Facility: BFN Scenario Number: NRC - 2 Op-Test Number: 1501

Examiners:_____ Operators: SRO: _____
_____ ATC: _____
_____ BOP: _____

Initial Conditions: Reactor Power is 100%. The Steam Vault Exhaust Booster Fan is tagged out for lubrication PMs. Suppression Pool Cooling is in service due to a HPCI flow rate test on the previous shift.

Turnover: Secure Suppression Pool Cooling. MIG signed on and will be performing 2-SR-3.3.6.1.5(4A/A) Core and Containment Cooling Systems RCIC Turbine Steam Line High Flow Instrument Channel A Calibration.

Event Number	Malfunction Number	Event Type*	Event Description
1	N/A	N-BOP N-SRO	Secure from Suppression Pool Cooling using 2-OI-74
2	N/A	I-SRO TS-SRO	MIG reports that 2-RLY-071-13A-K12 did not energize when 2-PDT-71-1A was pressurized and that they have stopped at step 7.4[7]B.
3	TH12B	C-SRO	Recirc Pump 2B vibration high
4	TH10B	R-ATC C-BOP TS-SRO	Recirc Pump 2B seal failure/2-AOI-68-1A
5	Override 2B SPE Auto	C-BOP C-SRO	The 2A Steam Packing Exhauster will trip and the 2B Steam Packing Exhauster will not auto start.
6	IOR	I-ATC	CRD Flow Control Valve FCV develops an air leak on the control air system.
7	TH22 RH01A&C RH06B	M-All	LOCA/Scram with inability to spray the Drywell/C4
8	TC02	C-BOP C-SRO	SRO directs cool down or rapid depressurization of the RPV using Turbine bypass valves however they fail closed and ED will be required.
9	CS02B	C-BOP	Core Spray Loop II injection valve will fail to open on initiation signal but can be manually opened.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Events

1. The BOP operator will secure from Suppression Pool Cooling using 2-OI-74. When Suppression Pool Cooling is secured the scenario may continue.

2. The Instrument Mechanic Foreman will call the SRO and report that during performance of 2-SR-3.3.6.1.5(4A/A), Core and Containment Cooling Systems RCIC Turbine Steam Line High Flow Instrument Channel A Calibration, 2-RLY-071-13A-K12 did not energize when 2-PDT-71-1A was pressurized and that they have stopped at step 7.4[7]B. The SRO will evaluate Tech Spec 3.3.6.1 and table 3.3.6.1-1 to determine that function 4a is the affected function and that the Tech Spec requires placing the channel in trip within 24 hours. Once the Tech Spec call is completed the scenario may continue.

3. 2-XA-55-4B window 20, RECIRC Pump Motor B Vibration High alarms. The BOP operator will dispatch an AUO to 2-LPNL-925-0712 and he/she will report that 2-XI-68-71D and E are in alarm reading 12.0 mils and rising slowly. The SRO will direct lowering 2B Recirc speed to attempt to clear the alarm. The ATC operator will lower 2B Recirc pump speed. The AUO will report that 2-XI-68-71D and E lowered to ~10 mils and will reset the alarm locally. When the lead examiner is ready the scenario may continue.

4. 2-XA-55-4B window 20, RECIRC Pump Motor B Vibration High alarms again and 2-XA-55-4B, window 25 Recirc Pump B no. 1Seal Leakage ABN, alarms. The number 2 seal pressure will rise to approximately Reactor Pressure. The SRO will direct tripping the 2B Recirc Pump and entering 2-AOI-68-1A. The ATC operator will lower Reactor Power IAW the RCP and 2-AOI-68-1A. The BOP operator will carry out the subsequent actions of the AOI. The SRO will address Tech Spec 3.4.1. When conditions have stabilized and the lead examiner is ready the scenario may continue.

5. The running steam packing exhauster will trip and the standby exhauster will fail to auto start. The BOP operator will place the standby steam packing exhauster in service IAW 2-OI-47C section 6.3 and adjusts its operation to obtain 10-12 inches of H_2O vacuum. At that point the scenario may continue.

6. The in service 2A CRD Flow Control Valve develops a control air leak causing the valve to slowly drift closed, causing the CRD Charging Header Pressure to go high. The ATC will enter the ARP for High Charging Pressure and attempt to control flow and pressure. The FCV will not respond to any attempt to control and after the AUO is sent to investigate, he reports an air leak, and the ATC uses OI-85 to swap Flow Control

Valves. When the 2B CRD FCV is in service and the lead examiner is ready the scenario may continue.

7. A leak in the Drywell will develop causing Drywell Temperature and Pressure to rise. The SRO will set a trigger value for a Reactor Scram and when that value is reached a manual Scram will be inserted or the Reactor will Scram at 2.45 psig Drywell Pressure. All control rods will be inserted on the scram. The SRO will direct entry into 2-AOI-100-1. The SRO will direct Suppression Chamber spray per EOI-2 Appendix 17C. The BOP operator will attempt to spray the Suppression Chamber however the select logic will fail on both loops of RHR.

   The SRO/BOP operator will determine that neither the Suppression Chamber nor the Drywell can be sprayed. The SRO may attempt to cool down or anticipate that an ED will be required and attempt to rapidly depressurize the Reactor using the bypass valves however the bypass valves will fail closed. An ED will be required based on Drywell Temperature. As the Reactor depressurizes the action required area of curve 8 RPV Saturation Temp will be entered and Reactor Water Level indication will be lost. The SRO will direct entry into C-4 and the crew will inject using available systems until one of the conditions in C-4, Note 7 is met.

8. When the SRO directs a cool down or rapid depression of the RPV using the main turbine bypass valves, the operator will determine and report that the bypass valves have failed closed. This will lead to an ED being required.

9. With an accident signal present the Core Spray loop II injection valve will fail to automatically open, the BOP operator will manually open the injection valve.

The Scenario ends when the crew has performed an emergency depressurization and flooded the RPV to the Main Steam Lines.

