data, the benefit derived from it is limited due to the highly conservative assumption regarding PORV out of service time.	F&O IE-04 appears to be an observation of conservatism in usage of generic industry data for stuck open SRV and PORV initiating events and is judged to be applicable to IE-C12. However, this treatment is judged to be appropriate and that this F&O does not apply to DA-C16. F&O AS-01: Credit for Main Feedwater has been removed from the ATWS model, which resolves this F&O. Recovery for MFW in ATWS events initiated by a loss of feedwater has no impact on Fire PRA. F&O DA-05 is related to specific component unavailabilities; see SR DA-C14 for disposition. F&O QU-05: Event NDORWSTDHE has been redefined and failure probability recalculated for the Catawba Rev 3a PRA Model Integration Notebook.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			F&O QU-05: Event NDORWSTDHE: This is a recovery action to terminate the NV and NI pumps in the event of failure of ND to provide recirculation after a SL. The event was quantified on the basis of tripping the pumps within 18 minutes. RWST refill was assumed to occur (from undescribed source) and pumps were restarted to continue injection. This recovery event is applied to a) loss of KC pumps b) SNSDRNVLHE - drain plug blockage c) CCF of ND pumps. The recovery event is intended to provide injection flow for the long term commensurate with the RWST make-up capability. The time of some of these failure is 20 minutes, when injection requirements are beyond the make-up capability of the RWST. Secondly, there are cutsets representing heat removal that can not be recovered by continued injection of HHSI. The sequence needs continuous injection of HHSI and heat removal from containment.		
DA-D1	CALCULATE realistic parameter estimates for significant basic events based on relevant generic and plant-specific evidence unless it is justified that there are adequate plant-specific data to	Dispositioned	F&O DA-08: Another example of conservatism is the SBO following trip event, PACBOFTDEX. This event in the top 100 cutsets has a 1E-3 probability, and has not been updated since the IPE.	NEI 00-02 does not address this supporting requirement. However, level "B" F&O DA-08 is considered to be most closely related to SR DA-D1. Calculation CNC-1535.00-00-0029 documents a Bayesian update of generic component failure data with plant-specific experience. Where plant-specific	Based on disposition, the CNS PRA model meets the requirements of Cat II for this SR. Any minor changes to the random failure rate of the components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	characterize the parameter value and its uncertainty. When it is necessary to combine evidence from generic and plant-specific data, USE a Bayes update process or equivalent statistical process that assigns appropriate weight to the statistical significance of the generic and plant-specific evidence and provides an appropriate characterization of uncertainty. CHOOSE prior distributions as either noninformative, or representative of variability in industry data. CALCULATE parameter estimates for the remaining events by using generic industry data.			data is not available, the generic data is used. Generic data has been updated as documented in DPC-1535.00-00-0016. Actual component unavailability data is derived from Maintenance Rule unavailability data. F&O DA-08: The ac power notebook documents the development of the current value, which is within an acceptable range, e.g. another Westinghouse plant uses 2.4E-3 for LOOP following general transient. This F&O is considered resolved.	to the Fire PRA or NFPA 805.
DA-D2	If neither plant-specific data nor generic parameter estimates are available for the parameter associated with a specific basic event, USE data or estimates for the most similar equipment available, adjusting if necessary to account	Dispositioned	None	NEI 00-02 does not address this supporting requirement. Use of multiple data sources provides a means to define sources for all generic failure data. If exception is taken, the departure is defined and the basis provided. The SSF diesel generator data is an example of a departure. No specific instances were identified in which neither generic or plant-	Based on disposition, the CNS PRA model meets the requirements of Cat II for this SR. Any minor changes to the random failure rate of the components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	for differences. Alternatively, USE expert judgment and document the rationale behind the choice of parameter values.			specific data is not available.	
DA-D3	PROVIDE a mean value of, and a statistical representation of the uncertainty intervals for, the parameter estimates of significant basic events. Acceptable systematic methods include Bayesian updating, frequentist method, or expert judgment.	Open	F&O DA-06: In SAAG 342, there is development of a failure probability for the rupture of an MOV. The type code for this event is MVR. This type code is used in the calculation of the ISLOCA frequency. In the SAROS database, this distribution is composed of three equally weighted distributions. The three distributions have error factors of close to 10.0. The error factor assigned to MVR is ~2.6. This is impossible – the error factor should be close to ten. The following provides additional explanation of this issue. Often it is useful to develop a distribution based on combining several distributions. That is f(λ) = Σi wi fi(λ), i =1…n. Such an operation often does not possess a closed solution and Monte Carlo (MC) simulations are required. However, care must be taken in implementing the MC solution. People are often tempted to set up a MC process where one iteration for I is based on taking samples from the weighted sum of samples from each of the fi(λ)'s. This is incorrect. This, in effect, loses data and results in a unimodal function. In the case of two equally weighted	Uncertainty distribution data has been calculated for all of the Bayesian-updated failure data. However, the data and CCF calcs (CNC-1535.00-00-0029 and CNC-1535.00-00-0028) do not document the error factors to be used for maintenance unavailability and CCF events. A review of the CAFTA database indicates that maintenance unavailability events have been assigned an error factor of 3 and CCFs have been assigned an error factor of 10. However, no basis for the use of these error factors is provided. Documentation should be revised to provide the basis for error factors. NEI 00-02 does not address this supporting requirement under the DA technical element; it is only partially addressed under QU-30, which was assigned a PSA grade of 3 by the 2002 CNS peer review team. However, F&O DA-06, issued at the 2002 CNS peer review is most closely aligned with this SR.	This is a documentation issue that does not impact the PRA model. In addition, any minor changes to the uncertainty distributions of component failure rates is not significant in the fire risk evaluations. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			functions A and B where every point on A is less than any point on B, the lower points of A and the higher points of B would not be in the resulting distribution. While the mean is preserved, the variance is understated and is incorrect. The proper method is to obtain samples for A, weight them, and put them in a pool. Then obtain samples for B, weight them, and put them in the pool. The points in the pool are MC distribution and, in this case, would be bi-modal. Note that page 5-38 of NUREG/CR-2300 uses the above equation and notes that it may produce a non-unimodal distribution.	F&O DA-06: As noted in revision 1 to CNC-1535.00-00-0029, type code MVR error factor value was revised to 6.5, and Bayesian Mean was revised from 4.28E-08 to 4.08E-08, based on MVR generic ER = 6.	
DA-D4	When the Bayesian approach is used to derive a distribution and mean value of a parameter, CHECK that the posterior distribution is reasonable given the relative weight of evidence provided by the prior and the plant-specific data. Examples of tests to ensure that the updating is accomplished correctly and that the generic parameter estimates are consistent with the plant-specific application include the following:	Open	None	NEI 00-02 does not address this supporting requirement. There is no evidence in the documentation that the specific checks required by this SR have been performed on the Bayesian-updated data to ensure that the data is appropriate. However, a verification of the proper operation of the software within the expected data range (item d of the SR) was performed. A quick review of the current data did not reveal any unusual or unexpected results. Documentation should be revised to provide the basis for error factors.	This is a documentation issue that does not impact the PRA model. Any minor changes to the random failure rates of components is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(a) confirmation that the Bayesian updating does not produce a posterior distribution with a single bin histogram (b) examination of the cause of any unusual (e.g., multimodal) posterior distribution shapes (c) examination of inconsistencies between the prior distribution and the plant-specific evidence to confirm that they are appropriate (d) confirmation that the Bayesian updating algorithm provides meaningful results over the range of values being considered (e) confirmation of the reasonableness of the posterior distribution mean value				
DA-D5	USE one of the following models for estimating CCF parameters for significant CCF basic	Open	None	The 2009 ASME/ANS Cat II requirements for DA-D5 were partially evaluated under NEI technical elements DA-8 thru DA-14 in the 2002 CNS Peer Review.	Fires do not affect CCF events in the PRA. Common cause failure of passive devices is not expected to be a contributor to fire risk.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	events: (a) Alpha Factor Model (b) Basic Parameter Model (c) Multiple Greek Letter Model (d) Binomial Failure Rate Model JUSTIFY the use of alternative methods (i.e., provide evidence of peer review or verification of the method that demonstrates its acceptability).			The peer review team assigned PSA grade of 3 to DA-8 thru DA-12. DA-13 and DA-14 were found to be not applicable. F&O DA-09 is related to element DA-12, which is Level "C" and is not addressed. The CNS PRA uses a "modified" MGL method as documented in CNC-1535.00-00-0028 (SAAG 670). In lieu of incorporating separate events for various combinations of 2 failures, 3 failures, etc., a set of combined CCF probability events are developed that include the relevant combinations of CCF failures that could impact system function. The approach appears reasonable. Generic estimates for error factors are used for the common cause events. However, the documentation for the selection of specific error factors used is not included in the CCF analysis.	There is no impact to the Fire PRA or NFPA 805.
DA-D6	USE generic common cause failure probabilities consistent with available plant experience. EVALUATE the common cause failure probabilities in a manner consistent with the component boundaries	Open	None	The 2009 ASME/ANS Cat II requirements for DA-D6 were partially evaluated under NEI technical elements DA-8 thru DA-14 in the 2002 CNS Peer Review. The peer review team assigned PSA grade of 3 to DA-8 thru DA-12. DA-13 and DA-14 were found to be not applicable. F&O DA-09 is related to element DA-12, which is Level "C" and is not addressed	Fires do not affect CCF events in the PRA. Any minor changes to the CCF failure rates is not significant in the fire risk evaluations. Fire risk is dominated by fire impacts. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				Plant-specific CCF failure documentation (CNC-1535.00-00-0028) was reviewed to ensure that the generic CCF estimates were consistent with plant operating experience. No evidence is provided to show that the component boundaries used in the CCF generic estimates are consistent with the component boundaries assumed for the PRA.	
DA-D8	If modifications to plant design or operating practice lead to a condition where past data are no longer representative of current performance, LIMIT the use of old data: (a) If the modification involves new equipment or a practice where generic parameter estimates are available, USE the generic parameter estimates updated with plant-specific data as it becomes available for significant basic events; or (b) If the modification is unique to the extent that	Dispositioned	None	NEI 00-02 does not address this supporting requirement. The referenced data analyses consider the applicability of the data. As noted in DPC-1535.00-00-0016, in most instances, a generic industry value and CNS specific experience are combined using a Bayesian update. In addition, CNS has a living PRA database program (PRA Tracker) to provide the means for formal documentation, tracking and resolution of any potential changes to the PRA based on plant modifications, discovered errors or industry information. When an issue is identified that calls into question some aspect of the PRA model or related analysis, or if during the review of a site design change package some issue is identified, the issue is entered into the PRA Tracker program, and tracked to closure.	Based on disposition, the CNS PRA model meets the requirements of Cat II for this SR. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	generic parameter estimates are not available and only limited experience is available following the change, then ANALYZE the impact of the change and assess the hypothetical effect on the historical data to determine to what extent the data can be used.				
DA-E1	DOCUMENT the data analysis in a manner that facilitates PRA applications, upgrades, and peer review.	Open	F&O DA-01: Workplace Procedure XSAA-110 is the primary data gathering procedure. It is supplemented by SAAG-655, Catawba PRA Revision 3 Failure Rate And Maintenance Unavailability Data, and SAAG-670, the CCF analysis report. Also, noteworthy is attachment 3, which includes the CCF checklist. Additional details are provided by SAAG File 579 (Rev. 2b Summary Report) and the Rev 2 Summary Report. The data guidance is generally adequate; however it does not address component boundaries. Component boundaries are apparent from the data as in the specific example in F&O DA-02, i.e., the incoming breaker and panelboard BLF. However, these should be defined in the guidance. F&O DA-06: In SAAG 342, there is development of a failure probability for	The data analysis is appropriately documented in a manner that facilitates PRA applications, upgrades, and peer review, except as noted by the assessment comments and recommendations of other DA supporting requirements. The 2009 ASME/ANS Cat II requirements for DA-E1 were evaluated under NEI technical elements DA-1, DA-19 and DA-20 in the 2002 CNS Peer Review. The peer review team assigned PSA grade of 3 to DA-19 and 20. DA-1 was assigned a PSA grade of 3 contingent on resolution of F&Os DA-01 and DA-06. F&O DA-01 was addressed in the referenced generic database development. Specifically, component boundaries are	Based on the disposition, the CNS PRA model meets the requirements of Cat II for this documentation SR; however, there is a documentation issue that does not impact the PRA model. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			the rupture of an MOV. The type code for this event is MVR. This type code is used in the calculation of the ISLOCA frequency. In the SAROS database, this distribution is composed of three equally weighted distributions. The three distributions have error factors of close to 10.0. The error factor assigned to MVR is ~2.6. This is impossible – the error factor should be close to ten. The following provides additional explanation of this issue. Often it is useful to develop a distribution based on combining several distributions. That is f(λ) = Σi wi fi(λ), i =1…n. Such an operation often does not possess a closed solution and Monte Carlo (MC) simulations are required. However, care must be taken in implementing the MC solution. People are often tempted to set up a MC process where one iteration for I is based on taking samples from the weighted sum of samples from each of the fi(λ)'s. This is incorrect. This, in effect, loses data and results in a unimodal function. In the case of two equally weighted functions A and B where every point on A is less than any point on B, the lower points of A and the higher points of B would not be in the resulting distribution. While the mean is preserved, the variance is understated and is incorrect. The proper method is to obtain samples for A, weight them, and put them in a pool. Then obtain	defined, time-dependent events for components such as motor-operated valves and check valves are developed, restrictions on the use of demand failures are provided, and data for standby vs. alternating and clean vs. water components are developed. F&O DA-06: As noted in revision 1 to CNC-1535.00-00-0029, type code MVR error factor value was revised to 6.5, and Bayesian Mean was revised from 4.28E-08 to 4.08E-08, based on MVR generic ER = 6.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			samples for B, weight them, and put them in the pool. The points in the pool are MC distribution and, in this case, would be bi-modal. Note that page 5-38 of NUREG/CR-2300 uses the above equation and notes that it may produce a non-unimodal distribution.		
DA-E2	DOCUMENT the processes used for data parameter definition, grouping, and collection including parameter selection and estimation, including the inputs, methods, and results. For example, this documentation typically includes (a) system and component boundaries used to establish component failure probabilities (b) the model used to evaluate each basic event probability (c) sources for generic parameter estimates (d) the plant-specific sources of data (e) the time periods for	Open	F&O DA-01: Workplace Procedure XSAA-110 is the primary data gathering procedure. It is supplemented by SAAG-655, Catawba PRA Revision 3 Failure Rate And Maintenance Unavailability Data, and SAAG-670, the CCF analysis report. Also, noteworthy is attachment 3, which includes the CCF checklist. Additional details are provided by SAAG File 579 (Rev. 2b Summary Report) and the Rev 2 Summary Report. The data guidance is generally adequate; however it does not address component boundaries. Component boundaries are apparent from the data as in the specific example in F&O DA-02, i.e., the incoming breaker and panelboard BLF. However, these should be defined in the guidance. F&O DA-06: In SAAG 342, there is development of a failure probability for the rupture of an MOV. The type code for this event is MVR. This type code is used in the calculation of the ISLOCA frequency. In the SAROS database, this distribution is composed	The existing data documentation provided in CNC-1535.00-00-0028 and CNC-1535.00-00-0029 address most, but not all, of the specific items noted in this SR. More documentation needs to be added to discuss the exclusion of plant-specific data (e.g., pre-Maintenance Rule data), and the development of uncertainty estimates for Maintenance unavailability and CCF events. The 2009 ASME/ANS Cat II requirements for DA-E1 were evaluated under NEI technical elements DA-1, DA-19 and DA-20 in the 2002 CNS Peer Review. The peer review team assigned PSA grade of 3 to DA-19 and 20. DA-1 was assigned a PSA grade of 3 contingent on resolution of F&Os DA-01 and DA-06. F&O DA-01 was addressed in the referenced generic database development. Specifically, component boundaries are defined, time-dependent events for	Based on disposition, the CNS PRA model meets the requirements of Cat II for this SR. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	which plant-specific data were gathered (f) justification for exclusion of any data (g) the basis for the estimates of common cause failure probabilities, including justification for screening or mapping of generic and plant-specific data (h) the rationale for any distributions used as priors for Bayesian updates, where applicable (i) parameter estimate including the characterization of uncertainty, as appropriate.		of three equally weighted distributions. The three distributions have error factors of close to 10.0. The error factor assigned to MVR is ~2.6. This is impossible – the error factor should be close to ten. The following provides additional explanation of this issue. Often it is useful to develop a distribution based on combining several distributions. That is $f(\lambda) = \Sigma i\ wi\ fi(\lambda)$, i =1…n. Such an operation often does not possess a closed solution and Monte Carlo (MC) simulations are required. However, care must be taken in implementing the MC solution. People are often tempted to set up a MC process where one iteration for I is based on taking samples from the weighted sum of samples from each of the $fi(\lambda)$'s. This is incorrect. This, in effect, loses data and results in a unimodal function. In the case of two equally weighted functions A and B where every point on A is less than any point on B, the lower points of A and the higher points of B would not be in the resulting distribution. While the mean is preserved, the variance is understated and is incorrect. The proper method is to obtain samples for A, weight them, and put them in a pool. Then obtain samples for B, weight them, and put them in the pool. The points in the pool are MC distribution and, in this case, would be bi-modal. Note that page 5-38 of NUREG/CR-2300 uses	components such as motor-operated valves and check valves are developed, restrictions on the use of demand failures are provided, and data for standby vs. alternating and clean vs. water components are developed. F&O DA-06: As noted in revision 1 to CNC-1535.00-00-0029, type code MVR error factor value was revised to 6.5, and Bayesian Mean was revised from 4.28E-08 to 4.08E-08, based on MVR generic ER = 6.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			the above equation and notes that it may produce a non-unimodal distribution.		
DA-E3	DOCUMENT the sources of model uncertainty and related assumptions (as identified in QU-E1 and QU-E2) associated with the data analysis.	Open	None	NEI 00-02 does not address this supporting requirement under the DA technical element; it is only partially addressed under QU technical element. The methodology, search and rationale are included in the documentation in order to support the prior supporting requirements. The data selection meets the intent by not deviating from the accepted consensus values for failure rates which is consistent with guidance document. However, The data analysis calculations, do not explicitly include an "Assumptions" section.	The disposition identifies a documentation issue that does not impact the PRA model. There is no impact to the Fire PRA or NFPA 805.
QU-A2	PROVIDE estimates of the individual sequences in a manner consistent with the estimation of total CDF to identify significant accident sequences/cutsets and confirm the logic is appropriately reflected. The estimates may be accomplished by using either fault tree linking or event trees with conditional split fractions.	Open	F&O QU-12: The Conditional core damage Probability of several Initiators from the CR2b results were evaluated. The results are: 8.30E-03 Loss Of RN 8.38E-03 Loss Of KC 5.04E-03 Small LOCA 2.30E-04 Secondary Line Break Inside Containment 5.47E-05 LOOP 1.24E-05 Inadvertent SS Actuation 1.24E-05 Loss Of Instrument Air 1.04E-05 Steamline Break Outside Containment 9.54E-06 FDW Line Break Outside Containment	The NEI SR applicable to this ASME SR is QU-8, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated this NEI SR as "3 with contingencies", with associated level "B" F&O QU-12. F&O QU-12: The CNS PRA has updated the small LOCA (SL) initiator to be redefined to only include small pipe breaks. The SL and SGTR initiating event frequencies are found in the CNS U1&2 internal initiator events	There is no impact to the Fire PRA or NFPA 805. The CNS PRA model consists of a top logic fault tree that links the fault tree models for the frontline and support systems, and is solved to produce an overall CDF and LERF. Results for individual accident sequences are not calculated, although individual cutsets are provided in order to review the overall model logic. This