Critical Tasks: 2

1. Emergency Depressurize before 300°F.

1. Safety Significance
   Precludes failure of Primary Containment

2. Cues
   Procedural compliance
   High Suppression Chamber or Drywell pressure

3. Measured by
   Observation-SRO updates or briefs the crew that ED is required based on not being able to restore and maintain drywell temperature below 280°F AND the operator opens 6 ADS/MSRVs

4. Feedback
   MSRV open indications
   RPV Pressure lowering

any or all

2. After all RPV level instruments flash, level unknown, inject into the RPV with ~~all~~ available sources until one of the conditions in C-4, Note 7 is met.

BM 2-12-15

1. Safety Significance
   Prevent fuel damage by establishing adequate core cooling

2. Cues
   Procedural compliance
   Loss of all RPV level indications

3. Measured by
   Observation-Indications that the Main Steam Lines are flooded are listed in C-4 Note 7

4. Feedback
   MSRV tail pipe temperature
   MSRV acoustic monitor
   RPV Pressure trend

Op Test No.: 15-01 Scenario No. 2 Event No.: 1 Page 1 of 3

Event Description: Secure from Suppression Pool Cooling using 2-OI-74

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to secure Suppression Pool Cooling in accordance with 2-OI-74.
	BOP	**2-OI-74** **8.6 Shutdown of Loop I(II) Suppression Pool Cooling** **NOTE** 1) All operations are performed at Panel 2-9-3 unless otherwise noted. 2) RHR flow should be monitored while in operation with multiple flow paths (e.g., LPCI and Suppression Pool Cooling together, etc.). During any evolution, total system flow as indicated on RHR SYSTEM I(II) FLOW, 2-FI-74-50(64), should remain between 7,000 to 10,000 gpm for 1 pump operation or between 10,000 and 20,000 gpm for 2-pump operation. [1] **VERIFY** Suppression Pool Cooling in operation. **REFER TO** Section 8.5. [2] **REVIEW** the precautions and limitations in Section 3.0. [3] **NOTIFY** Radiation Protection of Suppression Pool Cooling loop removed from service. **RECORD** name and time of Radiation Protection representative notified in NOMS narrative log. Verifies Suppression Pooling is in service, reviews P&L's in Section 3, and notifies RP that SPC is being removed from service.
	DRIVER	As RP, acknowledge that SPC is being removed from service.

Op Test No.: 15-01 Scenario No. 2 Event No.: 1 Page 2 of 3

Event Description: Secure from Suppression Pool Cooling using 2-OI-74

Time	Position	Applicant's Actions or Behavior
	BOP	**CAUTIONS** 1) To prevent draining an RHR Loop, at least one of the RHR System test valves must be closed before stopping RHR Pumps in the associated loop. 2) To prevent excessive vibration, RHR pumps should not be allowed to operate for more than 3 minutes at minimum flow. 3) When closing throttle valve RHR SYS I(II) SUPPR POOL CLG/TEST VLV, 2-FCV-74-59 and 2-FCV-74-73 from the control room, the handswitch should be held in the close position for approximately 6 seconds after the red light extinguishes. Failure to completely close these valves could provide a leak path to the suppression pool from the RHR discharge piping.
		[4] **IF** both RHR Pumps in Loop I(II) are in operation **AND** one pump is to be removed from service due to reduced heat load, **THEN**: [4.1] **THROTTLE** RHR SYS I(II) SUPPR POOL CLG/TEST VLV, 2-FCV-74-59(73), to obtain a flow of between 7,000 to 10,000 gpm and Blue light illuminated as indicated on RHR SYS I(II) FLOW, 2-FI-74-50(64). [4.2] **STOP** RHR PUMP 2A(2B) or 2C(2D) using 2-HS-74-5A(28A) or 16A(39A). [4.3] **CLOSE** associated RHR HX 2A(2B) or 2C(2D) RHRSW OUTLET VALVE, 2-FCV-23-34(46) or 40(52). [4.4] **IF** RHRSW for the Heat Exchanger removed from service is not required to support other unit operations, **THEN** **STOP** RHRSW pump for the Heat Exchanger removed from service.

Op Test No.: 15-01 Scenario No. 2 Event No.: 1 Page 3 of 3

Event Description: Secure from Suppression Pool Cooling using 2-OI-74

Time	Position	Applicant's Actions or Behavior
	BOP	[5] **CLOSE** RHR SYS I(II) SUPPR POOL CLG/TEST VLV, 2-FCV-74-59(73). [6] **WHEN** RHR SYS I(II) SUPPR POOL CLG/TEST VLV, 2-FCV-74-59(73) is CLOSED, **THEN** **STOP** RHR PUMPS 2A(2B) or 2C(2D) using 2-HS-74-5A(28A) and/or 16A(39A). [7] **CLOSE** RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV, 2-FCV-74-57(71). [8] **CLOSE** RHR HX(s) 2A(2B) and 2C(2D) RHRSW OUTLET VLV(s), 2-FCV-23-34(46) and 40(52). [9] **IF** RHRSW for RHR Heat Exchanger(s) A(B) and C(D) is not required to support other unit operations, **THEN** **STOP** RHRSW Pump(s) for the Heat Exchanger(s) removed from service. [10] **CHECK** RHR System discharge header pressure is greater than TRM 3.5.4 limit as indicated on 2-PI-74-51(65), RHR SYS I(II) DISCH PRESS. [11] **IF** the Drywell DP Compressor was removed from service in Section 8.5, **THEN** **REFER TO** 2-OI-64 to return to service
	BOP	[12] **WHEN** 2-TI-74-136A and B, A/C and B/D RHR PUMP ROOM TEMP indicators at Panel 2-9-3 indicate less than 95°F, **THEN** **RETURN** EECW to its normal operating configuration, if desired. REFER TO 0-OI-67. **NOTE** RHR Loop I(II) is now in a Standby Readiness Condition Secures Suppression Pool Cooling IAW 2-OI-74 Reports that Suppression Pooling is shutdown
	NRC	End of Event #1