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			2.26E-06 Loss Of Main Feedwater 2.89E-06 SGTR 7.75E-07 Loss Of Load 5.01E-07 Reactor Trip These results show a discrepancy between Small LOCA and SGTR that is not consistent with what is normally seen in PRAs in the industry. The CCDP for small LOCA and SGTR are usually in the same order of magnitude because the initiators have similar mitigation functions such as safety injection, secondary side heat removal, primary cooldown and depressurization, and long term injection if cooldown and depressurization are not successful. A difference of 3 orders of magnitude is unusual. Also, the CCDP value for the Loss of Instrument Air probability is identical to the Inadvertent SS Actuation probability (to 3 significant figures), which seemed surprising.	frequency data notebook. This is considered to resolve the finding. The CNS PRA model consists of a top logic fault tree that links the fault tree models for the frontline and support systems, and is solved to produce an overall CDF and LERF. Results for individual accident sequences are not calculated, although individual cutsets are provided in order to review the overall model logic. This ASME SR is considered still open.	ASME SR is considered still open. However, this has no impact on the results of the Fire PRA analysis or on NFPA 805.
QU-A3	ESTIMATE the mean CDF accounting for the "state-of- knowledge" correlation between event probabilities when significant [Note (1)].	Dispositioned	None	There are no NEI SRs applicable to this ASME SR. An uncertainty analysis is performed for both CDF and LERF to estimate the mean values from internal and external (excluding seismic) events. The analysis is described in the CNS Rev 3a PRA Model Integration Notebook. A correlation factor has been developed and is used to apply a multiplier to those ISLOCA cut sets having two MVR or CVR type	Based on the disposition, the requirements of Cat II are considered met. There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				code events in the same cut set.	
QU-A4	SELECT a method that is capable of discriminating the contributors to the CDF commensurate with the level of detail in the model.	Dispositioned	F&O QU-12: The Conditional core damage Probability of several Initiators from the CR2b results were evaluated. The results are: 8.30E-03 Loss Of RN 8.38E-03 Loss Of KC 5.04E-03 Small LOCA 2.30E-04 Secondary Line Break Inside Containment 5.47E-05 LOOP 1.24E-05 Inadvertent SS Actuation 1.24E-05 Loss Of Instrument Air 1.04E-05 Steamline Break Outside Containment 9.54E-06 FDW Line Break Outside Containment 2.26E-06 Loss Of Main Feedwater 2.89E-06 SGTR 7.75E-07 Loss Of Load 5.01E-07 Reactor Trip These results show a discrepancy between Small LOCA and SGTR that is not consistent with what is normally seen in PRAs in the industry. The CCDP for small LOCA and SGTR are usually in the same order of magnitude because the initiators have similar mitigation functions such as safety injection, secondary side heat removal, primary cooldown and depressurization, and long term injection if cooldown and depressurization are not successful. A difference of 3 orders of magnitude is unusual. Also, the CCDP value for the Loss of Instrument Air probability is	The NEI SRs applicable to this ASME SR are QU-4, QU-8, QU-9, QU-10, QU-11, QU-12, and QU-13, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated QU-4, QU-9, QU-10 and QU-12 as "3" and QU-8 and QU-11 as "3 with contingencies." QU-8 has one level "B" F&O: QU-12; and QU-11 has one level "B" F&O: QU-02. F&O QU-12: The CNS PRA has updated the small LOCA (SL) initiator to be redefined to only include small pipe breaks. The SL and SGTR initiating event frequencies are found in the CNS U1&2 internal initiator events frequency data notebook. This is considered to resolve the finding F&O QU-02: System level initiators represented as fully developed sub-tree structures are not in the Rev 3 model and Duke Energy does not intend to include them in the new model, Rev. 4, internal events fault tree structure. These initiators will be quantified and incorporated into the rev. 4 model as point estimates. Duke Energy feels that it is acceptable to not develop system level initiators as long as a review for	There is no impact to the Fire PRA or NFPA 805; Fire PRA considers fire-induced failures during scenario development.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			identical to the Inadvertent SS Actuation probability (to 3 significant figures), which seemed surprising. QU-02: The IE's for certain support system failures (RN, KC) are not input in the top event logic as a Boolean equation, but rather as a point estimate whose value is derived by solution of the IE fault tree. However, failures that cause the IE may also affect the mitigating system, such that there is a dependency between the initiating event and the available mitigation. Examples are an electrical bus that failed one train of KC and could fail one train of mitigating equipment. Another example is the operator error in the loss of KC to start the standby train of KC (KKCSTNBDHE). The HRA notebook states this event has dependencies with HYDBACKDHE.	dependencies takes place in the cut set file. This process has been proceduralized and is contained in Section 4 of Workplace Guideline XSAA-103, Guidelines For Determining Risk Significance. The CNS PRA model consists of a top logic fault tree that links the fault tree models for the frontline and support systems, and is solved to produce an overall CDF and LERF. The results produced include individual cutsets (consisting of basic event combinations) that are provided in order to determine the significant and non-significant contributors to CDF. The CNS self-assessment considered this SR met.	
QU-A5	INCLUDE recovery actions in the quantification process in applicable sequences and cut sets (see HR-H1, HR-H2, and HR-H3).	Dispositioned	F&O QU-05: Event NDORWSTDHE: This is a recovery action to terminate the NV and NI pumps in the event of failure of ND to provide recirculation after a SL. The event was quantified on the basis of tripping the pumps within 18 minutes. RWST refill was assumed to occur (from undescribed source) and pumps were restarted to continue injection. This recovery event is applied to a) loss of KC pumps b) SNSDRNVLHE - drain plug blockage	The NEI SRs applicable to this ASME SR are QU-18 and QU-19, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated QU-18 as "3" and QU-19 as "3 with contingencies," with associated level "B" F&Os QU-05 and QU-08, respectively. CNS Rev 3a PRA Model Integration Notebook describes the general recovery rules development and describes	There were no F&Os with "A" level of significance at CNS and there are no remaining open level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			c) CCF of ND pumps. The recovery event is intended to provide injection flow for the long term commensurate with the RWST make-up capability. The time of some of these failure is 20 minutes, when injection requirements are beyond the make-up capability of the RWST. Secondly, there are cutsets representing heat removal that can not be recovered by continued injection of HHSI. The sequence needs continuous injection of HHSI and heat removal from containment. F&O QU-08: Documentation of mutually exclusive events is limited to the text file, cr2b_rul.txt. The rule recovery file allows different numbers of max recoveries depending on the combinations in question. There is no documentation regarding how the max recoveries were established for each set of events. Examples of the content of the file are DBLMAINT, DELSEQ, and NSHEATEX, which function as recoveries set to 0.0 Note that this applies to recovery events as well as deleted combinations.	development of the recovery rules to address dependencies among HEP combinations. Some comments are included in the general rule files to describe the basis for the included recovery rules and the HRA documentation includes a spreadsheet which determines HEP dependencies and the associated recoveries needed. F&O QU-05: Event NDORWSTDHE has been redefined and failure probability recalculated for the CNS Rev 3a PRA Model Integration Notebook. F&O QU-08 is tied to the corresponding NEI SR QU-19.The F&O applies to SR QU-B8 and is not evaluated against SR QU-A4.	
QU-B2	TRUNCATE accident sequences and associated system models at a sufficiently low cutoff value that dependencies	Dispositioned	F&O QU-01: The truncation limit of the baseline CDF at 1E-9 is not low enough to defend convergence toward a stable result. This is shown on page 12 of SAAG-579. Use of the 1E-9 truncation limit yields 4485 cutsets,	The NEI SRs applicable to this ASME SR are QU-21, QU-22, QU-23, and QU-24, and there are no NRC objections. There is an industry action to confirm that this requirement is met. The original	There were no F&Os with "A" level of significance at CNS and there are no remaining open level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	associated with significant cutsets or accident sequences are not eliminated. NOTE: Truncation should be carefully assessed in cases where cutsets are merged to create a solution (e.g., where system level cutsets are merged to create sequence level cutsets).		while the 1E-10 truncation limit yields 31512 cutsets. Thus, although the PRA runs using 1E-9 are capturing about 85% of the CDF predicted with a cutoff of 1E-10, they are capturing only 13% of the cutsets using the 1E-10 truncation limit.	Peer Review rated QU-21, QU-22 and QU-23 as "3" and QU-24 as "3 with contingencies." QU-24 has one level "B" F&O: QU-01. F&O QU-01: CNS Rev 3a PRA Model Integration Notebook documents that a truncation study was performed to calculate the truncation limit that would meet the criteria of being four orders of magnitude below the calculated baseline CDF and captures 90% of the bounding CDF risk and the percent change in increase in calculated CDF should be less than 5% from the previous decade. A truncation limit of 5.0E-10 for CDF (and 5.0E-11 for LERF) was calculated to meet the criteria. This is considered to resolve the finding and achieve grade 3 of NEI SR / meet CAT II of the ASME SR	
QU-B3	ESTABLISH truncation limits by an iterative process of demonstrating that the overall model results converge and that no significant accident sequences are inadvertently eliminated. For example, convergence can be considered sufficient when successive	Dispositioned	F&O QU-01: The truncation limit of the baseline CDF at 1E-9 is not low enough to defend convergence toward a stable result. This is shown on page 12 of SAAG-579. Use of the 1E-9 truncation limit yields 4485 cutsets, while the 1E-10 truncation limit yields 31512 cutsets. Thus, although the PRA runs using 1E-9 are capturing about 85% of the CDF predicted with a cutoff of 1E-10, they are capturing only 13% of the cutsets using the 1E-10 truncation limit.	The NEI SRs applicable to this ASME SR are QU-21, QU-22, QU-23, and QU-24, and there are no NRC objections. There is an industry action to confirm that the final truncation limit is such that convergence toward a stable CDF is achieved. The original Peer Review rated QU-21, QU-22 and QU-23 as "3" and QU-24 as "3 with contingencies." QU-24 ha one level "B" F&O: QU-01.	There were no F&Os with "A" level of significance at CNS and there are no remaining open level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	reductions in truncation value of one decade result in decreasing changes in CDF or LERF, and the final change is less than 5%.			F&O QU-01: CNS Rev 3a PRA Model Integration Notebook documents that a truncation study was performed to calculate the truncation limit that would meet the criteria of being four orders of magnitude below the calculated baseline CDF and captures 90% of the bounding CDF risk and the percent change in increase in calculated CDF should be less than 5% from the previous decade. A truncation limit of 5.0E-10 for CDF (and 5.0E-11 for LERF) was calculated to meet the criteria. This is considered to resolve the finding and achieve grade 3 of NEI SR / meet CAT II of the ASME SR	
QU-B6	ACCOUNT for system successes in addition to system failures in the evaluation of accident sequences to the extent needed for realistic estimation of CDF. This accounting may be accomplished by using numerical quantification of success probability, complementary logic, or a delete term approximation and includes the treatment of transfers among event trees where the "successes" may not be	Open	F&O AS-04: There were several observations on the modeling of event D3 in the SGTR tree: Event D3 is generally defined as the event to cooldown to RHR conditions using 2/3 SG for depressurization. D3 includes the HEP YAGRCOLDHE, which is directed by ECA 3.1 and 3.2. 1. D3 is defined as "primary system cooldown via secondary system depressurization". Primary system depressurization must be accomplished in some sequences (YD1D2D3, YOD3, YUOD3), by either PORV, aux spray, or main spray. These functions are not included in D3. 2. Sequence YUOD3 needs a T/H justification that D3 can actually	The NEI SRs applicable to this ASME SR are AS-8, AS-9, QU-4, QU-20, and QU-25, and there are no NRC objections. There is an industry action to check for proper accounting of success terms. The original Peer Review rated QU-4 and QU-20 as "3" and AS-8 and AS-9 as "3 with contingencies." QU-25 is rated as "NA". AS-8 has one level "B" F&O: AS-04; and AS-9 has one level "B" F&O: AS-07. In the CNS Rev 3a PRA Model Integration Notebook system successes are credited by post-processing recovery rules.	There were no F&Os with "A" level of significance at CNS. Open level "B" F&O AS-04 is only applicable to SGTR events. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	transferred between event trees.		prevent core damage in this circumstance. This sequence has no injection and no SG isolation. This is "core cooling recovery" with an unisolated SGTR. ECA3 specifies cool down at less than 100F/hr. The core can not be maintained covered for the amount of time it takes to cooldown to RHR conditions at 100F/hr. Suggested resolution is to use a separate function for this heading, using an operator action directed by FRC.1 and without RCP operating. 3. Sequence YUD1QD3. comment #2 applies to this sequence as well. This is a stuck open relief PORV with no injection. F&O AS-07: The success criteria for AFW for SGTR is 1 CA pump to 2 steam generators. The ruptured SG is assumed to be one of the two steam generators that supply steam to the turbine-driven AFW pump. In the Catawba Rev. 2b fault tree model, however, the dependency of the TDP on the SGTR initiator is not modeled. Thus, the TDP supply is not degraded by the initiating event in the model logic, so the model is incorrect. (This item is already on the list of corrective actions for the Catawba PRA, and Duke has indicated that it will be implemented in the Rev. 3 PRA.)	F&O AS-04 is only applicable to SGTR events. The modeling of SGTR events was changed to be consistent with industry standards using the guidance in WCAP-15955. Success criteria runs were performed for the MNS PRA and are applicable to CNS. Reconstruction of the CNS SGTR success criteria is needed to close this F&O. F&O AS-07 is only applicable to SGTR events. The CA notebook was updated to reflect the correct success criteria due to SGTR loss of AFW pump, so AS-07 is considered resolved. This is considered to resolve the findings and achieve grade 3 of NEI SR / meet CAT II of the ASME SR.	
QU-B7	IDENTIFY cutsets (or sequences) containing	Dispositioned	F&O QU-08: Documentation of mutually exclusive events is limited to	The NEI SR applicable to this ASME SR is QU-26, and there are	There were no F&Os with "A" level of significance at CNS