Op Test No.: 15-01 Scenario No. 2 Event No.: 2 Page 1 of 2

Event Description: MIG reports that 2-RLY-071-13A-K12 did not energize when 2-PDT-71-1A was pressurized

Time	Position	Applicant's Actions or Behavior
	DRIVER	When the NRC Chief Examiner is ready for the second event, as the I&C Foreman, call the SRO and report the following: During performance of 2-SR-3.3.6.1.5(4A/A), Core and Containment Cooling Systems RCIC Turbine Steam Line High Flow Instrument Channel A Calibration, 2-RLY-071-13A-K12 did not energize when 2-PDT-71-1A was pressurized and that they have stopped at step 7.4[7]B.
	NRC	Relay is on print 2-45E626, sheet 2
		Refers to Technical Specifications Primary Containment Isolation Instrumentation 3.3.6.1 3.3 INSTRUMENTATION 3.3.6.1 Primary Containment Isolation Instrumentation LCO 3.3.6.1 The primary containment isolation instrumentation for each Function in Table 3.3.6.1-1 shall be OPERABLE. APPLICABILITY: According to Table 3.3.6.1-1.

Op Test No.: 15-01 Scenario No. 2 Event No.: 2 Page 2 of 2

Event Description: MIG reports that 2-RLY-071-13A-K12 did not energize when 2-PDT-71-1A was pressurized

Time	Position	Applicant's Actions or Behavior
	SRO	Table 3.3.6.1-1 4. Reactor Core Isolation Cooling (RCIC) System Isolation a. RCIC Steam Line Flow - High — 1,2,3 — F CONDITION — REQ ACTION — COMP TIME A. One or more required channels inoperable. — A.1 Place a channel in trip — 24 hours for Functions other than 2.a,2.b,5.h, 6.b, and 6.c Determines that a channel must be place in a tripped condition in 24 hours. Conducts a crew brief on the test failure and Technical Specifications requirements due to the failure.
	NRC	End of Event #2

Op Test No.: 15-01 Scenario No. 2 Event No.: 3 Page 1 of 2

Event Description: Recirc Pump 2B vibration high

Time	Position	Applicant's Actions or Behavior
	DRIVER	When the NRC Chief Examiner is ready for Event #3, insert F3 (imf th12b) for 'B' Reactor Recirc Pump high vibration.
	ATC	Reports RECIRC PUMP MOTOR B VIBRATION HIGH (2-XA-55-4B, Window 20) in alarm. **2-ARP-9-4B, Window 20** A. **CHECK** the following on RECIRC PMP MTR 2B WINDING AND BRG TEMP recorder, 2-TR-68-71 on Panel 2-9-21 are below: • Pump motor bearing temperatures (<190°F), • Pump motor winding temperatures (<255°F), • Pump Seal Cavity temperatures (<180°F), • Pump motor closed cooling water temperature (<140°F), B. **CHECK** for rise in Drywell equip sump pump out rate due to seal leakage. C. **DISPATCH** personnel to Panel 2-LPNL-925-0712 (Vibration Mon System) on El 565' (S-R10) and REPORT the Vibration Data for Pump 2B to the Unit Operator and any other alarm indications. The person shall advise the Unit Operator of any changes in the vibration values and Acknowledge Alarms as necessary D. **IF** alarm seals in, **THEN** **ADJUST** pump speed slightly to try to reset the alarm. Dispatches personnel to Panel 2-LPNL-925-0712 to report vibration on 2B recirc pump.

Op Test No.: 15-01 Scenario No. 2 Event No.: 3 Page 2 of 2

Event Description: Recirc Pump 2B vibration high

Time	Position	Applicant's Actions or Behavior
	DRIVER	As RB AUO, acknowledge going to Vibration Panel on 565 and reporting recirc pump 'B' vibration
	BOP	Checks Recirc Pump 'B' temperatures on Panel 2-9-21 and reports all temperatures within allowable values.
	DRIVER	After 5 minutes, call ATC operator and report 68-71D-G are trending up slowly. 68-71D and 68-71E are indicating 12 mils.
	ATC	Updates crew on vibration report on 'B' recirc pump
	SRO	Directs ATC to lower 'B' recirc pump speed to try to get vibration alarm to reset.
	ATC	Lowers 'B' recirc speed at least 5 rpm.
	NRC	Operator may using 'Lower Slow' (1rpm) or 'Lower Med' (5rpm)
	DRIVER	When 'B' recirc pump speed has been lowered approximately 5 rpm, report that vibration is lowering but the alarm is still sealed in. When speed has been lowered approximately 10 rpm, insert *dmf th12b* to delete the vibration condition and report the vibration is approximately 10 mils and lowering very slowly.
	SRO	Briefs crew on ARP operator actions if the vibration condition would occur again and was unable to be reset.
	NRC	SRO may not conduct a brief on a possible recurrence of the alarm End of Event #3

Op Test No.: 15-01 Scenario No. 2 Event No.: 4 Page 1 of 5

Event Description: Recirc Pump 2B seal failure/2-AOI-68-1A

Time	Position	Applicant's Actions or Behavior
	DRIVER	When the NRC Chief Examiner is ready for Event 4, insert F3 (imf th12b) to cause recirc pump 'B' vibration again.
	ATC	Reports RECIRC PUMP MOTOR B VIBRATION HIGH (2-XA-55-4B, Window 20) in alarm. Dispatches personnel to Panel 2-LPNL-925-0712 to report vibration on 2B recirc pump.
	NRC	Reported recirc pump vibration will continue to rise. Failure of the inner recirc pump seal will occur when vibration is 15 mils.
	DRIVER	After 5 minutes, call ATC operator and report 68-71D – G are rising. 69-D and 68-71E are indicating 12 mils. One minute later, call ATC operator and report 68-71D – G are rising. 68-71F and 68-71G are indicating 15 mils. Insert F4 (imf th10b 70) to fail the 'B' recirc pump inner seal
	SRO	Directs ATC to trip 'B' Recirc Pump and enter 2-AOI-68-1
	NRC	SRO may choose to enter 2-OI-68, Section 7.2 ((Stopping a Recirc Pump (Mode 1) & Single Loop Operation).