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	mutually exclusive events in the results.		the text file, cr2b_rul.txt. The rule recovery file allows different numbers of max recoveries depending on the combinations in question. There is no documentation regarding how the max recoveries were established for each set of events. Examples of the content of the file are DBLMAINT, DELSEQ, and NSHEATEX, which function as recoveries set to 0.0 Note that this applies to recovery events as well as deleted combinations.	no industry self assessment actions and no NRC objections. The original Peer Review rated this NEI SRs as "3", with associated level "B" F&O QU-08. F&O QU-08: Mutually exclusive event combinations (e.g., double initiating events, double maintenance, and other invalid combinations of events) are included in the general recovery rule file for the purpose of eliminating cutsets with those combinations from the quantification results which is shown in CNS Rev 3a PRA Model Integration Notebook. The NEI grade of 3 was assigned to the correlated element. CDF and LERF Model Integration Notebook 1535.00-00-0061 and Results and Insights for CNS PRA 1535.00-00-0075 were revised and this F&O is considered resolved.	and there are no remaining open level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.
QU-B8	CORRECT cutsets containing mutually exclusive events by either (a) developing logic to eliminate mutually exclusive situations, or (b) deleting cutsets containing mutually exclusive events	Dispositioned	F&O QU-08: Documentation of mutually exclusive events is limited to the text file, cr2b_rul.txt. The rule recovery file allows different numbers of max recoveries depending on the combinations in question. There is no documentation regarding how the max recoveries were established for each set of events. Examples of the content of the file are DBLMAINT, DELSEQ, and NSHEATEX, which function as	The NEI SR applicable to this ASME SR is QU-26, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated this NEI SR as "3", with associated level "B" F&O QU-08. F&O QU-08: Mutually exclusive event combinations (e.g., double initiating events, double maintenance, and other invalid	There were no F&Os with "A" level of significance at CNS and there are no remaining open level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			recoveries set to 0.0 Note that this applies to recovery events as well as deleted combinations.	combinations of events) are included in the general recovery rule file for the purpose of eliminating cutsets with those combinations from the quantification results which is shown in CNS Rev 3a PRA Model Integration Notebook. The NEI grade of 3 was assigned to the correlated element. CDF and LERF Model Integration Notebook 1535.00-00-0061 and Results and Insights for CNS PRA 1535.00-00-0075 were revised and this F&O is considered resolved.	
QU-C1	IDENTIFY cutsets with multiple HFEs that potentially impact significant accident sequences/cutsets by requantifying the PRA model with HEP values set to values that are sufficiently high that the cutsets are not truncated. The final quantification of these post-initiator HFEs may be done at the cutset level or saved sequence level.	Dispositioned	QU-02: The IE's for certain support system failures (RN, KC) are not input in the top event logic as a Boolean equation, but rather as a point estimate whose value is derived by solution of the IE fault tree. However, failures that cause the IE may also affect the mitigating system, such that there is a dependency between the initiating event and the available mitigation. Examples are an electrical bus that failed one train of KC and could fail one train of mitigating equipment. Another example is the operator error in the loss of KC to start the standby train of KC (KKCSTNBDHE). The HRA notebook states this event has dependencies with HYDBACKDHE.	The NEI SRs applicable to this ASME SR are QU-10, QU-17, HR-26, and HR-27, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated QU-10, HR-26 and HR-27 as "3" and QU-17 as "3 with contingencies." QU-17 has one level "B" F&O: QU-02. CNS Rev 3a PRA Model Integration Notebook describes the steps taken to solve the tree at 5.0E-11 (an order of magnitude lower than the typical truncation) with a special database where HFEs with a nominal value of less than 0.1 have been increased to 0.1 to ensure that cutsets involving multiple human events are not truncated and can be evaluated for dependencies. The identified	There is no impact to the Fire PRA or NFPA 805; Fire PRA considers fire-induced failures during scenario development.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				combinations are evaluated and quantified by an HRA analyst. Multiple human error events within a cut set are replaced with a single human error event that considers the sequence of the operator actions and their interdependence. F&O QU-02: System level initiators represented as fully developed sub-tree structures are not in the Rev 3 model and Duke Energy does not intend to include them in the new model, Rev. 4, internal events fault tree structure. These initiators will be quantified and incorporated into the rev. 4 model as point estimates. Duke Energy feels that it is acceptable to not develop system level initiators as long as a review for dependencies takes place in the cut set file. This process has been proceduralized and is contained in Section 4 of Workplace Guideline XSAA-103, Guidelines For Determining Risk Significance.	
QU-C2	ASSESS the degree of dependency between the HFEs in the cutset or sequence in accordance with HR-D5 and HR-G7.	Dispositioned	QU-02: The IE's for certain support system failures (RN, KC) are not input in the top event logic as a Boolean equation, but rather as a point estimate whose value is derived by solution of the IE fault tree. However, failures that cause the IE may also affect the mitigating system, such that there is a dependency between the initiating event and the	The NEI SRs applicable to this ASME SR are QU-10 and QU-17, and there are no NRC objections. There is an industry action to verify dependencies in cutsets/sequences are assessed. The original Peer Review rated QU-10 as "3" and QU-17 as "3 with contingencies." QU-17 has one level "B" F&O: QU-02.	There is no impact to the Fire PRA or NFPA 805; Fire PRA considers fire-induced failures during scenario development.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			available mitigation. Examples are an electrical bus that failed one train of KC and could fail one train of mitigating equipment. Another example is the operator error in the loss of KC to start the standby train of KC (KKCSTNBDHE). The HRA notebook states this event has dependencies with HYDBACKDHE.	CNS Rev 3a PRA Model Integration Notebook describes the steps taken to solve the tree at 5.0E-11 (an order of magnitude lower than the typical truncation) with a special database where HFEs with a nominal value of less than 0.1 have been increased to 0.1 to ensure that cutsets involving multiple human events are not truncated and can be evaluated for dependencies. The identified combinations are evaluated and quantified by an HRA analyst. Multiple human error events within a cut set are replaced with a single human error event that considers the sequence of the operator actions and their interdependence. F&O QU-02: System level initiators represented as fully developed sub-tree structures are not in the Rev 3 model and Duke Energy does not intend to include them in the new model, Rev. 4, internal events fault tree structure. These initiators will be quantified and incorporated into the rev. 4 model as point estimates. Duke Energy feels that it is acceptable to not develop system level initiators as long as a review for dependencies takes place in the cut set file. This process has been proceduralized and is contained in Section 4 of Workplace Guideline	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				XSAA-103, Guidelines For Determining Risk Significance.	
QU-D4	COMPARE results to those from similar plants and IDENTIFY causes for significant differences. For example: Why is LOCA a large contributor for one plant and not another?	Open	F&O QU-12: The Conditional core damage Probability of several Initiators from the CR2b results were evaluated. The results are: 8.30E-03 Loss Of RN 8.38E-03 Loss Of KC 5.04E-03 Small LOCA 2.30E-04 Secondary Line Break Inside Containment 5.47E-05 LOOP 1.24E-05 Inadvertent SS Actuation 1.24E-05 Loss Of Instrument Air 1.04E-05 Steamline Break Outside Containment 9.54E-06 FDW Line Break Outside Containment 2.26E-06 Loss Of Main Feedwater 2.89E-06 SGTR 7.75E-07 Loss Of Load 5.01E-07 Reactor Trip These results show a discrepancy between Small LOCA and SGTR that is not consistent with what is normally seen in PRAs in the industry. The CCDP for small LOCA and SGTR are usually in the same order of magnitude because the initiators have similar mitigation functions such as safety injection, secondary side heat removal, primary cooldown and depressurization, and long term injection if cooldown and depressurization are not successful. A difference of 3 orders of magnitude is unusual. Also, the CCDP value for the	The NEI SRs applicable to this ASME SR are QU-8, QU-11, and QU-31, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated QU-31 as "3" and QU-8 and QU-11 as "3 with contingencies." QU-8 has one level "B" F&O: QU-02; and QU-11 has one level "B" F&O: QU-12. Only F&O QU-12 is related to this ASME SR. F&O QU-12: The CNS PRA has updated the small LOCA (SL) initiator to be redefined to only include small pipe breaks. The SL and SGTR initiating event frequencies are found in the CNS U1&2 internal initiator events frequency data notebook. This is considered to resolve the finding. CNS needs to perform and document a comparison of results between the CNS PRA and other similar plants to be incorporated into the CNS PRA model integration notebook.	There is no impact to the Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			Loss of Instrument Air probability is identical to the Inadvertent SS Actuation probability (to 3 significant figures), which seemed surprising.		
QU-D6	IDENTIFY significant contributors to CDF, such as initiating events, accident sequences, equipment failures, common cause failures, and operator errors. INCLUDE SSCs and operator actions that contribute to initiating event frequencies and event mitigation.	Dispositioned	F&O QU-12: The Conditional core damage Probability of several Initiators from the CR2b results were evaluated. The results are: 8.30E-03 Loss Of RN 8.38E-03 Loss Of KC 5.04E-03 Small LOCA 2.30E-04 Secondary Line Break Inside Containment 5.47E-05 LOOP 1.24E-05 Inadvertent SS Actuation 1.24E-05 Loss Of Instrument Air 1.04E-05 Steamline Break Outside Containment 9.54E-06 FDW Line Break Outside Containment 2.26E-06 Loss Of Main Feedwater 2.89E-06 SGTR 7.75E-07 Loss Of Load 5.01E-07 Reactor Trip These results show a discrepancy between Small LOCA and SGTR that is not consistent with what is normally seen in PRAs in the industry. The CCDP for small LOCA and SGTR are usually in the same order of magnitude because the initiators have similar mitigation functions such as safety injection, secondary side heat removal, primary cooldown and depressurization, and long term injection if cooldown and depressurization are not successful. A	The NEI SRs applicable to this ASME SR are QU-8 and QU-31, and there are no NRC objections. There is an industry action to confirm that this requirement is met. The original Peer Review rated QU-31 as "3" and QU-8 as "3 with contingencies." QU-8 has one level "B" F&O: QU-02. The Results and Insights from CNS PRA Notebook provides a summary of the CDF results by IE, the most important operator actions and top SSCs. F&O QU-12: The CNS PRA has updated the small LOCA (SL) initiator to be redefined to only include small pipe breaks. The SL and SGTR initiating event frequencies are found in the CNS U1&2 internal initiator events frequency data notebook. This is considered to resolve the finding and achieve grade 3 of NEI SR / meet CAT II of the ASME SR	There were no F&Os with "A" level of significance at CNS and there are no remaining open level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			difference of 3 orders of magnitude is unusual. Also, the CCDP value for the Loss of Instrument Air probability is identical to the Inadvertent SS Actuation probability (to 3 significant figures), which seemed surprising.		
QU-D7	REVIEW the importance of components and basic events to determine that they make logical sense.	Dispositioned	None	There are no NEI SRs applicable to this ASME SR. The Results and Insights from CNS PRA Notebook provides the importances and top SSCs.	Based on the disposition, the requirements of Cat II are considered met. There is no impact to the Fire PRA or NFPA 805.
QU-E3	ESTIMATE the uncertainty interval of the CDF results. ESTIMATE the uncertainty intervals associated with parameter uncertainties (DA-D3, HR-D6, HR-G8, IE-C15), taking into account the "state-of-knowledge" correlation.	Dispositioned	None	The NEI SR applicable to this ASME SR is QU-30, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated this NEI SR as "3". There are no level "A" or "B" F&Os associated with this NEI SR. NEI 00-02 only partially addresses this supporting requirement under QU-30. An uncertainty analysis is performed for both CDF and LERF to estimate the mean values from internal and external (excluding seismic) events. The analysis is described in the CNS Rev 3a PRA Model Integration Notebook. A correlation factor has been developed and is used to apply a multiplier to those ISLOCA cut sets having two MVR or CVR type code events in the same cut set.	There were no F&Os with "A" level of significance at CNS and there are no level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
QU-E4	For each source of model uncertainty and related assumption identified in QU-E1 and QU-E2, respectively, IDENTIFY how the PRA model is affected (e.g., introduction of a new basic event, changes to basic event probabilities, change in success criterion, introduction of a new initiating event) [Note (1)].	Dispositioned	None	The NEI SRs applicable to this ASME SR are QU-28, QU-29, and QU-30, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated all of these NEI SRs as "3". There were no F&Os with "A" level of significance at CNS and there are no level "B" F&Os associated with any of these NEI SRs. NEI 00-02 only partially addresses this supporting requirement under QU-28, QU-29 and QU-30. Although general modeling assumptions are provided in the PRA Modeling Guidelines (XSAA-115) and specific assumptions related to system design, operation, and modeling are documented in the various PRA notebooks, the sensitivity of the results to model uncertainties and assumptions has not been thoroughly documented.	With the sensitivity of the model and characterization of uncertainties unknown there is potential to impact the Fire PRA or NFPA 805. However the impact can be expected to be minimal, due to the impact of the assumptions and sources of model uncertainty on the Fire PRA results are documented in the CNS Fire PRA Summary Report.
QU-F2	DOCUMENT the model integration process including any recovery analysis, and the results of the quantification including uncertainty and sensitivity analyses. For example, documentation typically includes	Dispositioned	F&O QU-04: More guidance or creation of a procedure is needed to address the quantification steps. For example, there is no desktop guide or procedure as there is for developing system fault trees. There is no discussion in any of the documentation on what codes are used for the quantification process, or what files are needed to establish the CAFTA run parameters. Develop quantification	The NEI SRs applicable to this ASME SR are QU-4, QU-12, QU-13, QU-27, QU-28, QU-31, QU-32, and MU-7, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated all of these NEI SRs as "3". There were no F&Os with "A" level of significance at CNS. Level "B" F&O QU-04 was written against	There were no F&Os with "A" level of significance at CNS and there are no remaining open level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(a) records of the process/results when adding non-recovery terms as part of the final quantification (b) records of the cutset review process (c) a general description of the quantification process including accounting for systems successes, the truncation values used, how recovery and post-initiator HFEs are applied (d) the process and results for establishing the truncation screening values for final quantification demonstrating that convergence towards a stable result was achieved (e) the total plant CDF and contributions from the different initiating events and accident classes (f) the accident sequences and their contributing cutsets		guidance for PSA analysts. This should include information on the quantification codes and the run parameters. Standards for quantification commensurate with the application type should be included.	NEI subelement QU-3 which is not mapped toany of the SRs in the current PRA Standard, however, it is associated with this SR. F&O QU-04: SAAG 791, CNS Rev 3 PRA Integration Notebook (1535.00-00-0061), has been greatly expanded with respect to providing quantification guidance for PSA analysts. The model integration process and basic quantification results are documented in the CNS Rev 3a PRA Model Integration Notebook. However the documentation of the PRA model needs to be expanded to address all required items. This is documented in the Level C F&O QU-10. The NEI grade of 3 was assigned to each correlated element.	

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	(g) equipment or human actions that are the key factors in causing the accidents to be non-dominant (h) the results of all sensitivity studies (i) the uncertainty distribution for the total CDF (j) importance measure results (k) a list of mutually exclusive events eliminated from the resulting cutsets and their bases for elimination (l) asymmetries in quantitative modeling to provide application users the necessary understanding of the reasons such asymmetries are present in the model (m) the process used to illustrate the computer code(s) used to perform the quantification will yield correct results				

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	process				
QU-F3	DOCUMENT the significant contributors (such as initiating events, accident sequences, basic events) to CDF in the PRA results summary. PROVIDE a detailed description of significant accident sequences or functional failure groups.	Dispositioned	None	The NEI SR applicable to this ASME SR is QU-31, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated this NEI SR as "3". There were no F&Os with "A" level of significance at CNS and there are no level "B" F&Os associated with this NEI SR. NEI 00-02 only partially addresses this supporting requirement under QU-31. The Results and Insights from CNS PRA Notebook provides a summary of the CDF results by IE, the most important operator actions and top SSCs.	There were no F&Os with "A" level of significance at CNS and there are no level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.
QU-F4	DOCUMENT the characterization of the sources of model uncertainty and related assumptions (as identified in QU-E4).	Dispositioned	None	The NEI SRs applicable to this ASME SR are QU-27, QU-28, and QU-32, and there are no industry self assessment actions and no NRC objections. The original Peer Review rated all of these NEI SRs as "3". There were no F&Os with "A" level of significance at CNS and there are no level "B" F&Os associated with any of these NEI SRs. NEI 00-02 only partially addresses this supporting requirement under QU-27, QU-28, and QU-32. General modeling assumptions are provided in the PRA Modeling	There were no F&Os with "A" level of significance at CNS and there are no level "B" F&Os related to this SR. No impact on Fire PRA or NFPA 805.

Table U-1 Internal Events PRA Peer Review – Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				Guidelines (XSAA-115) and specific assumptions related to system design, operation, and modeling are documented in the various PRA notebooks.	
QU-F5	DOCUMENT limitations in the quantification process that would impact applications.	Dispositioned	None	There are no NEI SRs applicable to this ASME SR. The PRA Modeling Guidelines (XSAA-115) describes some basic MAAP limitations. For applications, workplace procedure XSAA103 describes the need to resolve the integrated model if the failure probability associated with a modeled SSC increases. The procedure also notes that the initiator model is resolved prior to resolving the integrated model if an SSC of interest is included in an initiator fault tree.	Based on the disposition, the requirements of Cat II are considered met. There is no impact to the Fire PRA or NFPA 805.
QU-F6	DOCUMENT the quantitative definition used for significant basic event, significant cutset, and significant accident sequence. If it is other than the definition used in Part 2, JUSTIFY the alternative.	Dispositioned	None	There are no NEI SRs applicable to this ASME SR. The Results and Insights from CNS PRA notebook identifies the risk-significant accident sequences, systems, components and operator actions. However there is no discussion of a specific quantitative definition for significant basic events, cutsets, accident sequences or functional failures.	There is no impact to the Fire PRA or NFPA 805.

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
LE-B2	DETERMINE the containment challenges (e.g., temperature, pressure loads, debris impingement) resulting from contributors identified in LE-B1 using applicable generic or plant-specific analyses for significant containment challenges. USE conservative treatment or a combination of conservative and realistic treatment for non-significant containment challenges. If generic calculations are used in support of the assessment, JUSTIFY applicability to the plant being evaluated.	Dispositioned	None	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications.	Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the RG 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the RG 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.
LE-C1	DEVELOP accident sequences to a level of detail to account for the potential contributors identified in LE-B1 and analyzed in LE-B2. Compare the	Dispositioned	None	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications.	Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	containment challenges analyzed in LE-B with the containment structural capability analyzed in LE-D and identify accident progressions that have the potential for a large early release. JUSTIFY any generic or plant-specific calculations or references used to categorize releases as non-LERF contributors based on release magnitude or timing. NUREG/CR-6595, App. A [2-16] provides an acceptable definition of LERF source terms.				more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.
LE-C3	REVIEW significant accident progression sequences resulting in a large early release to determine if repair of equipment can be credited. JUSTIFY credit given for repair (i.e., ensure that plant conditions do not preclude repair and actuarial data exists from which to estimate the repair failure probability [see SY-A24, DA-C15, and DA-D8]). AC power recovery	Dispositioned	None	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications.	Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	based on generic data applicable to the plant is acceptable.				method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.
LE-C4	INCLUDE model logic necessary to provide a realistic estimation of the significant accident progression sequences resulting in a large early release. INCLUDE mitigating actions by operating staff, effect of fission product scrubbing on radionuclide release, and expected beneficial failures in significant accident progression sequences. PROVIDE technical justification (by plant-specific or applicable generic calculations demonstrating the feasibility of the actions, scrubbing mechanisms, or beneficial failures) supporting the inclusion of any of these features.	Dispositioned	None	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications.	Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
LE-C9	JUSTIFY any credit given for equipment survivability or human actions under adverse environments.	Dispositioned	None	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications.	Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.
LE-C11	JUSTIFY any credit given for equipment survivability or human actions that could be impacted by containment failure.	Dispositioned	None	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications.	Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
					and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.
LE-D2	EVALUATE the impact of containment seals, penetrations, hatches, drywell heads (BWRs), and vent pipe bellows and INCLUDE as potential containment challenges, as required. If generic analyses are used in support of the assessment, JUSTIFY applicability to the plant being evaluated.	Dispositioned	None	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications.	Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
					impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.
LE-D3	When containment failure location [Note (1)] affects the event classification of the accident progression as a large early release, DEFINE failure location based on a realistic containment assessment that accounts for plant-specific features. If generic analyses are used in support of the assessment, JUSTIFY applicability to the plant being evaluated.	Dispositioned	None	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications.	Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.
LE-D6	PERFORM an analysis of thermally induced SG	Dispositioned	None	Per Referenced Westinghouse report - LERF model is sufficient to	Limitations with the NUREG/CR-6595 LERF

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	tube rupture that includes plant specific procedures and design features and conditions that could impact tube failure. An acceptable approach is one that arrives at plant-specific split fractions by selecting the SG tube conditional failure probabilities based on NUREG-1570 [2-17] or similar evaluation for induced SG failure of a similarly designed SGs and loop piping. SELECT failure probabilities based on (a) RCS and SG post-accident conditions to sufficient to describe the important risk outcomes (b) secondary side conditions including plant-specific treatment of MSSV and ADV failures JUSTIFY assumptions and selection of key inputs. An acceptable justification can be obtained by the			support risk-informed applications.	approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the RG 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the RG 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	extrapolation of the information in NUREG-1570 [17] to obtain plant-specific models, use of reasonably bounding assumptions, or performance of sensitivity studies indicating low sensitivity to changes in the range in question.				
LE-E2	USE realistic parameter estimates to characterize accident progression phenomena for significant accident progression sequences resulting in a large early release. USE conservative or a combination of conservative and realistic estimates for non-significant accident progression sequences resulting in a large early release.	Open	LE-E2-01 (F): Catawba basically used the conservative parameter estimates from NUREG/CR-6595 to characterize the accident progression phenomena. This approach would satisfy CC-I. However, Duke is using the CCFPs from Rev. 0 of NUREG/CR-6595 rather than the more restrictive values from Revision 1. To meet this requirement would require using the NUREG/CR-6595, Rev. 1 CCFP values or providing an engineering analysis to defend use of the older values. At the time of the peer review, Duke did have a white paper, "Conditional Containment Failure Probabilities for the McGuire and Catawba Large Early Release Frequency Models", November 2012, (Reference 10) that discusses the basis for the use of the CCFPs from Revision 0 of NUREG/CR-6595. However, this white paper was not provided as part of the official documentation for the review and as such, was not directly	The Westinghouse focused peer review concluded that the CNS LERF model was adequate to meet Cat I; however, the LERF report needed to include the Duke white paper addressing the use of Conditional Containment Failure Probabilities (CCFPs) from Rev 0 of the NUREG as opposed to Rev 1. The Duke white paper reviewed the supporting analyses for the conditional containment failure probabilities provided in the various revisions to NUREG/CR-6595. Based on the plant specific analyses performed, the CCFPs utilized in the current CNS LERF analyses (based on NUREG/CR-6595 original issue) are judged to be better estimates than the estimates available from NUREG/CR-6427 or NUREG/CR-6595 revision 1 and are appropriate for a LERF model at CC 1. The CNS peer review noted that the position paper appeared to be a reasonable basis for using the NUREG/CR-6595 revision 0 results. Duke also believes that the NUREG/CR-6595 revision 0 results	When the Westinghouse documentation recommendation is implemented, the SR will meet Cat I. Then, per referenced Westinghouse report - LERF model is sufficient to support risk-informed applications. Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			reviewed. A later review of this white paper indicates that Duke appears to have a reasonable basis for using the revision 0 CCFP values based on plant-specific analysis. Duke should include this information in their LERF analysis reports.	are better estimates than the revision 1 results.	method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.
LE-F1	PERFORM a quantitative evaluation of the relative contribution to LERF from plant damage states and significant LERF contributors from Table 2-2.8-3.	Dispositioned	LE-G3-01 (F): In CNC-1535.00-00-061, Catawba documents the significant contributors to LERF in terms of contribution by initiating events. However, they did not document the relative contribution of contributors such as plant damage states, accident progression sequences, phenomena, containment challenges and containment failure modes. To move from CC-I to CC-II/III, Catawba needs to evaluate the relative contributions to LERF by such things as plant damage states, accident progression sequences, phenomena, containment challenges, and containment failure modes.	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications.	Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
LE-G3	DOCUMENT the relative contribution of contributors (i.e., plant damage states, accident progression sequences, phenomena, containment challenges, containment failure modes) to LERF.	Dispositioned	LE-G3-01 (F): In CNC-1535.00-00-061, Catawba documents the significant contributors to LERF in terms of contribution by initiating events. However, they did not document the relative contribution of contributors such as plant damage states, accident progression sequences, phenomena, containment challenges and containment failure modes. To move from CC-I to CC-II/III, Catawba needs to evaluate the relative contributions to LERF by such things as plant damage states, accident progression sequences, phenomena, containment challenges, and containment failure modes.	The Westinghouse report suggested that improving this SR to a Cat II would require evaluating the relative contributions to LERF by such things as plant damage states, accident progression sequences, phenomena, containment challenges and containment failure modes. Meeting Cat I already satisfies the application and improving to Cat II would only result in improved documentation.	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications. Limitations with the NUREG/CR-6595 LERF approach used for CNS include consideration of whether the estimated LERF is significantly below (about an order of magnitude or more) the R.G. 1.174 acceptance guideline. Even though the Fire PRA LERF and delta LERF estimates are within an order of magnitude of the R.G. 1.174 acceptance guideline, Duke believes the LERF model to be conservative and believes the NUREG/CR-6595 method is acceptable for fire since it produces adequate risk insights. LERF fire impacts are considered in the Fire PRA Component Selection Task, including MSO scenarios. Overall, the impacts to Fire PRA and NFPA 805 are expected to be minimal.
LE-G6	DOCUMENT the quantitative definition used for significant accident progression sequence. If other than the definition used in	Open	LE-G6-01 (F): Catawba did not document the quantitative definition of significant accident progression sequence. Catawba needs to add a definition for	The Westinghouse report suggested that CNS add a definition for significant accident progression sequence to the documentation	Per Referenced Westinghouse report - LERF model is sufficient to support risk-informed applications. This finding is documentation only and

Table U-2 LERF PRA Peer Review - Facts and Observations

SR	2009 ASME/ANS Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	Section 2, JUSTIFY the alternative.		significant accident progression sequence to CNC-1535.00-00-0143, Rev. 0 or CNC-1535.00-00-061. This can be accomplished by adding a specific definition of referencing the appropriate definition in Section 1-2 of RA-Sa-2009.		does not impact the Fire PRA results.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
IFPP-A2	DEFINE flood areas at the level of individual rooms or combined rooms/halls for which plant design features exist to restrict flooding.	Dispositioned	IFPP-A2-01 (F): Discrepancies exist regarding the defining of flood areas at the level of individual rooms. The CNS PRA clearly meets Capability Category I which is based on defining flood areas at the building level. There are som areas withing the buildings which are not clearly part of flood areas, where boudnaries are vaguely defined, or for where the flood area boundaries are defined incosistent with the requirements of the Standard. Pipe trencehs on AB522 are not included in any of the Flood AReas as defined in Att. A to the -022 calculation. The flood Zone boundary between 594A01 and 594A05 goes through the middle of a hallway south of the HVAC room. (similarly for Unit 2 side). There is no discussion on why this is an approprate boundary for a flood zone. It appears this flood zone should have been defined by the walls and doors to the immediate south of the Mian Control Room. Floods could clearly propagate without being impeded as this flood boundary was defined. Given the number of rooms with enclosed doors and flood sources within the plant, the Flood Zones would have been better defined with greater level of detail. As done, this results in many flooding barriers within a Zone. The AB522 flood area, for example,	Per LTR-RAM-II-13-008, flood zone drawings were evaluated and updated to provide required level of detail to meet Cat II.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			could have been subdivided since the Containment Spray (NS) and Residual Heat Removal (ND) pumps are in spearate rooms, with the ND pumps behind doors. Also, while liquid will spray down into all of these rooms, propagation within the room complex could differ depending on flood sources at higher elevations. Figure A-3 in CN-RAM-11-022 shows an incorrect location of the NI pump room s and NV pump rooms. Room 233 is not defined as part of any Flood Area in the Appendix A Figures. Details of flood zone boundaries south of zone 560Z09 are unclear.		
IFPP-A5	CONDUCT plant walkdown(s) to verify the accuracy of information obtained from plant information sources and to obtain or verify: (a) spatial information needed for the development of flood areas (b) plant design features credited in defining flood areas. Note: Walkdown(s)	Dispositioned	IFSO-A6-01 (F): Walkdowns were completed however, there were some discrepencies in walkdown notes. See IFSO-A6.	Per LTR-RAM-II-13-008, walkdown documentation was revised to resolve discrepancies noted by the peer review team.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	may be done in conjunction with the requirements of IFSO-A6, IFSN-A17, and IFQU-A11.				
IFPP-B3	DOCUMENT sources of model uncertainty and related assumptions (as identified in QU-E1 and QU-E2) associated with the internal flood plant partitioning.	Dispositioned	IFSO-B3-01 (F): No discussion of impact of sources of uncertainty with respect to paritioning was documented. No discussion of impact of sources of uncertainty with respect to flooding sources was documented.	Per LTR-RAM-II-13-008, the existing documentation was reviewed and two additional assumptions were added to cover any associated uncertainties related to source or plant partitioning.	The supporting requirement concentrates on internal flooding events. Documentation of uncertainty do not impact the Fire PRA model or applications.
IFSO-A1	For each flood area, IDENTIFY the potential sources of flooding [Note (1)]. INCLUDE: (a) equipment (e.g., piping, valves, pumps) located in the area that are connected to fluid systems (e.g., circulating water system, service water system, fire protection system, component cooling water system, feedwater system, condensate and steam systems, and reactor coolant system) (b) plant internal sources of flooding (e.g., tanks or pools)	Dispositioned	IFSO-A1-01 (F): For each flood area, the potential sources of flooding are to be identified, including equipment (e.g., piping, valves, pumps, tanks) located in the area. Section 5.5 (Table 5-4) documents potential flood sources for each flood area; however some flood areas are missing potential sources of flooding: Turbine Building (577T) does not include Conventional Low Pressure Service Water (RL) or Recirculating Cooling Water System (KR). Sections 5.3.11 and 5.3.12 indicate these piping systems are in the Turbine Building but failure of these systems is not addressed. Likewise, steam (HELB) systems are not included (e.g., Main Steam, Extraction Steam, Reheat Steam, etc). No piping less than or equal to 2-inch	Per LTR-RAM-II-13-008, missing flood sources were added and relevant scenarios were carried forward into the other calculation notes and adequately documented.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	located in the flood area (c) plant external sources of flooding (e.g., reservoirs or rivers) that are connected to the area through some system or structure (d) in-leakage from other flood areas (e.g., backflow through drains, doorways, etc.)		diameter is included for flooding and this pipe is not considered as spary source in most areas. Drinking Water (YD) piping was not included as a flood or spray source. Drinking Water systme is in the Internal Events PRA model (HYDBACKTRM, YD System is Unavailable) as backup cooling to the 1A NV pump. Failure os this piping may fail that function and flood spray other SSCs. Many tanks (e.g., Liquid Waste Tanks) were identified on teh Peer Review walkdowns that are not documented as potential flood sources.		
IFSO-A2	For multi-unit sites with shared systems or structures, INCLUDE any potential sources with multi-unit or cross-unit impacts.	Dispositioned	IFSO-A2-01 (F): One important case where the cross-unit impact is not considered is the consideration of a cross-unit flood from one turbine building affecting the other turbine building. Flooding in one turbine builidng can propagate to the other turbine building, per Figure 5-1 fo CN-RAM-11-022 and per General Arrangement drawings. This cross-unit source should have been considered but was not considered. Discussion of how flooding of Unit 2 offsite power transformers in zone 577T02 would or would not impact Unit 1 is not documented.	Per LTR-RAM-II-13-008, after review of plant characteristics, there was found to be no cross unit impact on the offsite power transformers. Documentation was revised to include this review.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.
IFSO-A5	For each source and its identified failure	Dispositioned	IFSO-A5-01 (F): The internal flooding PRA documentation does not identify	Per LTR-RAM-II-13-008, documentation was revised to	The supporting requirement concentrates on internal

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	mechanism, IDENTIFY the characteristic of release and the capacity of the source. INCLUDE: (a) a characterization of the breach, including type (e.g., leak, rupture, spray) (b) flow rate (c) capacity of source (e.g., gallons of water) (d) the pressure and temperature of the source		system capacities for many systems, nor does it identify flow rates for most releases, not does it identify the pressure and temperature of the source. While flood breach size is characterized in Assumption 9 of CN-RAM-11-023, maximum flow rates for failures in individual systems are not provided. Capacity of sources are discussed for some systems in CN-RAM-11-022 (e.g., Nuclear Service Water infinite capacity, volume of RWST for ECCS breaks), system capacities that would be released are not documented or identified for most systems (e.g., KC, for which a surge tank volume is identified but that does nto correspond to the entire system/train volume subject to release). (refer also to discussion relating to documentation under SR IFSN-B1 and its Finding)	include tables showing system capacities, flow, pressure and temperature to ensure that the information needed for flood sources is documented. References for all values are included in the tables.	flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.
IFSO-A6	CONDUCT plant walkdown(s) to verify the accuracy of information obtained from plant information sources and to determine or verify the location of flood sources and in-leakage pathways.	Dispositioned	IFSO-A6-01 (F): Discrepancies exist in Walkdown Notes. Walkdown notes identify a number of rooms which are part of the 554A01 and 554A02 Flood Areas as at elevation 560'. Walkdown notes for 577A01 general area does not list CCW HX's, which are very large components, as flood	Per LTR-RAM-II-13-008, walkdown documentation was revised to resolve discrepencies noted by the peer review team.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
	Note: Walkdown(s) may be done in conjunction with the requirements of IFPP-A5, IFSN-A17, and IFQU-A11.		sources. Various radwaste tanks located in general areas in teh auxiliary building were apparently not identified in teh walkdown notes. Note no equipment elevation information is provided for the 577A02 or 577A03 (rooms 419 and 427) mechanical penetration area PRA equipment in the walkdown notes. Main control room walkdown notes indicate two double watertight doors to the main control room. Drawing CN-1040-04 appears to show at least three double doors and three other doors that are not identified in the walkdown notes. Note Table B-1 of CN-RAM-11-023 lists an 18 inch critical height for CA pumps, whereas Table B-2 uses a 16 inch critical height. Note the header on many of the walkdown notes is incorrect. The 560A01 general area has a heador of "Aux. Bldg. 577' General Area." (p,212 ff.) The 577 General area 577A01 has a heading referencing to a stairwell. This introduces some confusion in checking the information in teh walkdown notes, including checks for validity. No walkdown sheets for Rooms 205A, 215, and 215B. It is inefficient to have the walkdown notes indexed based on room		

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			descriptions rather than by Flood Areas or Room Numbers with no map of room numbers provided.		
IFSO-B1	DOCUMENT the internal flood sources in a manner that facilitates PRA applications, upgrades, and peer review.	Dispositioned	IFSN-B1-01 (F): The documentation was found lacking either supporting calculations that produced applied values (e.g., flood rates) or references to calculations outside the IFPRA documentation. References to calculations such as break flow were not identified.	Flood rates were based on EPRI methodology to support the IEF generation for given scenarios of spray, flood, major flood or HELB. For flood rates this resulted in evaluating the upper bound of a system's capacity and assigning the appropriate failure mechanisms (e.g. for a system with a 1,000 gpm max flow rate spray and floods were deemed appropriate failure mechanisms). All calculations used and references were adequately explained and documented throughout the analysis. For example the drain flow rate calculations were performed and documented in a manner which would allow for them to be reproduced independently. The documents were re-examined and no other calculations were found to need additional documentation or clarification.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.
IFSO-B3	DOCUMENT sources of model uncertainty and related assumptions (as identified in QU-E1 and QU-E2) associated with the internal flood sources.	Dispositioned	IFSO-B3-01 (F): No discussion of impact of sources of uncertainty with respect to paritioning was documented. No discussion of impact of sources of uncertainty with respect to flooding sources was documented.	Per LTR-RAM-II-13-008, the existing documentation was reviewed and two additional assumptions were added to cover any associated uncertainties related to source or plant partitioning.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
IFSN-A7	In applying SR IFSN-A6 to determine susceptibility of SSCs to flood-induced failure mechanisms, TAKE CREDIT for the operability of SSCs identified in IFSN-A5 with respect to internal flooding impacts only if supported by an appropriate combination of (a) test or operational data (b) engineering analysis (c) expert judgment	Dispositioned	IFSN-A7-01 (F): Catawba is assuming that floor drains are capable of responding to Spray (100GPM) events so that such events do not need to be analyzed or further evaluated. Many Internal Flooding PRA's do not take any credit for drains, even for 100GPM Spray events, due to generally poor maintenance practices and availability for Sump Pumps, as well as due to the possibility that whatever flood event is going on will cause any debris in teh room (self-generated or left after maintenance) to clog the drains and/or damage sump pumps. Generally, Preventive Maintenance Tasks or sruveillance requirements for drains should exist prior to crediting the drans for flood mitigation. Also, the geometry of the drain ssytem should be invesetigated to ensure that it is not prone to blockages (e.g., check valve failures). This assumption would specifically impact not evaluating a 100GPM spray scenario in the Diesel Generator buildings, since if undetected this would flood the diesel room to four feet and then start flooding the switchgear areas. It would be legitimate to credit the drainsin teh switchgear areas – walkdown notes indicate five 6 inch diamater drains in teh switchgear rooms (zone 560A05 and 560A06). Water height for a 100 GPM release would be minimal, less than one inch, so the equipment in the switchgear	Per LTR-RAM-II-13-008, the finding was addressed by re-evaluating the credit of drains in the source of the spray. The drain system at CNS was only credited for spray scenarios in which the flow rate from the associated break is 100gpm or less. This was substantiated by documented calculations in which one drain was shown to be able to accommodate over 100gpm with a minimal amount of standing water. This credit was considered conservative and was not taken for flood and major flood mitigation or timing. Additionally all PRA-related components are considered failed within the originating flood area. Documentation was revised to reflect the re-evaluation of credit for drains.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			rooms would nto be damaged if the flood progressed to that point. While in general drains outside the immediate area would suffice to prevent flooding, this needs to be confirmed given the small number of drains that are reported for the large Aux. Bldg. general areas.		
IFSN-A10	DEVELOP flood scenarios (i.e., the set of information regarding the flood area, source, flood rate and source capacity, operator actions, and SSC damage that together form the boundary conditions for the interface with the internal events PRA) by examining the equipment and relevant plant features in the flood area and areas in potential propagation paths, giving credit for appropriate flood mitigation systems or operator actions, and identifying susceptible SSCs.	Dispositioned	IFSN-A10-01 (F): CN-RAM-12-005, Identification and Estimation of Initiating Event Frequecies, Table 5-4, CNS Passive System Failure Frequency by Flood Area: Table 5-4 (page 33) lists KF as a potential flood source in flood area 543A01. There is no flood or major flood initiator for KF in this flood area in Table 5-5, CNS Passive System Failure Frequency by Initiator. There is no scenario developed for failure of this piping (see CN-RAM-11-023, Characterization of Flood Scenarios, Section 5.4.2). Table 5-4 (page 33) lists CS and KR as potential flood sources in flood area 543A02. There are no flood initiators for CS or KR in this flood area in Table 5-5. There are no scenarios developed for failure of these piping systems in this area (see CN-RAM-11-023, Section 5.4.3). IFSO-A1-01 (F): IFSO-A1-01 (F): For each flood area, the potential sources of flooding are to be identified,	IFSN-A10-01 : Per LTR-RAM-II-13-008, the initiating event frequency documentation and scenario documentation was re-examined to determine whether all potential flood sources are identified and evaluated. Identified discrepancies, including the KF piping in flood area 543A01, were added to the analysis and documentation is being revised. IFSO-A1-01: Per LTR-RAM-II-13-008, missing flood sources were added and relevant scenarios were carried forward into the other calculation notes and adequately documented.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			including equipment (e.g., piping, valves, pumps, tanks) located in the area. Section 5.5 (Table 5-4) documents potential flood sources for each flood area; however some flood areas are missing potential sources of flooding: Turbine Building (577T) does not include Conventional Low Pressure Service Water (RL) or Recirculating Cooling Water System (KR). Sections 5.3.11 and 5.3.12 indicate these piping systems are in the Turbine Building but failure of these systems is not addressed. Likewise, steam (HELB) systems are not included (e.g., Main Steam, Extraction Steam, Reheat Steam, etc). No piping less than or equal to 2-inch diameter is included for flooding and this pipe is not considered as spary source in most areas. Drinking Water (YD) piping was not included as a flood or spray source. Drinking Water systme is in the Internal Events PRA model (HYDBACKTRM, YD System is Unavailable) as backup cooling to the 1A NV pump. Failure os this piping may fail that function and flood spray other SSCs. Many tanks (e.g., Liquid Waste Tanks) were identified on teh Peer Review walkdowns that are not documented as		

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			potential flood sources.		
IFSN-A11	For multi-unit sites with shared systems or structures, INCLUDE multi-unit scenarios.	Dispositioned	IFSO-A2-01 (F): One important case where the cross-unit impact is not considered is the consideration of a cross-unit flood from one turbine building affecting the other turbine building. Flooding in one turbine builidng can propagate to the other turbine building, per Figure 5-1 fo CN-RAM-11-022 and per General Arrangement drawings. This cross-unit source should have been considered but was not considered. Discussion of how flooding of Unit 2 offsite power transformers in zone 577T02 would or would not impact Unit 1 is not documented.	Per LTR-RAM-II-13-008, after review of plant characteristics, there was found to be no cross unit impact on the offsite power transformers. Documentation was revised to include this review.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.
IFSN-B1	DOCUMENT the internal flood scenarios in a manner that facilitates PRA applications, upgrades, and peer review.	Dispositioned	IFSN-B1-01 (F): The documentation was found lacking either supporting calculations that produced applied values (e.g., flood rates) or references to calculations outside the IFPRA documentation. References to calculations such as break flow were not identified.	Flood rates were based on EPRI methodology to support the IEF generation for given scenarios of spray, flood, major flood or HELB. For flood rates this resulted in evaluating the upper bound of a system's capacity and assigning the appropriate failure mechanisms (e.g. for a system with a 1,000 gpm max flow rate spray and floods were deemed appropriate failure mechanisms). All calculations used and references were adequately explained and documented throughout the analysis. For example the drain flow rate calculations were performed and documented in a manner which	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				would allow for them to be reproduced independently. The documents were re-examined and no other calculations were found to need additional documentation or clarification.	
IFEV-A4	For multi-unit sites with shared systems or structures, INCLUDE multi-unit impacts on SSCs and plant-initiating events caused by internal flood scenario groups.	Dispositioned	IFSO-A2-01 (F): One important case where the cross-unit impact is not considered is the consideration of a cross-unit flood from one turbine building affecting the other turbine building. Flooding in one turbine builidng can propagate to the other turbine building, per Figure 5-1 fo CN-RAM-11-022 and per General Arrangement drawings. This cross-unit source should have been considered but was not considered. Discussion of how flooding of Unit 2 offsite power transformers in zone 577T02 would or would not impact Unit 1 is not documented.	Per LTR-RAM-II-13-008, after review of plant characteristics, there was found to be no cross unit impact on the offsite power transformers. Documentation was revised to include this review.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.
IFEV-A5	DETERMINE the flood-initiating event frequency for each flood scenario group by using the applicable requirements in 2-2.1.	Dispositioned	IFSO-A1-01: For each flood area, the potential sources of flooding are to be identified, including equipment (e.g., piping, valves, pumps, tanks) located in the area. Section 5.5 (Table 5-4) documents potential flood sources for each flood area; however some flood areas are missing potential sources of flooding: Turbine Building (577T) does not include Conventional Low Pressure Service Water (RL) or Recirculating Cooling Water System (KR). Sections	Per LTR-RAM-II-13-008, missing flood sources were added and relevant scenarios were carried forward into the other calculation notes and adequately documented.	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
			5.3.11 and 5.3.12 indicate these piping systems are in the Turbine Building but failure of these systems is not addressed. Likewise, steam (HELB) systems are not included (e.g., Main Steam, Extraction Steam, Reheat Steam, etc). No piping less than or equal to 2-inch diameter is included for flooding and this pipe is not considered as spary source in most areas. Drinking Water (YD) piping was not included as a flood or spray source. Drinking Water systme is in the Internal Events PRA model (HYDBACKTRM, YD System is Unavailable) as backup cooling to the 1A NV pump. Failure os this piping may fail that function and flood spray other SSCs. Many tanks (e.g., Liquid Waste Tanks) were identified on teh Peer Review walkdowns that are not documented as potential flood sources.		
IFEV-B1	DOCUMENT the internal flood-induced initiating events in a manner that facilitates PRA applications, upgrades, and peer review.	Dispositioned	IFSN-B1-01 (F): The documentation was found lacking either supporting calculations that produced applied values (e.g., flood rates) or references to calculations outside the IFPRA documentation. References to calculations such as break flow were not identified.	Flood rates were based on EPRI methodology to support the IEF generation for given scenarios of spray, flood, major flood or HELB. For flood rates this resulted in evaluating the upper bound of a system's capacity and assigning the appropriate failure mechanisms (e.g. for a system with a 1,000 gpm max flow rate	The supporting requirement concentrates on internal flooding events. Resolutions to address internal event peer review findings do not impact the Fire PRA model or applications.

Table U-3 Internal Flood PRA Peer Review - Facts and Observations

SR	2009 ASME Cat II Requirement	Status	Finding/Observation	Disposition	Impact to Fire PRA
				spray and floods were deemed appropriate failure mechanisms). All calculations used and references were adequately explained and documented throughout the analysis. For example the drain flow rate calculations were performed and documented in a manner which would allow for them to be reproduced independently. The documents were re-examined and no other calculations were found to need additional documentation or clarification.	