Op Test No.: 15-01 Scenario No. 2 Event No.: 4 Page 2 of 5

Event Description: Recirc Pump 2B seal failure/2-AOI-68-1A

Time	Position	Applicant's Actions or Behavior
	ATC	**2-OI-68** **7.2 Stopping a Recirc Pump (Mode 1) & Single Loop Operation** **CAUTIONS** 1) Prior to stopping a recirc pump, all attempts should be made to evaluate where the plant power to flow conditions will end up when a recirc pump is removed from service. If practical, the control rod line should be below 95.2% before stopping a recirc pump. 2) Per Technical Specifications, the reactor CAN BE operated indefinitely with one recirc loop out of service, provided the requirements of T.S. 3.4.1 are implemented within 24 hours of entering single loop operations. 3) In Single Loop Operation (SLO), reactor power is limited to less than or equal to 50%, core flow is limited to less than or equal to 50% and Active Recirc Drive flow is limited to 46.6kGPM. **NOTE** When depressing the switches which control the recirc drives, these switches must be firmly depressed to ensure all the contacts are made-up. [1] IF stopping of the recirc pump is immediately required, THEN (Otherwise Continue at Step 7.2[2]) [1.2] IF shut down of Recirc Drive 2B is desired, THEN (Otherwise N/A): [1.2.1] FIRMLY DEPRESS RECIRC DRIVE 2B S/D, 2-HS-96-20. [1.2.2] CHECK recirc drive decelerates to 345 RPM. [1.2.3] CHECK recirc drive shuts down. [1.2.4] CHECK DRIVE RUNNING, 2-IL-96-40, is extinguished. [1.3] REFER TO 2-AOI-68-1A or 1B for further required actions. Trips 'B' Recirc Pump and refers to 2-AOI-68-1A

Op Test No.: 15-01 Scenario No. 2 Event No.: 4 Page 3 of 5

Event Description: Recirc Pump 2B seal failure/2-AOI-68-1A

Time	Position	Applicant's Actions or Behavior
	ATC	**2-AOI-68-1A** **4.2 Subsequent Actions (continued)** **NOTE** Power To Flow Map is maintained in 0-TI-248"Station Reactor Engineer" and on ICS. [2] **IF** a single Recirc Pump tripped, **THEN** **CLOSE** tripped Recirc Pump discharge valve. [3] **IF** Region I or II of the Power to Flow Map is entered, **THEN** (Otherwise N/A) **IMMEDIATELY** take actions to INSERT control rods to less than 95.2% loadline. Refer to 0-TI-464, Reactivity Control Plan Development and Implementation. [9] [NER/C] **WHEN** conditions allow, **THEN** **MAINTAIN** operating jet pump loop flow greater than 41 x 10^6 lbm/hr (2-FI-68-46 or 2-FI-68-48). [GE SIL 517]
	DRIVER	When 'B' Recirc Pump is tripped insert *dmf th12b* to delete recirc pump 'B' vibration
	ATC	Closes 'B' Recirc Pump discharge valve
	ATC / BOP	Inserts control rods to lower reactor power below the 74% loadline AND greater than 45% core flow IAW RCP. When conditions allow and at SRO direction, raises operating jet pump loop flow > 41 x 10^6
		Reports RECIRC PUMP B NO 1 SEAL LEAKAGE ABN (2-XA-55-4B, Window 25) in alarm. **2-ARP-9-4B** **NOTE** Annunciator Window will not reset until all Alarms are ACK on the recorder 2-XR-68-2/5 (RECIRC PUMPS DISCH FLOW & TEMP). A. **DETERMINE** initiating cause by comparing No. 1 and 2 seal cavity pressure indicators on Panel 2-9-4 or ICS.

Op Test No.: 15-01 Scenario No. 2 Event No.: 4 Page 4 of 5

Event Description: Recirc Pump 2B seal failure/2-AOI-68-1A

Time	Position	Applicant's Actions or Behavior
	ATC	• Plugging of No. 2 RO - No. 2 seal pressure approaches no. 1 seal pressure. • Failure of No. 1 seal - No. 2 seal pressure is greater than 50% of the pressure of No. 1. Reports that No. 1 seal pressure and No. 2 seal pressure are approximately equal
	SRO	**2-AOI-68-1A** **4.2 Subsequent Actions (continued)** [9] **NOTIFY** Reactor Engineer to **PERFORM** the following: • REFER TO Tech Specs 3.4.1 • 2-SR-3.4.1(SLO), Reactor Recirculation System Single Loop Operation • 0-TI-248, Core Flow Determination in Single Loop Operation [10] [NER/C] **WHEN** the Recirc Pump discharge valve has been closed for at least five minutes (to prevent reverse rotation of the pump) [GE SIL-517], **THEN** (N/A if Recirc Pump was isolated in Step 4.2[8]) **OPEN** Recirc Pump discharge valve as necessary to maintain Recirc Loop in thermal equilibrium. Calls RE to inform them of the Recirc Pump trip Directs ATC to open 'B' Recirc Pump discharge valve after 5 minutes
	ATC	Opens 'B' Recirc Pump discharge valve after 5 minutes