V. Fire PRA Quality

23 Pages Attached

In accordance with RG 1.205 position 4.3:

> *"The licensee should submit the documentation described in Section 4.2 of Regulatory Guide 1.200 to address the baseline PRA and application-specific analyses. For PRA Standard "supporting requirements" important to the NFPA 805 risk assessments, the NRC position is that Capability Category II is generally acceptable. Licensees should justify use of Capability Category I for specific supporting requirements in their NFPA 805 risk assessments, if they contend that it is adequate for the application. Licensees should also evaluate whether portions of the PRA need to meet Capability Category III, as described in the PRA Standard."*

V.1 Fire PRA Quality Overview

The CNS Fire PRA Peer Review was performed on July 12-16, 2010 using RG 1.200, Revision 2, the combined PRA standard, ASME/ANS RA-Sa–2009 as endorsed by RG 1.200, Revision 2, and the NEI 07-12 Fire PRA peer review process. The purpose of this review was to provide a method for establishing the technical quality and adequacy of the Fire PRA for the spectrum of potential risk-informed plant licensing applications for which the Fire PRA may be used. The peer review findings were addressed and the dispositions reviewed to validate that no changes were made which meet the definition of a PRA model upgrade per RG 1.200. Therefore, no additional peer reviews, partial scope or focused scope, were required to be conducted for the CNS Fire PRA.

The CNS Fire PRA was judged to meet Capability Category II consistent with RG 1.205 guidance. A total of twenty (20) F&O findings and twenty-nine (29) F&O suggestions (plus 1 best practice F&O) were generated. The capability categories are defined in ASME/ANS RA-Sa-2009, Part 4, "Requirements for Fires At-Power PRA". The peer review report noted that there were thirteen (13) SRs where the standard was not met. Sixteen (16) F&Os were issued against SRs which met Capability Category I (some classified as "findings" and some addressed via "suggestions"). The findings have been resolved with the dispositions summarized in Table V-1. The impact of those areas where only the Capability Category I requirement was met is summarized in Table V-2. All F&Os that were defined as suggestions have been dispositioned and will be available for NRC review. No changes were made in the resolution of the findings that meet the definition of a model upgrade as defined by RG 1.200, therefore a follow-up peer review is not required. The Fire PRA is judged to be adequate to support the NFPA 805 Licensing Basis.

V.2 Fire PRA Methodology Issues Addressed in Recent NFPA 805 LAR RAIs

V.2.1 Deviations from NUREG/CR 6850

The Fire PRA does not utilize unreviewed analysis methods (UAMs). During the pre-LAR submittal meeting with the NRC on April 18, 2013, Duke Energy indicated that the Fire PRA included credit for Administrative Controls for selected transient fire scenarios and credit for hot short duration for DC circuits. The CNS Fire PRA was updated to eliminate credit for Administrative Controls for transient fire scenarios. The deterministic safe shutdown analysis did not take credit for the fire to eventually clear the fault; however, credit for hot short duration probability was applied in the Fire PRA for fail-safe

valves. FAQ 08-0051 recognized that certain power-operated valves that are subject to fire-induced mispositioning may return to their desired state (fail-safe position) following termination of the short without operator intervention. However, the FAQ limited the credit for this self-healing feature to AC circuits. No hot short duration credit for AC circuits was applied in the Fire PRA since no important fail-safe AC-powered valves were identified where credit for returning to their fail-closed or fail-open position would appreciably impact the results. Sensitivity analyses were performed to address the credit for hot short duration for DC circuits and to address an additional NRC concern communicated during the pre-LAR meeting regarding treatment of MCC enclosures as well-sealed and robustly secured.

V.2.2 Sensitivity Study on Control Power Transformer Factor 2

CNS did not credit reduced circuit failure probabilities for circuits with Control Power Transformers (CPTs). No sensitivity is required.

V.2.3 Heat Release Rate

The CNS Fire PRA addresses the potential increase in heat release rate (HRR) caused by the spread of a fire from the ignition source to other combustibles. For trays within the zone of influence (ZOI), vertical fire propagation beyond the ZOI is generally assumed to fail cables in all trays between the lowest tray and the ceiling. Given that the armored cables at CNS have no PVC jacketing, this approach conservatively addresses the potential for vertical fire spread due to secondary combustibles. IEEE–383 qualified cables are typically composed of thermoset materials that do not propagate flames. Cables that are not IEEE–383 qualified cables are typically composed of thermoplastic materials that are capable of propagating flames. NUREG/CR-6850 Section R.4.1.4 states that no flame spread is assumed for armored cable with thermoset insulation and no coating. Since the armored cables at CNS have no PVC jacketing, the potential for horizontal fire propagation can be readily dismissed. Therefore, horizontal fire propagation along cable trays is adequately captured within the target set of each scenario involving overhead tray failures. Participation of armored cables in the generation of heat load is intuitively expected to be less than similar cables without armor. However, since the influence of secondary combustibles on heat load cannot be entirely dismissed, the hot gas layer evaluation includes margin to accommodate additional heat load from cable tray targets.

Credit for suppression was limited in the Fire PRA to the following scenarios: 1) credit for prompt suppression was applied to hot work scenarios, 2) credit for manual suppression in accordance with FAQ 08-0050 was applied to selected cabinet fire scenarios, 3) credit for automatic suppression was applied to the severe DG fire scenarios, 4) credit for automatic suppression was applied to the auxiliary feedwater (CA) and component cooling (KC) pump fire scenarios, and 5) credit for suppression in the Main Control Room including Main Control Board fire scenarios in accordance with Appendix L of NUREG/CR-6850.

V.2.4 Transient Fires

As discussed in the calculation entitled "Fire Scenario Report" in Sections 3.0 and 8.2, transient fires were placed at appropriate locations where targets were located within

the ZOI. Hot work was assumed to occur in locations where hot work is a possibility, even if improbable (but not impossible), where they can threaten pinch points.

V.2.5 Calculation of the Frequencies of Transient and Hot Work Fires

NUREG/CR-6850 provides for a weighting mechanism in the calculation of transient fire ignition frequency through the consideration of influence factors for maintenance, occupancy, and storage. The initial rankings for each influence factor that were determined based on interviews with the CNS Fire Protection Engineer have been updated to address FAQ 12-0064. In addition to the inclusion of a fourth influence factor to address hot work, the previous influence factors were reviewed to ensure consistency with the overall intent of the weighting exercise. A total of sixty (60) Physical Analysis Units (PAUs) were assigned an influence factor for hot work, maintenance, occupancy, and storage. For the Turbine Building and Reactor Building, the magnitude of the influence factor is immaterial since both PAUs (one per unit) within the applicable generic location receive equal weight. For the remaining generic locations, a ranking of '3' was the most common assignment, as it is intended to be representative of the "typical" weight for each influence factor. In keeping with that intent, a near equal distribution of '10' (high) versus '1' (low) rankings were assigned with the exception of the Occupancy Rank where '10' was only applied to the Main Control Room and Control Room Tagout areas (note: the '10' ranking previously applied to the SSF was eliminated in this update since the security guard is no longer stationed at the SSF). This provides for the ability to distinguish between those PAUs that are more or less likely to be influenced by a given factor when considering transient scenario frequencies within a given generic location such as the Auxiliary Building.

V.2.6 Generic Ignition Frequency Sensitivity Analysis

Sensitivity Analysis for Use of Generic Ignition Frequency in NUREG/CR-6850 provides generic ignition frequencies as identified in task 6 in the NUREG. These frequencies have since been reviewed and updated as part of FAQ 08-0048. The updated generic frequencies are documented in EPRI 1016735 (NUREG/CR–6850 Supplement 1, Chapter 10). FAQ 08-0048 communicated the NRC's acceptance of the updated frequencies provided a sensitivity study was performed to address the differences in risk and delta-risk results. This provision was limited to the bins in Table 2-2 of EPRI 1016735 with an alpha of less than or equal to 1. Bins 4 and 15 were the only bins of concern that were identified for potential VFDR delta risk impact. The Bin 4 frequency decrease was limited to Fire Area 21 where the delta risk considering the frequency difference between NUREG/CR-6850 and FAQ 08-0048 remained below the applicable acceptance thresholds. Similarly, the Bin 15 frequency difference did not alter the FRE conclusions for any fire area.

V.2.7 Main Control Room Abandonment Scenarios

With regard to considerations for Alternate Shutdown (ASD), the FRE for the Main Control Room (MCR) utilizes Fire PRA methods and guidance similar to other fire areas with a few notable exceptions. The MCR scenarios include a) Main Control Board (MCB) fire scenarios developed using NUREG/CR-6850, Vol. 2, Appendix L, b) non-MCB scenarios similar to other fire areas, and c) two (2) abandonment scenarios. Abandonment scenario W1 addresses MCR abandonment resulting from a MCB fire;

abandonment scenario W2 addresses MCR abandonment resulting from a fire originating from all other ignition sources (i.e., non Bin 4 including electrical cabinets and transients) in the Control Room. In both cases, failures were assumed which virtually eliminated all success paths other than the Standby Makeup Pump and the TD CA pump from the SSF. MCR fire modeling was used to determine the time required to reach MCR abandonment environment conditions which would then force abandonment. As described in NUREG/CR-6850, Volume 2, Section 11.5.2.1, fire protection features, room ventilation, and room geometry were inputs to each Control Room abandonment scenario.

Control room abandonment is only considered for cases where the Control Room environment (temperature and smoke) reaches the criteria specified in NUREG/CR 6850. For non-abandonment cases credit may be taken at the PCS as needed to control functions impacted for a given Control Room panel fire. Credit for Control Room actions associated with components not impacted by the fire is allowed for the non-abandonment scenarios. The Conditional Core Damage Probabilities (CCDPs) associated with the non-abandonment scenarios are consistent with limited loss of control from the Control Room, and therefore, abandonment due to these failures is not considered necessary even if the functional failures eliminate multiple success paths.

The SSF alternate shutdown success path functions are modeled in the Fire PRA (i.e., the Alternate Shutdown Panel) which allows for direct calculation of an abandonment CCDP based on the loss of MCR functionality and the spurious events associated with a given panel fire. The W1 abandonment scenario is based on the highest CCDP from an MCB fire with additional failures as necessary to ensure no credit for functions that require continued presence in the MCR. Similarly, the W2 abandonment scenario is based on the highest CCDP from a non-MCB fire with additional failures as necessary to ensure no credit for functions that require continued presence in the MCR. Even though it could be argued that scenarios that do not result in abandonment are compliant and need not be considered as part of the delta risk calculation, the compliant condition considers all of the MCR scenarios to capture the contribution from VFDRs that are not associated with either of the abandonment scenarios.

V.2.8 Fire PRA Fire Scenario Assumptions

The calculation entitled “Fire Scenario Report” provides a discussion of the fire scenario development assumptions. The calculation entitled “FPRA Summary Report” provides a discussion of the sources of uncertainty for the various NUREG/CR-6850 tasks which are related to fire scenario development.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
CS-A11-01	IDENTIFY instances where cable routing is assumed.	The "Y3" assessment in Appendix B of CNC-1535.00-00-0109 excludes cables for a small number of components that are not in the ARTRAK (e.g., 7 components for Air). While the routing of the cables from the electrical panel to the compressor may be sufficient to determine that power is available, the compressor itself has instrumentation and controls, that could cause spurious trips or spurious starts that do not appear to be included in the review of Y3 components and may not be limited to the routing areas in the assumed routing. For instance, the compressor control cable will likely go to the control room for switches, alarms and other controls. Similar information would be needed for other systems credited in the Y3 list as well. This SR was judged to be not met.	Closed / Met	An assumption was added to the FPRA Summary Report to indicate that the Y3 components are based on assumed routing. The Y3 list of basic events was developed considering both power and control cables in which each Y3 component could be credited. Sensitivity analysis performed in the FPRA Summary Report show that the impact of the Y3 components on quantification is relatively minimal. Credit by exclusion was used as a reasonable alternative to cable routing of Fire PRA components of lesser importance.
CS-B1-01	ANALYZE all electrical distribution buses credited in the FPRA Plant Response Model for proper overcurrent coordination and protection.	CNS performed a review of their existing electrical overcurrent coordination and protection analysis. As a result of this review, CNS identified a number of deficiencies in terms of scope and level of detail. CNS is currently in the process of completely redoing their electrical overcurrent coordination and protection analysis. The new analysis will increase the level of detail and to increase the scope to include all Appendix R equipment, the PRA equipment and the NPO equipment. As part of this re-analysis, CNS is making plant modifications as needed. However, at this time, this analysis is not complete. SR considered met at CC-I.	Closed/CC-I	The update of the breaker coordination and protection analysis was completed subsequent to the peer review and has since been incorporated into the Fire PRA. Breaker coordination related interlocks from pseudo components modeled in DATATRAK that were tabulated in Section 6.0 of the CNS Appendix R Coordination Study [Document No. 32-9043224] have been included in the Fire PRA as described in the Cable Selection Report.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
CS-C3 (no F&O)	If the provision of SR CS-A11 is used, DOCUMENT the assumed cable routing and the basis for concluding that the routing is reasonable in a manner that facilitates FPRA applications, upgrades, and peer review.	The review of the components selected for Y3 in Appendix B do not provide justification that the components and routings for Y3 are a complete list and that the systems can be credited in all of the fire areas and scenarios where they have been excluded from the UNL list. This SR was judged to be not met.	Closed / Met	Refer to disposition for cross-referenced F&O CS-A11-01.
ES-C1-01	IDENTIFY instrumentation that is relevant to the quantification of HEPs for operator actions that are to be addressed in the FPRA and quantified per SR HRA-C1.	HRA events are reviewed for instrumentation in attachment B of CNC-1535.00-00-0108 revision 0. The documentation for HRA events that do not have instrumentation in the internal events model is not clear. Instrumentation is described in general terms without information on the number of trains or the number of instruments available. There is not enough documentation to justify the diverse and redundant argument. This SR was judged to be not met.	Closed / Met	Additional details were added to Appendix B of the Component Selection calculation to support the redundant (multiple trains) and diverse (multiple parameters such as level and pressure) argument.
ES-C2-01	IDENTIFY instrumentation associated with each operator action to be addressed, based on fire-induced failure of any single instrument whereby one of the modes of failure to be considered is spurious operation of the instrument.	The Equipment Selection calculation CNC-1535.00-00-0108 revision 0, addresses spurious instrumentation under "Errors of Commission". This section states "No specific instruments were identified that would cause an undesired operator action without first taking one or more confirmatory actions". The results of the assessment are provided, but no details are provided on who performed the review, what method was used, and what procedures were reviewed. This SR was judged to be not met.	Closed / CC-II	The Component Selection calculation was updated to include additional details of the instrument review including the names of the reviewers. Using the guidance provided in Section 9.7 of the calculation and their firsthand knowledge of CNS, the reviewers evaluated the applicable EP(s), OP(s), & AP(s) in order to determine the important parameters that would be relied on for successful execution of each modeled operator action.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
FQ-A2-01	For each fire scenario selected per the FSS requirements that will be quantified as a contributor to fire-induced plant CDF and/or LERF, IDENTIFY the specific initiating event or events (e.g., general transient, LOOP) that will be used to quantify CDF and LERF.	Loss of Offsite Power (LOOP) events are not adequately represented in the Fire PRA model. Scenarios resulting in a LOOP are modeled by setting %T1 to TRUE along with the basic events for 6900V Switchgear 1TA/1TD and transformers 1ATC/1ATD. However, this does not satisfy all the LOOP logic, such as the PORV and SRV response following a LOOP, impact on Instrument Air and the ability to recover Main Feedwater. SR judged to be met.	Closed / Met	The Fire PRA model was updated to collect offsite power cables under1/2SYS-OSP which have been linked to basic event PACBOFTDEX under new gate TQ76A to address LOOP logic. This assures that the LOOP affects are reflected in the PORV, IA, MFW, and SRV logic structure.
FQ-F1-01	DOCUMENT the CDF and LERF analyses in accordance with the HLR-QU-F and HLR-LE-G high level requirements and their supporting requirements in the ASME PRA Standard and DEVELOP a basis supporting the claim of nonapplicability of any of the requirements under HLR-QU-A Part 2.	There are asymmetries in the model results between train A and B; this is due to the assumption that A train components are normally running and B train components are in standby (and thus all maintenance is assigned to that train). This results in asymmetrical results and is not discussed in the document. This SR was judged to be not met.	Closed / Met	A discussion of the model asymmetries and the potential impact on the Fire PRA results has been added to the Fire PRA Model Development report. Additionally, a comparison of risk results and importance measures for A-train versus B-train fire areas and selected equipment demonstrated the impact from model asymmetry to be insignificant with respect to FRE conclusions based on 1.174 acceptance thresholds (refer to Section 6.2.5).

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
FQ-F1-02	DOCUMENT the CDF and LERF analyses in accordance with the HLR-QU-F and HLR-LE-G high level requirements and their supporting requirements in the ASME PRA Standard and DEVELOP a basis supporting the claim of nonapplicability of any of the requirements under HLR-QU-A Part 2.	Many specific details from HLR-QU-F and HLR-LE-G are not documented. Specifically: - QU-F2: Review process, identification of key equipment and operator actions, bases for mutually exclusive events, and the process used to illustrate computer code correctness. - QU-F5 and LE-G5: Limitations in the quantification process that would impact applications. - QU-F6 and LE-G6: Quantitative definition for 'significant'. - LE-G2: Containment failure analysis and failure probability estimate for containment implosion due to spurious NS or VX activation.	Closed / Met	An appendix to the CNS Fire PRA Summary Report has been added to include an importance measure report from the integrated cutset results to address QU-F2 (the key equipment/actions). Sections 3.1 and 3.2 of the Model Development Report have had additional discussion provided to address LE-G2 (Spurious NS, VX). Section 4.0 of the Model Development Report addresses the quantitative definition of significant, QU-F6 and LE-G6. Section 7.0 of the Application Calculation and Sections 2.2 of the model development report have been updated to addresses QU-F2 and LE-G5 (computer code correctness and limitations). Section 6.2 of the Model Development report was updated to provide the basis for mutually exclusive event recovery rules.
FSS-A1-01	IDENTIFY all risk-relevant ignition sources, both fixed and transient, in each unscreened physical analysis unit within the global analysis boundary.	Documentation of the potential sources of fire in each compartment has not been completed. SR judged to be met.	Closed / Met	The Fire Scenario report documentation was updated to list the ignition sources that were screened from quantification for each fire compartment.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
FSS-A2-01	GROUP all risk-relevant damage targets in each unscreened physical analysis unit within the global analysis boundary into one or more damage target sets and for each target set, SPECIFY the equipment and cable failures, including specification of the failure modes.	Target Sets and related Failure Modes are not listed in a comprehensive and organized fashion, and then linked to ignition sources. Example: For FA1, targets are (1) trays in pump room, (2) NS Pump 1A motor, (3) NS Pump 1A itself, (4) NS Pump 1A motor junction box, etc. Tray identification may be needed in some fire areas. Then postulated ignition sources are linked to each target or group of targets (i.e., oil leak to pump and motor, etc.). SR judged to be met.	Addressed with no impacts to the NFPA 805 application / Met	As described in the CNS Fire Scenario Report, only those targets within the zone of influence of an ignition source (which may also be a target as in the case of an NS pump) are identified for a given scenario. It was considered not practical to group target sets and then locate ignition sources. However, a list of scenarios where a specific target was impacted (either a tray target or a specific component) can be derived using the FRANC database. Note that all of the targets in the NS and ND pump rooms in FA 1 were assumed to be failed by the pump fire.
FSS-H10-01	DOCUMENT the walkdown process and results.	Fire Area walkdown notes were input to a computer database, but no output has been created for documentation purposes. In addition, plant drawings identifying the fire areas and the ratings of boundaries to these fire areas have not been found. SR judged to be met.	Closed / Met	The fire scenario walkdown information has been appended to the Fire Scenario Report (Appendix F) for documentation purposes. CN-1209 series drawings identify the fire areas and boundaries.
HRA-A2-01	For each fire scenario, identify any new fire-specific safe shutdown actions called out in the plant fire response procedures in a manner consistent with the scope of selected equipment from the ES and PRM elements of the RA-S-2009 standard and in accordance with HLR-HR-E and its SRs in Part 2.	This requirement states that HRAs are identified in a manner similar to HLR-HR-E from part 2 of the standard with emphasis on fire scenarios. SR HR-E1 discusses a systematic review of the applicable procedures for operator actions of interest. However, the Fire Modeling documentation does not discuss the review of Plant Fire procedure or other applicable procedures to identify fire specific actions. If this review was performed, then some evidence of the actions considered should be provided. The SR was judged to be not met.	N/A	The goal is to have a post transition plant with as few fire specific actions as possible. Consequently, no fire specific actions are added to the Fire PRA model. Any important actions identified as necessary to reduce risk can be added to the procedures and model at a later time. No operator actions have been identified at this time; the requirement is N/A at this time.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
HRA-A4-01	TALK THROUGH (i.e., review in detail) with plant operations and training personnel the procedures and sequence of events to confirm that interpretation of the procedures relevant to actions identified in SRs HRA-A1, HRA-A2, and HRA-A3 is consistent with plant operational and training practices.	Information on operator walk throughs or talk throughs for the impact of fires on the operator actions is not present in CNC-1535.00-00-0111. There is information in the HRA calculator sheets for the new operator actions developed but it has no information concerning when these actions where discussed or with whom. This information should be maintained as backup information or included in the applicable document. Also, if the talk throughs have not been updated since the IPE or IPEEE days, the procedural changes may require updating for the FPRA. SR considered met at CC-I.	Addressed with no impacts to the NFPA 805 application / CC-I	The Fire PRA uses a set of multipliers as described in the model development report to account for fire impacts on human reliability. This process is intended to implicitly account for (in a conservative manner) factors influencing operator performance such as fire effects on instrumentation, operator stress, and possible impact on timing. This conservative approach is judged to be consistent with a CC-I approach as indicated in SR HRA-C1 of the standard. With the HRA at CC-I, the Fire PRA results possess a conservative bias from this aspect of the analysis. With overall risk metric results of the Fire PRA acceptable, the conservatism does not impede the use of the Fire PRA for the transition to NFPA 805. No actions have been taken to bring this HRA element to CC-II.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
HRA-B3-01	COMPLETE the definitions of HFEs identified previously in HRA-B1 and HRA-B2 of this Standard and, within the context in the fire scenarios in the Fire PRA, specify the following: accident sequence specific timing of cues, time window for completion and procedure guidance. Also specify the availability of indications for detection and high-level tasks needed to achieve the goal of the response.	The methodology for HRA adjustments does not explicitly address instrumentation, timing and procedural impacts other than simple vs. complex actions, which per HRA-B1-01 were noted as not defined in the documentation. The SR was judged to be not met.	Addressed with no impacts to the NFPA 805 application / CC-I	The HEP multiplier process is intended to implicitly address timing, procedure use, and instrument availability (when considered along with the instrument review documented in the component selection calculation). No changes have been made to bring the HRA to CC-II.
HRA-C1-02	For each selected fire scenario, quantify the HEPs for all HFEs, accident sequences that survive initial quantification and account for relevant fire-related effects using conservative estimates, in accordance with the SRs for HLR-HR-G in Part 2 set forth under CC-I.	A finding from the FPIE evaluation stated that HEPs are not converted from medians to means. This issue was said to be addressed with a sensitivity case. However, this issue should be addressed in the Fire PRA. SR considered met at CC-I.	Closed/ CC-II	The HEP values have been converted from median to mean in the Fire PRA model.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
HRA-D2-01	[HR-H2] CREDIT operator recovery actions only if a procedure is available and operator training has included the action as part of crew's training, or justification for the omission for one or both is provided.	The one recovery action developed for the Fire PRA (TSSPZRLRHE) is not proceduralized nor is it trained on. There is no discussion of why this action can be credited, which is contrary to the requirements of HR-H2 so this SR is Not Met.	Closed / Met	The operator action referenced in the finding is not a "fire recovery" in the context of NFPA 805. This is an action added to the Fire PRA model to address a specific accident sequence (not fire specific) that was not yet included in the internal events model. Section 5.1 of the Model Development Report has been updated to better describe the basis for crediting this operator action.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
PRM-B2-01	Verify the peer review exceptions and deficiencies for the Internal Events PRA are dispositioned, and the disposition does not adversely affect the development of the Fire PRA plant response model.	Section 4 of CNC-1535.00-00-0111 addresses PRA model quality for fire PRA use. Two potentially significant items not address are HRA pre-initiators (HR-A3 and HR-D6) and failure probability data (DA-B1) from DPC-1535.00-00-0013 revision 2. Section 4 of the FPRA Model Development should address these two items. This SR was judged to be not met.	Addressed with no significant impacts to the NFPA 805 application / Met	The CNS internal events peer review was conducted under NEI 00-02. There is no internal event PRA finding which corresponds to element HR-D6 in the ASME/ANS PRA Standard;; however, the HEPs have been quantified using mean values in the Fire PRA. There were no internal events peer review findings against HR-A3. No changes have been made to the Fire PRA. Compared to post-initiator HEPs and fire induced failures, latent human error probabilities, equipment random failure rates and maintenance unavailability, calibration HEPs and misalignment of multiple trains of equipment are not expected to contribute significantly to overall equipment unavailability. Thus there is no material impact on the Fire PRA and no changes to the pre-initiator human error modeling have been made for the Fire PRA. The internal events peer review identified a finding against DA-B1 (F&O DA-01) which noted that the data development workplace procedure did not identify component boundaries. The finding went on to note that component boundaries are apparent from the data. The change to the workplace procedure does not impact the Fire PRA quantification and no examples where the data was found to be incorrect were identified. Modest changes to the random failure rates have little impact on the results as fire induced failures are far more significant in the Fire PRA results.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
PRM-B5-01	For those fire-induced initiating events included in the Internal Events PRA model, REVIEW the corresponding accident sequence models and IDENTIFY any existing accident sequences that will require modification based on unique aspects of the plant fire response procedures in accordance with HLR-AS-A and HLR-AS-B of the ASME PRA Standard and their support requirements and IDENTIFY any new accident sequences that might result from a fire event that were not included in the Internal Events PRA in accordance with HLR-AS-A and HLR-AS-B of the ASME PRA Standard and their supporting requirements.	Reactor trip was used for fire initiating events in the model, although feedwater is failed due to lack of routing information. The plant response model is not the same for the plant trip and loss of feedwater initiating events, for example the probability of lifting a PORV or SRV is 1E-2 for loss of feedwater and 1E-3 for plant trip. The SR was judged to be met.	Closed / Met	The Fire PRA model was modified to add gate IEFIRES which enables the fire initiating events to inherit the plant response logic for any transient event. The transient logic in the IEPRA and consequently the Fire PRA includes transfers to all of the necessary support systems logic. Updated Section 6.3 of the Fire PRA Model Development report.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
PRM-B6-01	MODEL accident sequences for any new initiating events identified per PRM-B2 and any accident sequences identified per PRM-B4 reflective of the possible plant responses to the fire-induced initiating events in accordance with HLR-AS-A and HLR-AS-B and their SRs in the ASME PRA Standard and DEVELOP a defined basis to support the claim of nonapplicability of any of these requirements in the ASME PRA Standard.	CNS added several new accident sequences to address some fire specific issues that were not part of the base PRA. The model was reviewed and generally found to follow the process from the internal events PRA. The one issue was identified in that one of the new sequences included a new operator action, TSSPZRLRHE, but did not provide a basis for the assumed timing. In the HRA quantification section, CNS indicated that this was an ex-control room action with more than an hour available to perform the action. However, CNS did not provide the basis for saying that more than an hour was available.	Closed / Met	Section 5.1 of the Fire PRA Model Development report has been updated to provide additional basis for the action and the assumed HEP value. Note that this HEP is not an NFPA 805 fire-specific recovery event.
PRM-B7-01	IDENTIFY any cases where new or modified success criteria will be needed to support the FPRA consistent with the HLR-SC-A and HLR-SC-B of the ASME PRA Standard and their SRs.	The self-assessment indicated that success criteria issues were considered in the Model Development Report. However, no evidence could be found that success criteria had been discussed in the Model Development report. The SR was judged to be not met.	Closed / Met	A discussion addressing success criteria has been added to the Fire PRA Model Development report (section 3.4).
PRM-B11 (no F&O)	MODEL all operator actions and operator influences in accordance with the HRA element of this standard.	This SR is judged to be not met because of a number of issues associated with the identification and incorporation of fire related HFEs. See HRA F&Os.	Closed / Met	Refer to disposition for cross-referenced F&Os PRM-B6-01, HRA-A4-01, & HRA-B1-01.

Table V-1 Fire PRA Peer Review – Facts and Observations

F&O	Requirement	Finding	Status	Disposition
SF-A3-01	ASSESS the potential for common-cause failure of multiple fire suppression systems due to the seismically-induced failure of supporting systems such as fire pumps, fire water storage tanks, yard mains, gaseous suppression storage tanks, or building stand-pipes.	The seismic/fire interaction evaluation is discussed in Section 3.13 of CNC-1535.00-00-0112. In general, CNS relies upon the assessments performed for the IPEEE analyses, in particular, the walkdowns. The IPEEE walkdown is documented in CNC-1435.00-00-0007 and the overall IPEEE is documented in the IPEEE Submittal Report. There is no indication in the documents provided that both seismic-induced fire as well as seismic-induced failure of fire mitigation systems has been considered. The SR was judged to be not met.	Closed / Met	Section 3.13 of the Fire PRA Summary report has been updated to indicate that both seismic-induced fire and seismic-induced failure of fire mitigation systems were considered in the seismic/fire interaction evaluation. No impact on quantification.
SF-A5-01	Review (a) plant fire brigade training procedures and assess the extent to which training has prepared firefighting personnel to respond to potential fire alarms and fires in the wake of an earthquake and (b) the storage and placement of firefighting support equipment and fire brigade access routes, and (c) assess the potential that an earthquake might compromise one or more of these features.	This SR basically requires that CNS qualitatively assess their existing fire brigade training procedures to determine if the training has prepared the brigade to respond to fire alarms after an earthquake, to review their staging of fire mitigation equipment and to assess whether or not the occurrence of a seismically induced fire and any associated damage might compromise either of these elements. The CNS seismic/fire interaction evaluation is discussed in Section 3.13 of CNC-1535.00-00-0112. In general, CNS relies upon the assessments performed for the IPEEE analyses, in particular, the walkdowns. The IPEEE walkdown is documented in CNC-1435.00-00-0007 and the overall IPEEE is documented in the IPEEE Submittal Report. A review of these documents does not show any evaluation of a seismically induced fire and the potential impacts on brigade response and equipment staging.	Closed / Met	Section 3.13 of the Fire PRA Summary Report has been updated to include an evaluation of seismically induced fire and the potential impacts on brigade response and equipment staging. No impact on quantification.

Table V-2 Fire PRA– Category I Summary

SR	Topic	Status
PP-B3	Spatial separation not relied upon for compartment assignments. This SR, PP-B3, is judged to be met at CC-I since no spatial separation is credited and CC-II/III requires crediting of spatial separation as credited in the regulatory fire protection program. Basis for Significance: As performed, adequate compartmentalization is used for the Catawba fire PRA. Possible Resolution: For CC-II/III, refinement of the compartmentalization to smaller compartment is required. (F&O PRM-B3-01)	As indicated by the reviewer, adequate compartmentalization is used for the CNS Fire PRA. Not crediting spatial separation as a partitioning feature is conservative; therefore, CC-I for this SR is acceptable for the NFPA 805 application.
PP-B5	No active fire barrier elements are credited for Catawba Fire PRA compartmentalization. The credited passive fire barriers correspond to barriers credited in the regulatory fire protection program. Basis for Significance: The Catawba fire PRA credits only fire rated passive barriers. In order to meet Capability Category II/III, crediting of active fire barrier elements in fire compartment boundaries, with appropriate justification, is necessary. Possible Resolution: If CC-II/III is desired, the PRA compartmentalization must be revised with credits for active fire barriers, with appropriate justification. (F&O PRM-B5-01)	The Catawba Fire PRA analysis did not credit active barriers for partitioning, which is a conservative treatment. CC-I for this SR is acceptable for the NFPA 805 application.
CS-B1	CNS performed a review of their existing electrical over-current coordination and protection analysis. As a result of this review, CNS identified a number of deficiencies in terms of scope and level of detail. CNS is currently in the process of completely redoing their electrical over-current coordination and protection analysis. The new analysis will increase the level of detail and to increase the scope to include all Appendix R equipment, the PRA equipment and the NPO equipment. As part of this re-analysis, CNS is making plant modifications as needed. However, at this time, this analysis is not complete. Basis for Significance: A review of the existing electrical over-current	The update of the breaker coordination and protection analysis was completed subsequent to the peer review and has since been incorporated into the Fire PRA. In some cases, the Fire PRA results were updated to reflect a larger cable footprint for affected power sources by including cables for uncoordinated loads (via related pseudo components). In other cases, the Fire PRA credited modifications to minimize or eliminate the coordination issues. This SR is now considered met at CC-II/III.

Table V-2 Fire PRA– Category I Summary

SR	Topic	Status
	coordination and protection analysis is required to meet the SR even at the CC-I level. Possible Resolution: To move from CC-I up to CC-II/III complete the on-going update of the electrical over-current coordination and protection analysis and formally issue the report. (F&O CS-B1-01)	
FSS-B2	Section 3.1.3 of CNC-1535.00-00-010 and Appendix E of that document identifying fire-driven parameters necessitating abandonment discuss the conditions that are assumed for fire scenarios W1 and W2 addressed in the document. A bounding type analysis for the control room was performed. To achieve Capability Category II requires a realistic characterization. The scenario analyzed are bounding in nature but could be tweaked for more realism and analysis with additional detail in order to achieve a Capability Category II rating. Basis for Significance: Analysis presented satisfies Capability Category I requirements. Possible Resolution: If Capability Category II is desired, perform additional control room analysis with more realistically modeled scenarios, crediting panel design and other specific features of the Catawba control room design. (F&O FSS-B2-01)	The MCR abandonment evaluation employed acceptable fire modeling methods and the calculated CCDP is based on the proceduralized success path provided by the SSF. CC-I for this SR is bounding; therefore CC-I is considered acceptable for the NFPA 805 application. However, the contribution of MCR abandonment is not inordinate to the overall fire CDF/LERF.
FSS-C1	A two-point treatment was used for isolated selected scenarios such as low energy panels but not for "each selected" scenario. Basis for Significance: Analysis performed addresses Capability Category I requirements and more but not to the extent to qualify for a Capability Category II rating. Possible Resolution: If Capability Category II rating is desired, a preponderance of evaluated scenarios should be evaluated using two-point methodology. (F&O FSS-C1-01)	The Fire PRA analysis was updated to increase the number of scenario refinements using a 2-point treatment. Analysis has since been updated; SR now considered met at CC-II.

Table V-2 Fire PRA– Category I Summary

SR	Topic	Status
FSS-C2	Peak heat release rates reflected in NUREG 6850 were utilized. Time-dependent growth heat release rate curves were not discussed. Basis for Significance: Analysis performed meets industry practice. Possible Resolution: If Capability Category II rating is desired, then additional analysis utilizing time-dependent heat release rate information is required. (F&O FSS-C2-01)	Time dependent HRR profiles have since been incorporated into numerous high risk scenarios. Analysis has since been updated; SR now considered met at CC-II.
FSS-C3	Burn out was considered in analysis for hot gas layer impact but did not seem to be based on fuel exhaustion but rather taking the room condition to total involvement. Additional discussion and detail addressing fuel exhaustion is required for improved rating. Basis for Significance: Analysis performed appears to satisfy requirement but does not address detail for higher than Capability Category I rating. Possible Resolution: If Capability Category II/III is desired, additional analysis considering the impact of fuel exhaustion in each compartment is required. (F&O FSS-C3-01)	The treatment for the hot gas layer is a conservative screening evaluation; therefore CC-I is considered acceptable for the NFPA 805 application.
FSS-F2	Structural collapse is not deemed likely or addressed further. This meets Capability Category I which does not have any requirements identified. The discussion of structural collapse is qualitative in nature which does not meet the requirements for Capability Category II/III structural collapse analyses. Basis for Significance: Capability Category I has no requirements identified, so that SR CC-I is met. Capability Category II/III required more in-depth scenario development, identifying the criteria for structural collapse. Possible Resolution: If Capability Category II//III is desired, then more detailed structural analysis is required to be incorporated into the model. However, this may not always be cost effective.	The Fire PRA locations were reviewed and determined to not meet the definition in FSS-F1. Therefore, this SR is N/A.

Table V-2 Fire PRA– Category I Summary

SR	Topic	Status
	(F&O FSS-F2-01)	
FSS-F3	No quantitative discussion is provided. A qualitative discussion of structural collapse is provided in Section 3.2 of CNC-1535.00-00-011 Basis for Significance: Qualitative discussion meets criterion for Capability Category I. Capability Category II/III requires specific risk determination for structural collapse. Possible Resolution: If Capability Category II/III grading is required, then update of the Catawba Fire PRA is required that specifically determines fire risk resulting in structural collapse as per the SR. (F&O FSS-F3-01)	The Fire PRA locations were reviewed and determined to not meet the definition in FSS-F1. Therefore, this SR is N/A.
FSS-G4	Plans indicate that some three-hour boundaries are constructed with two-hour block with grout filled cells. No justification for this arrangement and its adequacy was provided. This is also a plant partitioning issue. Basis for Significance: Used three-hour fire rated fire area boundaries and allowed for barrier failure in screening analysis, Attachment 4 of the Fire Scenario Report [CNC-1535.00-00-0110]. Possible resolution: To achieve Capability Category II, provide original plant construction documents and/or industry test information and building code acceptance information to justify the validity of two-hour block with grout filled cells being equivalent to a three-hour barrier. (F&O FSS-G4-01)	While conditions within the plant may still be impacted by the fire event, the major actions associated with fire mitigation are assumed to be complete within a 1 to 2 hour time frame. From NUREG/CR-6850, fire barriers with a minimum fire protection endurance rating of one hour can be credited to prevent the spread of fire. Therefore, the difference between a 2 or 3 hour barrier rating is inconsequential to the Fire PRA.
FSS-H2	Duke testing was not used. Hughes report was the default report for damage mechanisms resulting in zone of influence damage criteria. Basis for Significance: Used zone of influence scoping and documented in Generic Fire Modeling Treatments Report for project 1SPH.02902.030 and CNC-1535.00-00-0110. Thresholds for target damage were based on industry criteria for damage with zone of influence assessment for Catawba. Catawba specific damage criteria were not used.	The damage criteria applied in the Generic Fire Modeling Treatments are taken from NUREG/CR-6850. No plant specific data is available for use in lieu of NUREG/CR-6850. Since the plant specific ignition sources are comparable to those in the Generic Fire Modeling Treatments, use of ZOI information based on the generic configurations is considered acceptable for the NFPA 805 application.

Table V-2 Fire PRA– Category I Summary

SR	Topic	Status
	Possible Resolution: In order to meet Capability Category II/III classification, the use of Catawba plant-specific damage criteria is required. Determination of plant-specific damage criteria is required with a well document technical basis. Revise and update the Fire PRA as noted above. (F&O FSS-H2-01)	
HRA-A3	The Equipment Selection Calculation CNC-1535.00-00-0108 revision 0, addresses spurious instrumentation under "Errors of Commission". This section states "No specific instruments were identified that would cause an undesired operator action without first taking one or more confirmatory actions". The results of the assessment are provided, but no details are provided on who performed the review, what method was used, and what procedures were reviewed. Basis for Significance: There is not sufficient documentation to determine the SR is met. Possible Resolution: Add documentation describing what procedures were reviewed, what method was applied during the review, and what the qualification of the individual performing the review was. (F&O ES-C2-01)	Analysis has since been updated; SR now considered met at CC-II.
HRA-A4	Information on operator walk-throughs or talk-throughs for the impact of fires on the operator actions is not presented in CNC-1535.00-00-0111. There is information in the HRA Calculator sheets for the new operator actions developed, but it has no information concerning when these actions were discussed or with whom. This information should be maintained as backup information or included in the applicable document. Also, if the talk-throughs have not been updated since the IPE or IPEEE days, the procedural changes may require updating for the FPRA. Basis for Significance: A review of procedural impacts for the fire is required to determine correct impacts on the HEPs due to events such as fire. Talk-throughs will also help verify that any additional actions are not missed.	The Fire PRA uses a set of multipliers as described in the model development report to account for fire impacts on human reliability. This process is intended to implicitly account for (in a conservative manner) factors influencing operator performance such as fire effects on instrumentation, operator stress, and possible impact on timing. This conservative approach is judged to be consistent with a CC-I approach as indicated in SR HRA-C1 of the standard. With the HRA at CC-I, the Fire PRA results possess a conservative bias from this aspect of the analysis. With overall risk metric results of the Fire PRA acceptable, the conservatism does not impede the use of the Fire PRA for the transition to NFPA 805. CC-I is considered acceptable for the NFPA 805 application.