Op Test No.: 15-01 Scenario No. 2 Event No.: 4 Page 5 of 5

Event Description: Recirc Pump 2B seal failure/2-AOI-68-1A

Time	Position	Applicant's Actions or Behavior
	SRO	Reviews Technical Specification 3.4.1 3.4 REACTOR COOLANT SYSTEM (RCS) 3.4.1 Recirculation Loops Operating LCO 3.4.1 Two recirculation loops with matched flows shall be in operation. OR One recirculation loop may be in operation provided the following limits are applied when the associated LCO is applicable a. LCO 3.2.1, "AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)," single loop operation limits specified in the COLR; b. LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)," single loop operation limits specified in the COLR; c. LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," Function 2.b (Average Power Range Monitors Flow Biased Simulated Thermal Power - High), Allowable Value of Table 3.3.1.1-1 is reset for single loop operation; CONDITIONS — REQ. ACTIONS — COMP A. Requirements of LCO not met — A.1 Satisfy the requirements of the LCO — 24 hr Briefs crew on the Technical Specification requirements for only one recirc pump in operation.
	DRIVER	As RE, acknowledge call that 'B' recirc pump was tripped due to high vibration and TS requirements for single loop operations
	NRC	End of Event #4

Op Test No.: 15-01 Scenario No. 2 Event No.: 5 Page 1 of 2

Event Description: The 2A Steam Packing Exhauster will trip and the 2B Steam Packing Exhauster will not auto start.

Time	Position	Applicant's Actions or Behavior
	DRIVER	When the NRC Chief Examiner is satisfied with the Technical Specification call and ready for Event #5, insert F5 to trip 2A Steam Packing Exhauster (bat NRC/1501-2-5)
	NRC	If one SPE breaker trips, indication will be lost on BOTH SPEs. This is the normal logic scheme.
	BOP	Reports STEAM PACKING EXHAUSTER VACUUM LOW (2-XA-55-7A, Window 12) in alarm. Reports SPE Fan 2A has tripped and SPE Fan 2B has failed to start. **2-ARP-9-7A, Window 12** B. **IF** standby blower fails to start, **THEN** **START** standby OR **VERIFY** normal in service. **REFER TO** 2-OI-47C. C. **IF** blower is running, **PERFORM** the following: 1. **THROTTLE** in-service STEAM PACKING EXHR 2B(2A) DISCHARGE VLV, 2-HS-66-35A (2-HS-66-34A), UNTIL SPE Vacuum, as indicated on STEAM PACKING EXH VACUUM, 2-PI-66-54, is between 10" and 12" Vacuum, or as appropriate for plant conditions. **REFER TO** 2-OI-47C. 2. **VERIFY** SJAE/OG CNDR CNDS FLOW, 2-FI-2-42, between 2 x 10^6 lbm/hr and 3 x 10^6 lbm/hr to prevent tripping SPE due to inadequate cooling. **REFER TO** 2-OI-2. Starts 2B SPE Fan and throttles discharge valve until SPE Vacuum is between 10" and 12" Vacuum. Verifies proper SJAE/OG CNDR condensate flow. Reports 2B SPE Fan in service

Op Test No.: 15-01 Scenario No. 2 Event No.: 5 Page 2 of 2

Event Description: The 2A Steam Packing Exhauster will trip and the 2B Steam Packing Exhauster will not auto start.

Time	Position	Applicant's Actions or Behavior
	SRO	Calls Work Control to initiate a WO on the 2A SPE Fan OR directs BOP to call.
	DRIVER	As Work Control, acknowledge initiating a WO on the 2A SPE fan.
	NRC	End of Event #5

Op Test No.: 15-01	Scenario No. 2	Event No.: 6	Page 1 of 5
Event Description: CRD in service Flow Control Valve failure			

Time	Position	Applicant's Actions or Behavior
	DRIVER	When the NRC Chief Examiner is ready for Event #4, insert SF4 (bat NRC/1501-2-4) to fail the 2A CRD Flow Control Valve.
	ATC	Reports (2-XA-55-5A, Window 10) in alarm and CRD parameters abnormal. **Automatic Action:** None **Operator Action:** A. **CHECK** CRD ACCUM CHARGING WATER PRESSURE HI on 1-PI-85-13A, Panel 1-9-5. It is reading about 1500 psig. B. **CHECK** 1-FCV-085-0011 A or B in service. A is in service C. **IF** in service controller has failed, **THEN REFER TO** 2-OI-85. Will refer to 2-OI-85 D. **IF** pressure is still greater than 1510 psig after verifying proper controller operation, **THEN THROTTLE** CRD PUMP DISCH THROTTLING VLV , 1-THV-085-0527, to maintain between 1475 and 1500 psig.
	SRO	Directs entry into 2-AOI-85-3
	ATC	**2-AOI-85-3** **4.2 Subsequent Actions** [3] **IF** operating CRD Pump has NOT tripped, **THEN PERFORM** the following:(**REFER TO** 2-OI-85) (Otherwise N/A) [3.1] **VERIFY** FULL OPEN CRD PUMPS 2A & 1B UNIT 2 SUCTION, 2-FCV-85-65. [3.4] **IF** system flow is high or low, **THEN SHIFT** CRD Flow Control Valves. Dispatches the AUO to CRD Flow Control station to investigate.
	DRIVER	Report back to the ATC that there is an air leak on the 'A' FCV.

Op Test No.: 15-01 Scenario No. 2 Event No.: 6 Page 2 of 5

Event Description: CRD in service Flow Control Valve failure

Time	Position	Applicant's Actions or Behavior
	SRO	Directs that CRD Flow Control Valves be shifted
	ATC	**2-OI-85** **6.3 Shifting CRD Flow Control Valves** [1] **VERIFY** Control Rod Drive Hydraulic System in operation. Refer to Section 5.1. [2] **REVIEW** all Precautions and Limitations in Section 3.6. **NOTE** 1) Erratic operation of CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, may be observed during refueling/shutdown operations when larger ΔPs exists due to low reactor pressure and CRD pressure. 2) As CRD Flow Control Valves are shifting, CRD System Flow Controller should be adjusted, as needed, to maintain a constant flow. [3] **PERFORM** the following for Flow Control Valve being brought into service from Reactor Bldg El 565' Dispatches AUO to perform Step 6.3[3]
	DRIVER	[3.1] **OPEN** FCV-85-11B INLET SOV, 2-SHV-085-0561. [3.2] **OPEN** FCV-85-11B OUTLET SOV, 2-SHV-085-0562 [3.3] **VERIFY OPEN** PCV BYPASS SOV TO FCV-85-11B, 2-85-318 [3.4] **CHECK OPEN** PCV 85-11 SOV, 2-85-247. [3.5] **CHECK OPEN** HDR ISOL TO FCV-85-11A & B, 2-85-313. [3.6] **CHECK** FCV-85-11A THREE WAY ISOL valve handle in Horizontal position for 2-85-251. [3.7] **CHECK** FCV-85-11B, THREE WAY ISOL valve handle in Horizontal position for 2-85-252. Report to ATC that Step 6.3[3] is complete

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Event Description: CRD in service Flow Control Valve failure

Time	Position	Applicant's Actions or Behavior
	ATC	[4] **VERIFY** CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, in BAL position on outer control selector wheel. [4.1] **BALANCE** CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, by turning Manual Control Pot inside Control Selector Wheel UNTIL red deviation pointer is in Green Band. [4.2] **TURN** CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, Control Selector from BAL position to MAN position. [5] **REDUCE** CRD SYSTEM FLOW using 2-FIC-85-11, to approximately 40 gpm with Manual Control Pot on 2-FIC-85-11. Completes Steps 4 and 5. Contacts AUO to perform 6.3[6]
	DRIVER	[6] **PLACE** CRD SYSTEM FLOW CV SELECTOR SW 2-XS-85-11, on 2-LPNL-925-0018B, to select Flow Control Valve being brought into service, in VALVE A(VALVE B). Contact ATC operator and report that Step 6.3[6] is complete
	ATC	[7] **CHECK** selected in-service valve opening and out-of-service valve closing. Observes 'A' FCV closing and 'B' FCV opening Contacts AUO to perform Step 6.3[8]
	DRIVER	[8] **PERFORM** the following for Flow Control Valve being removed from service: [8.1] **CLOSE** FCV-85-11A(B) INLET SOV, 2-SHV-085-0563(0561). [8.2] **CLOSE** FCV-85-11A(B) OUTLET SOV, 2-SHV-085-0564(0562). Contact ATC operator and report Step 6.3[8] is complete

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Event Description: CRD in service Flow Control Valve failure

Time	Position	Applicant's Actions or Behavior
	ATC	[9] **ADJUST** CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, to establish between 40 gpm and 65 gpm. [10] **BALANCE** CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, by **TURNING** Flow Demand Thumb Wheel until Red Deviation Pointer is in Green band, **AND PLACE** in AUTO **OR** BALANCE. Contacts the AUO to perform Step 6.3[11]
	DRIVER	[11] **VERIFY** CRD STABILIZING FLOW, 2-FI-85-22, is approximately 6 gpm (locally on 2-LPNL-925-0018B). Call ATC operator and report that Stabilizing flow is approximately 6 gpm.
	ATC	[12] **VERIFY** CRD DR WATER HDR FLOW, 2-FI-85-15A, is approximately 0 gpm. [13] **ESTABLISH** the following by alternately adjusting tape setpoint of CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, **AND** throttled position of CRD DRIVE WATER PRESS CONTROL VLV, 2-HS-85-23A: • CRD CLG WTR HDR DP, 2-PDI-85-18A between 10 psid and 20 psid. □ • CRD DRIVE WTR HDR DP, 2-PDI-85-17A between 250 psid and 270 psid. □ • CRD SYSTEM FLOW, 2-FIC-85-11 between 40 gpm and 65 gpm. **NOTE** PUMP DISCH THROTTLING valve, 2-85-527, has been set to supply 1500 psig charging water pressure and Unit Supervisor authorization is required prior to changing valve position.

Op Test No.: 15-01	Scenario No. 2	Event No.: 6	Page 5 of 5
Event Description: CRD in service Flow Control Valve failure			

Time	Position	Applicant's Actions or Behavior
	ATC	[14] **IF** CRD ACCUM CHG WTR HDR PRESSURE, 2-PI-85-13A, is less than 1475 psig, **OR** greater than 1500 psig, **THEN THROTTLE** PUMP DISCH THROTTLING, 2-THV-085-0527, to maintain pressure within normal operating range of between 1475 psig and 1500 psig, as indicated on 2-PI-8-13A. **NA**
	NRC	End of Event #6

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	DRIVER	When NRC Chief Examiner is ready for Event 7, insert F7 (imf th22 100 20:00) bottom head leak.
	BOP	Reports Drywell Pressure rising slowly Continues to monitor containment parameters Reports PRI CONTAINMENT N_2 PRESS HIGH (2-XA-55-3B, Window 10) in alarm Reports Drywell Pressure 1.5 psig and rising slowly **2-ARP-9-3B** A. **CHECK** containment pressure using multiple indications: B. **CHECK** containment temperature. C. **REFER TO** 2-OI-64, Venting the drywell with standby gas treatment fan. Verifies drywell pressure rising using other indications Reports containment temperature rising slowly Reports DRYWELL NORM OPERATING PRESS HIGH (2-XA-55 3B, Window 19) in alarm Reports Drywell Pressure 1.6 psig and rising slowly **2-ARP-9-3B** G. **IF** Drywell pressure is high, **THEN** **REFER TO** 2-AOI-64-1.