Table V-2 Fire PRA– Category I Summary

SR	Topic	Status
	Possible Resolution: If talk-throughs were performed for this FPRA, the information should be maintained as backup information or included in the applicable document. If the talk-throughs have not been performed or adequately documented since the IPEEE, then the talk-throughs should be performed and documented in a manner that will help future updates. (F&O HRA-A4-01)	
HRA-B4	HRA events are reviewed for instrumentation in Attachment B of CNC-1535.00-00-0108, Rev. 0. The documentation for HRA events that do not have instrumentation in the internal events model is not clear. Instrumentation is described in general terms without any information on the number of trains or the number of instruments available. There is not enough documentation to justify the diverse and redundant argument. Basis for Significance: Based on the available documentation, reviewers were unable to determine if the instrumentation supporting credited HRA events was diverse and redundant enough to credit associated events. Possible Resolution: Provided additional details on the number, type, and trains of instrumentation being credited. (F&O ES-C1-01)	Analysis has since been updated; SR now considered met at CC-II.
HRA-C1	A finding from the FPIE evaluation stated that HEPs are not converted from medians to means. This issue was said to be addressed with a sensitivity case. However, this issue should be addressed in the Fire PRA. Basis for Significance: This finding will have a minor impact on post-accident HEP, but will cause a 2-3 times increase in pre-accident HEPs. Possible Resolution: Ensure that the HEPs are completely based on means rather than medians. (F&O HRA-C1-02)	The Fire PRA uses a set of multipliers as described in the model development report to account for fire impacts on human reliability. This process is intended to implicitly account for (in a conservative manner) factors influencing operator performance such as fire effects on instrumentation, operator stress, and possible impact on timing. This conservative approach is judged to be consistent with a CC-I approach as indicated in SR HRA-C1 of the standard. With the HRA at CC-I, the Fire PRA results possess a conservative bias from this aspect of the analysis. With overall risk metric results of the Fire PRA acceptable, the conservatism does not impede the use of the Fire PRA for the transition to NFPA 805. CC-I is considered acceptable for the NFPA 805 application.
HRA-D1	CNS added several new accident sequences to address some fire-specific issues that were not part of the base PRA. The model was	The Fire PRA uses a set of multipliers as described in the model development report to account for fire impacts on human reliability. This

Table V-2 Fire PRA– Category I Summary

SR	Topic	Status
	reviewed and generally found to follow the process from the internal events PRA. One issue was identified: One of the new sequences included a new operator action, TSSPZRLRHE, but the documentation did not provide a basis for the assumed timing. In the HRA quantification section, CNS indicated that this was an excontrol room action with more an hour was available to perform the action. However, CNS did not provide the basis for saying that more than an hour was available. Basis for Significance: This important information needs to be documented in relation to inclusion of a new operator action in the PRA. Possible Resolution: CNS needs to explicitly define the basis for stating that more than an hour is available to perform an ex-control room fire-specific action. Also, CNS should review all ex-control room actions to confirm that they have reasonable bases for the assumed time available. (F&O PRM-B6-01)	process is intended to implicitly account for (in a conservative manner) factors influencing operator performance such as fire effects on instrumentation, operator stress, and possible impact on timing. This conservative approach is judged to be consistent with a CC-I approach as indicated in SR HRA-C1 of the standard. With the HRA at CC-I, the Fire PRA results possess a conservative bias from this aspect of the analysis. With overall risk metric results of the Fire PRA acceptable, the conservatism does not impede the use of the Fire PRA for the transition to NFPA 805. CC-I is considered acceptable for the NFPA 805 application.

W. Fire PRA Insights

19 Pages Attached

W.1 Fire PRA Overall Risk Insights

Risk insights were documented as part of the development of the Fire PRA. The total plant fire CDF/LERF was derived using the NUREG/CR-6850 methodology for Fire PRA development and is useful in identifying the areas of the plant where fire risk is greatest. The risk insights generated were useful in identifying areas where specific contributors might be mitigated via modification. A detailed description of significant risk sequences associated with the fire initiating events that represent a 1% contribution of the calculated fire risk for the plant was prepared for the purposes of gaining these insights and an understanding of the risk significance of MSO combinations. These insights are provided in Table W-2 and are based on Unit 1 results; however, since Unit 2 results are similar, the risk insights are considered representative for both units.

W.2 Risk Change Due to NFPA 805 Transition

In accordance with the guidance in Regulatory Position 2.2.4.2 of RG 1.205 Revision 1:

> *"The total increase or decrease in risk associated with the implementation of NFPA 805 for the overall plant should be calculated by summing the risk increases and decreases for each fire area (including any risk increases resulting from previously approved recovery actions). The total risk increase should be consistent with the acceptance guidelines in Regulatory Guide 1.174. Note that the acceptance guidelines of Regulatory Guide 1.174 may require the total CDF, LERF, or both, to evaluate changes where the risk impact exceeds specific guidelines. If the additional risk associated with previously approved recovery actions is greater than the acceptance guidelines in Regulatory Guide 1.174, then the net change in total plant risk incurred by any proposed alternatives to the deterministic criteria in NFPA 805, Chapter 4 (other than the previously approved recovery actions), should be risk-neutral or represent a risk decrease."*

W.2.1 Methods Used to Determine Changes in Risk

The methods and data used to develop the Fire PRA models of the post-transition plant and the compliant plant are consistent with those that underwent the Fire PRA peer review.

Variances from deterministic requirements (VFDRs) identified for CNS may be generally categorized as either a pre-transition OMA, separation issue or a degraded fire protection system or feature. To calculate the delta risk of a given VFDR, the Fire PRA relies on the list of fire-damaged cables and equipment identified during the VFDR identification phase to model the compliant plant. These cables and equipment are, therefore, at the origin of a delta risk between the post-transition plant and the compliant plant.

The variant case represents the post-transition condition and includes a risk-informed strategy that utilizes failure probabilities for recovery actions, plant modifications, or a combination, to mitigate the risk of the VFDRs. The variant condition represents the 'post-transition' plant configuration, not the currently existing as-built as-operated plant configuration. The variant and compliant conditions includes all modifications, which include those that reduce plant risk, but are not directly related to any particular VFDR. The compliant case was created by manipulating the Fire PRA model to 'remove' the

VFDR(s). Fire PRA manipulations involved 'toggling off' or excluding specific PRA basic events to remove the potential fire induced failure associated with the VFDRs. The definitions of the post-transition and compliant plant used in this Attachment are consistent with Regulatory Guide 1.205, which requires that the risk associated with VFDRs be evaluated by comparison to the deterministically compliant plant (Section 2.2.4 of Regulatory Guide 1.205). For additional detail on VFDR dispositions and delta risk, see the calculation entitled, "NFPA 805 Transition, Fire Risk Evaluations (FREs)."

In some cases, the function of concern for a given VFDR was not modeled. Justification may be based on the minimal contribution to plant risk based on the PRA mission time or it may be based on credit of additional plant features credited in the PRA that minimize the risk benefit of the particular function of concern. Justification for not modeling deterministic safe shutdown equipment is part of the SSEL disposition process under NUREG/CR-6850 Task 2. This process was extended to evaluation of recovery actions that are not explicitly modeled in the PRA. If the function being recovered by the action is modeled, then a delta risk calculation can be performed. If the function being recovered is not modeled, then the action is not risk significant. Similarly, very few instruments are modeled directly in the Fire PRA; however, a number of instruments can be considered to be modeled indirectly through their relationship with operator actions. In some cases, the delta risk for a VFDR related to an instrument monitoring function was conservatively estimated by using a modeled actuation function for that instrument as a surrogate. Separately, instruments are reviewed to ensure that sufficient cues remain available to support modeled operator actions. The PRA disposition of each VFDR is provided as part of the fire risk evaluation to describe the Fire PRA manipulations necessary to create the compliant case condition or provide justification for not modeling the VFDR. The compliant case treatment may be different for the same component between fire areas due to the safe shutdown strategy which varies between SSF and Main Control Room safe shutdown fire areas.

W.2.2 Risk Acceptance Criteria

From Tables W-3 and W-4, the total change in risk associated with the transition to NFPA 805 results in a risk increase as follows:

- 5.28E-06/rx-yr / 5.70E-07/rx-yr, respectively for Unit 1 CDF and LERF
- 5.27E-06/rx-yr / 5.89E-07/rx-yr, respectively for Unit 2 CDF and LERF

From Table W-1, the total plant risk is less than 1E-04/yr for CDF and less than 1E-05/yr for LERF with completion of the modifications identified in Tables S-2a and S-2b in Attachment S. Therefore, the transition risk is within the applicable acceptance limits from RG 1.174 of delta CDF values less than 1E-05 and delta LERF values less than 1E-06.

The additional risk of recovery actions is bounded by the treatment of additional risk associated with the applicable VFDR for that recovery action. In calculating the additional risk of the VFDR, the compliant case recovers the fire-induced failure(s) as if the variant condition no longer exists. The resulting delta risk between the variant and compliant

condition bounds any additional risk for the recovery action even if that recovery action were modeled.

The Fire PRA model CDF and LERF are calculated using minimal cutsets created by the FORTE cutset generation algorithm for each fire scenario. For complex models such as the fire PRA model, the top event frequency is difficult to calculate exactly, so programs such as CAFTA and FRANC make a number of approximations . CAFTA and FRANC use the Min Cut Upper Bound (MCUB) method rather than a simple sum of the cutsets as it is easy to calculate, will never be higher than 1.0 and it will give an upper limit . However, the MCUB approximation calculation becomes less accurate when the model contains large failure probabilities or there is a large amount of dependence between cutsets as happens in highly redundant systems. The ACUBE program was developed to improve upon the traditional approximations for the top event frequency, given the model cutsets. The values provided below are the result of the ACUBE application.

Total CDF and LERF

The plant risk from internal events, internal flood, seismic, other hazards and fire are provided in Table W-1 below.

Table W-1 Summary of Total Plant Risk

Hazard	Unit 1 CDF (per rx-yr)	Unit 1 LERF (per rx-yr)	Unit 2 CDF (per rx-yr)	Unit 2 LERF (per rx-yr)
Internal Events	1.3E-05	1.1E-06	1.3E-05	1.1E-06
Internal Flood	2.4E-05	5.4E-07	2.4E-05	5.4E-07
Seismic	1.1E-05	Not Calculated	1.1E-05	Not Calculated
Tornado	1.6E-06	1.4E-07	1.6E-06	1.4E-07
Fire	3.1E-05	3.0E-06	3.2E-05	3.1E-06
Total	8.1E-05	4.8E-06*	8.2E-05	4.9E-06*

*Does not include Seismic LERF

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)

Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF [b]	CDF	% LERF	LERF Rank	LERF/CDF
45_T01	Transient Fire near Cable Shaft	6.9% / 6.9%	This scenario is dominated by loss of SSHR sequences. The fire results in loss of RN train A, the TDCAP, the MSIV bypass valves, draining of the FWST, and loss of thermal barrier cooling. Random and fire induced failures affecting the remaining CA pump leads to loss of SSHR. Mitigation fails due to random or fire induced failure of the sump recirculation function. Some conservative bias may be present if operator actions to manually close main steam branch lines can reduce the likelihood of a SG being treated as faulted. No credit for such action is taken.	3.8E-01	8.9E-06	3.4E-06	10.1%	1	1.5E-01
15_D1	Essential Load Center 1ELXC Severe Fire	5.0% / 11.9%	This scenario has the largest contribution from loss of secondary side heat removal sequences though seal LOCAs are also important. The fire results in a loss of power to the normally operating train of equipment, A train of RN on both units, MFW, SSF standby makeup pump, and the TDCAP. Random failure of the redundant train (primarily KC and RN maintenance) results in a loss of the standby train of CA. Mitigation fails due to the random failures of the standby equipment.	6.1E-02	4.0E-05	2.4E-06	2.2%	8	4.6E-02

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)

Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF [b]	CDF	% LERF	LERF Rank	LERF/CDF
8_B1	Essential Swgr 1ETB Severe Fire	4.8% / 16.7%	This scenario is dominated by loss of secondary side heat removal sequences. The fire results in loss of power to the standby train of equipment, the TDCA pump, and MFW. A combination of random and fire induced failure of the operating train leads to loss of CA. Mitigation fails due to random failures of the ECCS for feed and bleed primarily as a result of operator error.	1.6E-02	1.5E-04	2.4E-06	5.8%	4	1.3E-01
21_B3	MCB MC11 Fire (1ETA & 1ETB)	4.6% / 21.3%	This scenario has the largest contribution from loss of secondary side heat removal sequences though seal LOCAs are also important. The fire results in a total loss of power. Random failure of the TDCAP or the SSF standby makeup pump leads to core damage. Mitigation fails due to the loss of power.	4.8E-01	4.7E-06	2.2E-06	7.6%	2	1.7E-01
15_C1	Essential Load Center 1ELXA Severe Fire	4.4% / 25.7%	This scenario has the largest contribution from loss of secondary side heat removal sequences though seal LOCAs are also important. The fire results in a loss of power to the normally operating train of equipment, A train of RN on both units, MFW, SSF standby makeup pump, and the TDCAP. Random failure of the redundant train (primarily KC and RN maintenance) results in a loss of the standby train of CA. Mitigation fails due to the random failures of the standby equipment.	4.0E-02	5.4E-05	2.1E-06	1.7%	14	4.1E-02

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)									
Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF [b]	CDF	% LERF	LERF Rank	LERF/CDF
21_C3	MCB MC10 Fire	3.6% / 29.3%	This scenario is dominated by loss of secondary side heat removal sequences. The fire results in loss of both MDCA pumps and the pressurizer PORVs. Random and fire induced failures of the TDCAP lead to a need for feed and bleed. Mitigation fails due to the inability to establish a bleed path.	3.7E-01	4.7E-06	1.8E-06	2.0%	10	5.8E-02
15_B4	Essential Swgr 1ETA (16-18) Severe Fire	2.4% / 31.8%	This scenario has the largest contribution from loss of secondary side heat removal sequences though seal LOCAs are also important. The fire results in a loss of power to the normally operating train of equipment, A train of RN on both units, and the TDCAP. Random failure of the redundant train (primarily KC and RN maintenance) results in a loss of the standby train of CA. Mitigation fails due to the random failures of the standby equipment.	4.7E-02	2.5E-05	1.2E-06	1.6%	15	6.9E-02
15_B2	Essential Swgr 1ETA (6-10) Severe Fire	2.1% / 33.8%	This scenario has the largest contribution from loss of secondary side heat removal sequences though seal LOCAs are also important. The fire results in a loss of power to the normally operating train of equipment and the TDCAP. Random failure of the redundant train (primarily KC and RN maintenance) results in a loss of the standby train of CA. Mitigation fails due to the random failures of the standby equipment.	2.4E-02	4.2E-05	1.0E-06	0.9%	23	4.5E-02

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)									
Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF [b]	CDF	% LERF	LERF Rank	LERF/CDF
15_B3	Essential Swgr 1ETA (11-15) Severe Fire	2.1% / 35.9%	This scenario has the largest contribution from loss of secondary side heat removal sequences though seal LOCAs are also important. The fire results in a loss of power to the normally operating train of equipment and the TDCAP. Random failure of the redundant train (primarily KC and RN maintenance) results in a loss of the standby train of CA. Mitigation fails due to the random failures of the standby equipment.	2.4E-02	4.2E-05	1.0E-06	0.9%	25	4.5E-02
15_B1	Essential Swgr 1ETA (1-5) Severe Fire	2.1% / 38.0%	This scenario has the largest contribution from loss of secondary side heat removal sequences though seal LOCAs are also important. The fire results in a loss of power to the normally operating train of equipment and the TDCAP. Random failure of the redundant train (primarily KC and RN maintenance) results in a loss of the standby train of CA. Mitigation fails due to the random failures of the standby equipment.	2.4E-02	4.2E-05	1.0E-06	0.9%	26	4.5E-02
18_G7	Essential Area Terminal Cabinet 1/2EATC7 Fire	1.9% / 39.9%	This scenario is a mix of RCP seal LOCAs and unmitigated LOCAs due to a stuck open pressurizer safety valve due to failure to establish SSF letdown. The fire results in loss of all normal seal cooling, loss of the SSF letdown path, various valve mispositionings, and results in draining the FWST to the sump. Failure to control pressurizer level from the SSF in the absence of letdown can lead to a stuck open pressurizer safety valve. Random failure of the SSF can lead to a seal	2.5E-02	3.7E-05	9.2E-07	1.0%	22	5.5E-02

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)									
Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF [b]	CDF	% LERF	LERF Rank	LERF/CDF
			LOCA. Mitigation fails due to various fire induced valve failures in the ECCS systems.						
49_B	Transient Fire	1.7% / 41.6%	This scenario is dominated by loss of SSHR sequences. The fire results in failure of the PORVs and MSIVs on 2 of 4 SGs resulting in faulted SGs. Random failure of CA to one of the intact generators fails the SSHR function. Mitigation fails due to feed and bleed failure primarily due to operator error.	8.4E-03	1.0E-04	8.5E-07	0.5%	53	2.9E-02
8_C1	Essential Load Center 1ELXB Severe Fire	1.7% / 43.3%	This scenario is dominated by loss of secondary side heat removal sequences. The fire results in loss of power to the standby train of equipment and the TDCAP. A combination of random and fire induced failure of the operating train leads to loss of CA. Mitigation fails due to random failures of the ECCS for feed and bleed primarily as a result of operator error.	1.6E-02	5.4E-05	8.4E-07	2.1%	9	1.3E-01
10_DB	Inverter/Switch Cabinet 1KXIB/1KXAB Fire	1.5% / 44.8%	This scenario is a mix of RCP seal LOCAs, loss of SSHR sequences, and stuck open pressurizer PORV sequences. The fire results in draining of the FWST to the sump, loss of normal power to ETA and ETB, emergency power to ETB, spurious pressurizer heater operation, loss of seal injection, and loss of RCP thermal barrier cooling. Random failures of CA or the SSF standby makeup pump result in a challenge requiring ECCS. Mitigation fails because the FWST has been lost.	1.7E-01	4.5E-06	7.5E-07	2.6%	5	1.8E-01

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)

Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF[b]	CDF	% LERF	LERF Rank	LERF/CDF
18_N1	Essential MCC 1EMXA Severe Fire	1.5% / 46.3%	This scenario is a mix of RCP seal LOCAs and stuck open pressurizer relief valve sequences. The fire results in draining of the FWST to the sump, spurious opening of NI-9A, loss of the SSF letdown path, loss of seal injection, and loss of RCP thermal barrier cooling. Random failures to control pressurizer level and of relief valves to close result in pressurizer LOCAs. Random failure of the SSF standby makeup pump leads to a seal LOCA. Mitigation fails because the FWST has been lost.	1.2E-02	6.0E-05	7.3E-07	0.5%	54	3.2E-02
10_CH	Battery Charger 1CCS Severe Fire	1.5% / 47.8%	This scenario is dominated by loss of SSHR sequences. The fire results in loss of ETB and loss of normal power to ETA, loss of the TDCAP, and loss of RCP thermal barrier cooling. Random failures of train A power lead to loss of CA and ECCS failure. Mitigation fails due to the loss of ECCS.	5.3E-02	1.4E-05	7.2E-07	1.7%	13	1.2E-01
10_CA	Battery Charger 1ECA Severe Fire	1.3% / 49.2%	This scenario is dominated by loss of SSHR sequences. The fire results in loss of a MDCAP, the TDCAP, ND HX function, and RCP thermal barrier cooling. Random failures of the remaining MDCAP leads to loss of SSHR. Mitigation fails at sump recirculation due to the loss of the ND HX function.	4.8E-02	1.4E-05	6.5E-07	0.4%	59	3.2E-02