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to vent the drywell IAW 2-AOI-64-1
	BOP	**2-AOI-64-1** **4.2 Subsequent Actions** [2] **IF** Drywell Pressure is High, **THEN** **PERFORM** the following: (Otherwise N/A) [2.4] **ALIGN and START** additional Drywell coolers and fans as necessary. **REFER TO** 2-OI-64. **CAUTION** Stack release rates exceeding 1.4 X 10^7 µci/sec, or a SI-4.8.B.1.a.1 release fraction above one will result in ODCM release limits being exceeded
	BOP	[2.5] **VENT** Drywell as follows: [2.5.1] **CLOSE** SUPPR CHBR INBD ISOLATION VLV 2-FCV-64-34 (Panel 2-9-3). [2.5.2] **VERIFY OPEN**, DRYWELL INBD ISOLATION VLV, 2-FCV-64-31 (Panel 2-9-3). [2.5.3] **VERIFY** 2-FIC-84-20 is in AUTO and SET at 100 scfm (Panel 2-9-55). [2.5.4] **VERIFY RUNNING** a Standby Gas Treatment Fan STGTS TRAIN C(A)(B) (Panel 2-9-25). [2.5.5] **IF** required, **THEN** **REQUEST** Unit 1 Operator to START Standby Gas Treatment Fans A or B. (Otherwise N/A) [2.5.7] **PLACE** 2-FCV-84-20 CONTROL DW/SUPPR CHBR VENT, 2-HS-64-35, in OPEN (Panel 2-9-3). Calls Unit 1 operator and requests that a standby gas train be started. Vents the drywell IAW 2-AOI-64-1

Op Test No.: 15-01 Scenario No. 2 Event No.: 7 Page 3 of 21

Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	DRIVER	When NRC Chief Examiner is satisfied with AOI actions, insert SF7 (bat NRC/1501-2-7) steam leak in the drywell and a failure of RHR select switches.
	BOP	Reports drywell pressure and temperature continuing to rise Reports DRYWELL PRESS APPROACHING SCRAM (2-XA-55-3B, Window 30) in alarm **2-ARP-9-3B** **A. CHECK** containment pressure and temperature using multiple indications. Continues to monitor and report containment parameters
	SRO	Briefs crew on current plant conditions. Directs that a reactor scram be initiated at a point prior to the automatic scram (line in the sand) Calls line management and Load Dispatcher to inform them of upcoming scram
	DRIVER	Acknowledge call concerning upcoming scram
	ATC	Reports that drywell pressure is at the value directed by SRO

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	ATC	Initiates a manual reactor scram **Reactor Scram OATC Hard Card** **1.0 IMMEDIATE ACTIONS** [1] **DEPRESS** REACTOR SCRAM A and B, 2-HS-99-5A/S3A and 2-HS-99-5A/S3B, on Panel 2-9-5. [2] **IF** scram is due to a loss of RPS, **THEN PLACE** REACTOR MODE SWITCH, 2-HS-99-5A-S1, in START & HOT STBY **AND PAUSE** for approximately 5 seconds (Otherwise N/A) [3] Refuel Mode One Rod Permissive Light check: [3.1] PLACE REACTOR MODE SWITCH, 2-HS-99-5A-S1, in REFUEL. [3.2] CHECK illuminated REFUEL MODE ONE ROD PERMISSIVE light, 2-XI-85-46. [3.3] IF REFUEL MODE ONE ROD PERMISSIVE light, 2-XI-85-46, is NOT illuminated, THEN CHECK all control rod positions at Full-In Overtravel, or Full-In. (Otherwise N/A) [4] PLACE REACTOR MODE SWITCH, 2-HS-99-5A-S1, in SHUTDOWN. [5] REPORT the following status to the US: • Reactor Scram • Mode Switch is in Shutdown • "All rods in" or "rods out" • Reactor Water Level and trend (recovering or lowering) • Reactor pressure and trend • MSIV position (Open or Closed) • Power level Completes 'hard card' actions and makes scram report

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	Enters EOI-1 on RPV Water Level below +2" **Verify** RX scram – **CHECKED** **RC/Q** **Monitor** and **Control** reactor power - **CHECKED** The reactor is subcritical AND NO boron has been injected **THEN** **EXIT** RC/Q and **ENTER** AOI-100-1, Reactor Scram - **CHECKED** Directs ATC to enter 2-AOI-100-1 **RC/L** CAUTION: Ambient temp may affect RPV water level indication and trend – **CHECKED** **MONITOR** and **CONTROL** RPV water level – **CHECKED** **VERIFY** each as required • PCIS isolations (Groups 1, 2, and 3) – **CHECKED** It has NOT been determined that the reactor will remain subcritical without boron under all conditions – **SUBCRITICAL** RPV water level CANNOT be determined – **CAN** PC water level CANNOT be maintained below 105 ft - **CAN** OR Suppr chmbr press CANNOT be maintained below 55 psig - **CAN** CAUTION #2 Pump NPSH and Vortex Limits #3 Elevated suppr chmbr press may trip RCIC #6 HPCI or RCIC suction temp above 140°F – **CHECKED**

Op Test No.: 15-01 Scenario No. 2 Event No.: 7 Page 6 of 21

Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	RESTORE and MAINTAIN RPV water level between +2 in and +51 in with ANY of the following CNDS and FW 5A CRD 5B RCIC with CST suction if available 5C HPCI with CST suction if available 5D CNDS 6A CS 6D,6E LPCI 6B, 6C Directs ATC to restore and maintain reactor level between +2 in and +51 in using Condensate and Feedwater in accordance with Appendix 5A **RC/P** DW press is above 2.4 psig - **NO** Emergency RPV depressurization is anticipated - **NO** AND The reactor will remain subcritical without boron under all conditions Emergency RPV depressurization is or has been required - **NO** RPV water level CANNOT be determined - **CAN** Is ANY MSRV cycling - **NO** Steam cooling is required - **NO** Suppr pl temp and level CANNOT be maintained in a safe area of Curve 3 at the existing RPV press - **CAN** Suppr pl level CANNOT be maintained in the safe area - **CAN** of Curve 4