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)									
Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF [b]	CDF	% LERF	LERF Rank	LERF/CDF
41_F16	Essential Area Terminal Cabinet 1EATC16 Fire	1.3% / 50.5%	This scenario is dominated by loss of secondary side heat removal sequences. The fire results in a loss of power to the normally operating train of equipment, A train of RN on both units, and the TDCAP. Random failure of the redundant train (primarily KC and RN maintenance) results in a loss of the standby train of CA. Mitigation fails due to the random failures of the standby equipment.	3.5E-02	1.9E-05	6.5E-07	0.3%	68	2.8E-02
45_B	A Train H2 Analyzer Control Unit 1MIMT5320A Fire	1.3% / 51.8%	This scenario is a mix of loss of SSHR sequences, and stuck open pressurizer PORV sequences. The fire results in loss of ETB and loss of normal power to ETA, spurious pressurizer heater operation, loss of the TDCAP, loss of cooling to ND HX A, and loss of RCP thermal barrier cooling. Random failures of CA or a stuck open pressurizer relief valve challenges ECCS. Mitigation fails at sump recirculation due to loss of both trains of ND HXs..	1.7E-01	3.7E-06	6.4E-07	0.9%	27	7.0E-02
8_D1	Essential Load Center 1ELXD Severe Fire	1.3% / 53.1%	This scenario is dominated by loss of secondary side heat removal sequences. The fire results in loss of power to the standby train of equipment and MFW. A combination of random and fire induced failure of the operating train leads to loss of CA. Mitigation fails due to random failures of the ECCS for feed and bleed primarily as a result of operator error.	1.6E-02	4.0E-05	6.3E-07	1.6%	16	1.3E-01

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)

Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF [b]	CDF	% LERF	LERF Rank	LERF/CDF
10_CD	Battery Charger 1ECD Severe Fire	1.3% / 54.3%	This scenario is dominated by loss of SSHR sequences. The fire results in loss of ETB and loss of normal power to ETA, loss of the TDCAP, and loss of RCP thermal barrier cooling. Random failures of train A CA (primarily power) leads to loss of SSHR. Mitigation fails due to random failure of ECCS (power or operator error).	4.5E-02	1.4E-05	6.2E-07	2.5%	6	2.1E-01
3_T02	Transient (Hot work) Fire above TDP	1.2% / 55.6%	This scenario is a mix of loss of SSHR and RCP seal LOCA sequences. The fire results in loss of train A of RN, several KC valves. and the TDCAP. Random failure of the redundant train (primarily RN and KC maintenance) lead to loss of all SSHR as well as mitigation. Fire induced failures of KC valves lead to RCP seal LOCAs and loss of mitigation.	5.4E-02	1.1E-05	6.0E-07	0.4%	55	3.8E-02
6_H	Essential Area Terminal Cabinet 1EATC1 Fire	1.2% / 56.7%	This scenario is dominated by RCP seal LOCAs though the top cutsets are stuck open pressurizer PORVs. The fire results in loss of RCP seal cooling, prevents tripping on 2 of 4 RCPs, spurious pressurizer heater operation, failure of a PORV block valve, and draining of the FWST to the sump. Random failure of the SSF standby makeup pump results in a seal LOCA on the untripped pumps. Random failure of the PORV to close results in a PORV LOCA. Mitigation fails because the FWST is unavailable.	3.0E-02	1.9E-05	5.7E-07	1.3%	18	1.2E-01

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)									
Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF [b]	CDF	% LERF	LERF Rank	LERF/CDF
22_H	Essential MCC 2EMXH Fire	1.1% / 57.9%	This scenario is a mix of loss of SSHR and seal LOCA sequences. The fire results in loss of the B train MDCAP and a few other failures, mostly components powered by the affected MCC the most significant of which is spurious closure of RN-843B isolating the discharge to the lake. Random failures dominate the cutsets. Mitigation also fails due to combinations of random failures primarily operator failure to align RN to the pond along with CA and SSF related failures	2.7E-03	2.1E-04	5.6E-07	2.2%	7	2.0E-01
21_C4	MCB MC1/MC2/MC10 Fire	1.1% / 58.9%	This scenario is dominated by loss of SSHR sequences. The fire results in loss of the normal power supply to both essential busses, loss of all 3 pressurizer PORVS, loss of both MDCA Pumps, and a number of CA valves. Random failure of the TDCA Pump or fire induced valve transfers results in loss of all SSHR. Mitigation fails due to loss of the PORVs.	3.1E-01	1.7E-06	5.3E-07	1.1%	20	1.0E-01
3_T03	Transient (Hot work) Fire near BB-50	1.0% / 59.9%	This scenario is a mix of loss of SSHR and RCP seal LOCA sequences. The fire results in loss of train B of RN, several KC valves. and the TDCAP. Random or fire induced failure of the redundant train lead to loss of all SSHR as well as mitigation. Fire induced failures of KC valves lead to RCP seal LOCAs and loss of mitigation.	4.5E-02	1.1E-05	5.0E-07	0.4%	63	3.8E-02

Table W-2 Significant Fire Initiating Events (Individually Representing >1% of Calculated Fire Risk)

Scenario	Description	% CDF / Cumulative[a]	Risk Insights	CCDP	IF [b]	CDF	% LERF	LERF Rank	LERF/CDF
32_F01	1A Aux Shutdown Panel Fire	1.0% / 60.9%	This scenario is dominated by loss of SSHR sequences. The fire results in loss of KC train A, the TDCAP, and RCP thermal barrier cooling. Random failures of train B (primarily KC and RN maintenance) leads to loss of CA and ECCS failure. Mitigation fails due to the loss of ECCS.	2.6E-02	1.9E-05	4.9E-07	0.6%	39	6.2E-02
15_J	DC Distribution Center 1EDE Fire	1.0% / 61.9%	This scenario has the largest contribution from loss of secondary side heat removal sequences. The fire results in a loss of the normally operating train of KC, spurious SG PORV operation, and loss of the TDCAP. Random failure of the redundant train (primarily KC and RN maintenance) results in a loss of the standby train of CA. Mitigation fails due to the random failures of the standby equipment.	2.5E-02	1.9E-05	4.7E-07	0.4%	56	4.7E-02

Notes:

a. Individual contribution followed by cumulative contribution.

b. Ignition Frequency (IF) includes severity factor and probability of non suppression, where applicable.

Table W-3 CNS Unit 1 Fire Area Risk Summary[5]

Fire Area	Area Description	NFPA 805 Basis	Fire Area CDF	Fire Area LERF	VFDR (Yes/No)	RAs (Yes/No)	Fire Risk Eval[6] Δ CDF	Fire Risk Eval[6] Δ LERF	Additional Risk of RAs Δ CDF/LERF
1	ND & NS Pump Room	4.2.4.2	6.54E-09	6.30E-10	Yes	No	0.00E+00	0.00E+00	N/A
3	CA Pump Room	4.2.4.2	2.33E-06	2.72E-07	Yes	No	2.08E-07	6.60E-09	N/A
4	Aux Bldg Gen Area & NV Pump Room	4.2.4.2	1.86E-08	9.40E-10	Yes	No	2.20E-09	3.56E-11	N/A
6	Electrical Pen Room (B)	4.2.4.2	1.14E-06	1.12E-07	Yes	No	5.82E-07	6.51E-08	N/A
8	4160V Essential 'B' SWGR Room	4.2.4.2	4.59E-06	5.44E-07	Yes	No	3.00E-08	1.59E-08	N/A
10	Battery Room	4.2.4.2	4.60E-06	6.11E-07	Yes	Yes	5.09E-07	5.68E-08	5.09E-07/5.68E-08
11	Aux Bldg Gen Area & U1 KC Pump Room	4.2.4.2	3.68E-07	1.82E-08	Yes	No	4.53E-09	1.80E-10	N/A
13	Electrical Pen Room (A)	4.2.4.2	6.98E-07	9.55E-08	Yes	No	5.07E-08	8.50E-09	N/A
15	4160V Essential 'A' SWGR Room	4.2.4.2	1.13E-05	5.42E-07	Yes	No	5.55E-07	4.11E-08	N/A
17	Cable Room	4.2.4.2	1.18E-06	1.08E-07	Yes	Yes	1.17E-07	6.41E-09	1.17E-07/6.41E-09
18	Aux Bldg Gen Area & U2 KC Pump Room	4.2.4.2	1.78E-06	8.60E-08	Yes	No	1.51E-08	8.21E-10	N/A
20	Electrical Pen Room	4.2.4.2	3.85E-09	7.15E-10	Yes	No	0.00E+00	0.00E+00	N/A
21	Control Room	4.2.4.2	5.93E-06	9.45E-07	Yes	Yes	1.03E-06	3.56E-08	1.03E-06/3.56E-08

[5] The risk results are limited to Unit 1 fire areas; the contribution from Unit 2 fire areas is approximately 1.3E-06 CDF and is considered not significant enough to report.
[6] When used in the context of delta risk, 0.00E+00 is defined as negligible, including cases where the results are below the truncation limit or where the VFDRs were not modeled due to their insignificant contribution to risk.

Table W-3 CNS Unit 1 Fire Area Risk Summary[5]

Fire Area	Area Description	NFPA 805 Basis	Fire Area CDF	Fire Area LERF	VFDR (Yes/No)	RAs (Yes/No)	Fire Risk Eval[6] Δ CDF	Fire Risk Eval[6] Δ LERF	Additional Risk of RAs Δ CDF/LERF
22	Aux Bldg Gen Area	4.2.4.2	9.42E-07	1.46E-07	Yes	No	0.00E+00	0.00E+00	N/A
24	Fuel Storage Area	4.2.4.2	8.40E-10	1.38E-10	Yes	No	0.00E+00	0.00E+00	N/A
25	Diesel Generator Bldg - A	4.2.4.2	1.48E-07	9.41E-09	Yes	No	0.00E+00	0.00E+00	N/A
26	Diesel Generator Bldg - B	4.2.4.2	7.97E-08	4.41E-09	Yes	No	0.00E+00	0.00E+00	N/A
29	Train A RN Pump Structure	4.2.4.2	1.00E-07	3.15E-09	Yes	No	0.00E+00	0.00E+00	N/A
30	Train B RN Pump Structure	4.2.4.2	3.76E-08	4.36E-09	Yes	No	0.00E+00	0.00E+00	N/A
32	Train A Aux Shutdown Panel	4.2.4.2	4.86E-07	3.37E-08	Yes	No	2.40E-08	3.80E-09	N/A
34	Train B Aux Shutdown Panel	4.2.4.2	2.36E-07	1.77E-08	Yes	No	6.20E-08	5.00E-09	N/A
35	Control Room Tagout Area	4.2.4.2	2.54E-09	4.71E-10	Yes	No	0.00E+00	0.00E+00	N/A
37	Turbine Driven CA Pump Control Panel Room	4.2.4.2	5.12E-08	1.58E-09	Yes	No	0.00E+00	0.00E+00	N/A
38	Fuel Storage Area HVAC Room	4.2.4.2	1.52E-10	2.83E-11	Yes	No	0.00E+00	0.00E+00	N/A
40	Turbine Driven CA Pump Pit	4.2.4.2	1.43E-07	2.48E-09	Yes	No	5.87E-08	6.70E-10	N/A
41	DG 'A' Sequencer Tunnel	4.2.4.2	1.19E-06	4.03E-08	Yes	No	1.10E-09	5.10E-12	N/A
42	DG 'B' Sequencer Tunnel	4.2.4.2	2.30E-07	1.12E-08	Yes	No	8.00E-11	6.00E-12	N/A
45	Cable Room Corridor	4.2.4.2	4.03E-06	5.67E-07	Yes	No	1.89E-06	3.09E-07	N/A
49	Inner Doghouse	4.2.4.2	8.45E-07	2.45E-08	Yes	No	0.00E+00	0.00E+00	N/A

Table W-3 CNS Unit 1 Fire Area Risk Summary[5]

Fire Area	Area Description	NFPA 805 Basis	Fire Area CDF	Fire Area LERF	VFDR (Yes/No)	RAs (Yes/No)	Fire Risk Eval[6] Δ CDF	Fire Risk Eval[6] Δ LERF	Additional Risk of RAs Δ CDF/LERF
51	Outer Doghouse	4.2.4.2	1.20E-07	1.16E-08	Yes	No	0.00E+00	0.00E+00	N/A
RB1	Reactor Building	4.2.4.2	3.63E-07	7.79E-08	Yes	No	3.60E-08	1.00E-08	N/A
SRV	Service Building	4.2.4.2	1.32E-06	2.16E-07	Yes	No	7.81E-08	3.86E-09	N/A
SSF	Standby Shutdown Facility	4.2.3.2	4.01E-08	1.34E-09	No	No	0.00E+00	0.00E+00	N/A
TB1	Turbine Building	4.2.4.2	2.95E-06	4.85E-07	Yes	No	2.60E-08	1.10E-09	N/A
YRD	Yard Area	4.2.4.2	3.19E-07	3.48E-08	Yes	No	0.00E+00	0.00E+00	N/A
Total	**Overall Plant Fire Risk**		**4.76E-05**	**5.03E-06**			**5.28E-06**	**5.70E-07**	

Table W-4 CNS Unit 2 Fire Area Risk Summary[7]

Fire Area	Area Description	NFPA 805 Basis	Fire Area CDF	Fire Area LERF	VFDR (Yes/No)	RAs (Yes/No)	Fire Risk Eval[8] Δ CDF	Fire Risk Eval[8] Δ LERF	Additional Risk of RAs Δ CDF/LERF
1	ND & NS Pump Room	4.2.4.2	6.54E-09	6.30E-10	Yes	No	0.00E+00	0.00E+00	N/A
2	CA Pump Room	4.2.4.2	2.22E-06	2.50E-07	Yes	No	1.67E-07	5.91E-09	N/A
4	Aux Bldg Gen Area & NV Pump Room	4.2.4.2	1.62E-08	9.00E-10	Yes	No	2.07E-10	2.70E-12	N/A
5	Electrical Pen Room (B)	4.2.4.2	1.26E-06	1.32E-07	Yes	No	3.18E-07	3.08E-08	N/A
7	4160V Essential 'B' SWGR Room	4.2.4.2	4.43E-06	4.61E-07	Yes	No	1.02E-07	2.86E-08	N/A
9	Battery Room	4.2.4.2	3.77E-06	5.13E-07	Yes	Yes	5.77E-07	7.27E-08	5.77E-07/7.27E-08
11	Aux Bldg Gen Area & U1 KC Pump Room	4.2.4.2	4.83E-07	2.57E-08	Yes	No	6.70E-09	3.90E-10	N/A
12	Electrical Pen Room (A)	4.2.4.2	3.25E-07	3.21E-08	Yes	No	3.01E-08	5.57E-09	N/A
14	4160V Essential 'A' SWGR Room	4.2.4.2	1.41E-05	6.29E-07	Yes	No	9.12E-07	6.67E-08	N/A
16	Cable Room	4.2.4.2	2.27E-06	4.82E-07	Yes	Yes	1.27E-07	3.06E-08	1.27E-07/3.06E-08
18	Aux Bldg Gen Area & U2 KC Pump Room	4.2.4.2	1.91E-06	9.14E-08	Yes	No	1.53E-08	1.09E-10	N/A
19	Electrical Pen Room	4.2.4.2	4.25E-09	7.23E-10	Yes	No	0.00E+00	0.00E+00	N/A
21	Control Room	4.2.4.2	5.93E-06	9.45E-07	Yes	Yes	1.03E-06	3.56E-08	1.03E-06/3.56E-08

[7] The risk results are limited to Unit 2 fire areas; the contribution from Unit 1 fire areas is approximately 1.3E-06 CDF and is considered not significant enough to report.
[8] When used in the context of delta risk, 0.00E+00 is defined as negligible, including cases where the results are below the truncation limit or where the VFDRs were not modeled due to their insignificant contribution to risk.

Table W-4 CNS Unit 2 Fire Area Risk Summary[7]

Fire Area	Area Description	NFPA 805 Basis	Fire Area CDF	Fire Area LERF	VFDR (Yes/No)	RAs (Yes/No)	Fire Risk Eval[8] Δ CDF	Fire Risk Eval[8] Δ LERF	Additional Risk of RAs Δ CDF/LERF
22	Aux Bldg Gen Area	4.2.4.2	9.34E-07	1.45E-07	Yes	No	0.00E+00	0.00E+00	N/A
23	Fuel Storage Area	4.2.4.2	8.28E-10	1.36E-10	Yes	No	0.00E+00	0.00E+00	N/A
27	Diesel Generator Bldg - A	4.2.4.2	4.23E-07	2.29E-08	Yes	No	0.00E+00	0.00E+00	N/A
28	Diesel Generator Bldg - B	4.2.4.2	1.50E-07	6.36E-09	Yes	No	0.00E+00	0.00E+00	N/A
29	Train A RN Pump Structure	4.2.4.2	1.00E-07	3.15E-09	Yes	No	0.00E+00	0.00E+00	N/A
30	Train B RN Pump Structure	4.2.4.2	3.76E-08	4.36E-09	Yes	No	0.00E+00	0.00E+00	N/A
31	Train A Aux Shutdown Panel	4.2.4.2	3.80E-07	1.59E-08	Yes	No	2.70E-08	3.00E-10	N/A
33	Train B Aux Shutdown Panel	4.2.4.2	2.41E-07	1.35E-08	Yes	No	4.10E-08	2.80E-09	N/A
35	Control Room Tagout Area	4.2.4.2	2.54E-09	4.71E-10	Yes	No	0.00E+00	0.00E+00	N/A
36	Turbine Driven CA Pump Control Panel Room	4.2.4.2	5.03E-08	1.55E-09	Yes	No	0.00E+00	0.00E+00	N/A
39	Turbine Driven CA Pump Pit	4.2.4.2	3.80E-09	1.19E-10	Yes	No	0.00E+00	0.00E+00	N/A
43	DG 'A' Sequencer Tunnel	4.2.4.2	1.49E-06	4.62E-08	Yes	No	1.87E-08	2.05E-10	N/A
44	DG 'B' Sequencer Tunnel	4.2.4.2	2.52E-07	9.20E-09	Yes	No	3.20E-09	6.00E-11	N/A
46	Cable Room Corridor	4.2.4.2	3.52E-06	5.46E-07	Yes	No	1.77E-06	3.00E-07	N/A
47	Fuel Storage Area HVAC Room	4.2.4.2	1.81E-10	2.97E-11	Yes	No	0.00E+00	0.00E+00	N/A
48	Inner Doghouse	4.2.4.2	8.53E-07	2.47E-08	Yes	No	0.00E+00	0.00E+00	N/A

Table W-4 CNS Unit 2 Fire Area Risk Summary[7]

Fire Area	Area Description	NFPA 805 Basis	Fire Area CDF	Fire Area LERF	VFDR (Yes/No)	RAs (Yes/No)	Fire Risk Eval[8] Δ CDF	Fire Risk Eval[8] Δ LERF	Additional Risk of RAs Δ CDF/LERF
50	Outer Doghouse	4.2.4.2	1.20E-07	1.26E-08	Yes	No	0.00E+00	0.00E+00	N/A
RB2	Reactor Building	4.2.4.2	3.13E-07	3.40E-08	Yes	No	5.62E-08	4.65E-09	N/A
SRV	Service Building	4.2.4.2	1.67E-06	2.22E-07	Yes	No	7.35E-08	3.94E-09	N/A
SSF	Standby Shutdown Facility	4.2.3.2	4.01E-08	1.34E-09	No	No	0.00E+00	0.00E+00	N/A
TB2	Turbine Building	4.2.4.2	2.63E-06	4.51E-07	Yes	No	6.80E-11	0.00E+00	N/A
YRD	Yard Area	4.2.4.2	3.19E-07	3.48E-08	Yes	No	0.00E+00	0.00E+00	N/A
Total	**Overall Plant Fire Risk**		**5.03E-05**	**5.16E-06**			**5.27E-06**	**5.89E-07**	