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	DW control air becomes unavailable - **AVAIL** Boron injection is required - **NO** AND The main condenser is available AND There has been no indication of a steam line break **STABILIZE** RPV press below 1073 psig with the main turbine bypass valves (APPX 8B) Directs BOP to control reactor pressure 800 psig to 1000 psig in accordance with Appendix 8B
	BOP	Verifies that Main Turbine Bypass valves are controlling reactor pressure 800 psig to 1000 psig. Verifies and reports successful Gr. 2, 3, 6, and 8 PCIS Isolations
	ATC	**2-EOI APPENDIX-5A** 1. IF .....It is desired to use a reactor feed pump that is in operation, THEN .....**CONTINUE** at step 12 to control the operating pump 12. **SLOWLY ADJUST** RFPT speed UNTIL feedwater flow to the RPV is indicated, using ANY of the following methods on Panel 2-9-5: • Individual 2-HS-46-8A(9A)(10A), RFPT 2A(2B)(2C) SPEED CONT RAISE/LOWER switch in MANUAL GOVERNOR, **OR** • Individual 2-SIC-46-8(9)(10), RFPT 2A(2B)(2C) SPEED CONTROL in MANUAL, **OR** • 2-LIC-46-5, REACTOR WATER LEVEL CONTROL, in MANUAL with individual 2-SIC 13. **ADJUST** RFPT speed as necessary to control injection using the methods of step 12.

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	ATC	14. WHEN .....RPV level is approximately equal to desired level AND automatic level control is desired, THEN ..... **PLACE** 2-LIC-46-5, REACTOR WATER LEVEL CONTROL, in AUTO with individual 2-SIC-46-8(9)(10), RFPT 2A(2B)(2C) SPEED CONTROL in AUTO Restores reactor water level to +2 in to +51in IAW App. 5A **2-AOI-100-1** **2.0 SUBSEQUENT ACTIONS:** [2] **DRIVE** in all IRMs and SRMs from Panel 2-9-5 as time and conditions permit. [3] **VERIFY** SCRAM DISCH VOL VENT & DR VLVS closed by green indicating lights at SDV Display on Panel 2-9-5. [4] **MONITOR** and **CONTROL** Reactor Water Level between +2" and +51", or as directed by US, using RFP/RFPT. [5] **RETURN** to body of procedure at step 4.2[5] **AND CONTINUE** with actions as required. Performs AOI-100-1 subsequent actions
	BOP	**2-AOI-100-1** **4.2 Subsequent Actions (continued)** **VERIFY TRIPPED** the Main Turbine as follows: [9.1] **DEPRESS** the TRIP pushbutton, 2-HS-47-67D on Panel 2-9-7. [NER/C] [INPO SOER 81-015] [9.2] **PERFORM** the following as required to **VERIFY OPEN** GENERATOR PCB 224: [9.2.1] **CHECK** green light illuminated and red light not illuminated above handswitch GENERATOR PCB 224 CNTR W/REV BYPASS, 2-HS-242-224A. [9.3] IMMEDIATELY **PLACE** VOLTAGE REGULATOR START/STOP SEL, 2-HS-57-24, to STOP and release. [9.4] **CHECK** the following at 2-HS-57-24: • GREEN light illuminated • RED light extinguished

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	BOP	[10] MONITOR Main Turbine Vibration on TURBINE GENERATOR VIBRATION, 2-XR-47-15, during coast down. [11] ADJUST TURBINE OIL TEMPERATURE CONT, 2-TIC-24-75, setpoint to 85°F. [12] WHEN turbine speed is less than 900 RPM, THEN START the following: • TURBINE BEARING LIFT OIL PUMPS • MOTOR SUCTION PUMP • AC TURNING GEAR OIL PUMP
	ATC/BOP	Updates crew on drywell pressure continuing to rise and reaching 2.45 psig – EOI-2 entry condition
	BOP	Reports start and injection of HPCI into the RPV.
	SRO	Verifies HPCI not needed for RPV level control and directs BOP to trip and lockout HPCI.
	BOP	Trips HPCI by holding the trip pushbutton depressed until turbine speed in zero then taking HPCI Aux Oil Pump sw. to PTL.
	SRO	Enters EOI-2 and re-enters EOI-1 on High Drywell Pressure. **EOI-2** SAMG entry is required and the TSC SAM team has assumed command and control - **NO** SAMG entry is required – **NO** CAUTION #4 PC press vs pump NPSH - **CHECKED** DW sprays have been initiated - **NO** Suppr chmbr sprays have been initiated – **NO** PC water level CANNOT be restored and maintained below 105 ft OR Suppr chmbr press CANNOT be restored and maintained below 55 psig - **CAN** CAUTION #2 Pump NPSH and Vortex Limits – **CHECKED**

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	**PC/P** **MONITOR** and **CONTROL** PC press below 2.4 psig using the Vent system (AOI-64-1) - **CHECKED** WHEN PC press CANNOT be maintained below 2.4 psig – **CHECKED** **BEFORE** suppr chmbr press rises to 12 psig **CONTINUE – CHECKED** CAUTION #2 Pump NPSH and Vortex Limits INITIATE suppr chmbr sprays using only pumps NOT required to assure adequate core cooling by continuous inj (APPX 17C) Directs BOP to initiate Suppression Pool Spray IAW App 17C
	BOP	**2-EOI APPENDIX-17C** 1. BEFORE Suppression Chamber pressure drops below 0 psig, **CONTINUE** in this procedure at Step 6. 2. IF ..... Adequate core cooling is assured **OR** Directed to spray the Suppression Chamber irrespective of adequate core cooling, THEN ... **BYPASS** LPCI injection valve open interlock as necessary: • **PLACE** 2-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS**. • **PLACE** 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.** 5. **INITIATE** Suppression Chamber Sprays as follows: a. **VERIFY** at least one RHRSW pump supplying each EECW header. b. IF.....EITHER of the following exists: • LPCI Initiation signal is NOT present, **OR** • Directed by SRO,

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	BOP	THEN...**PLACE** keylock switch 2-XS-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE. c. **MOMENTARILY PLACE** 2-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT, switch in SELECT. d. IF.....2-FCV-74-53(67), RHR SYS I(II) INBD INJECT VALVE, is OPEN, THEN...**VERIFY CLOSED** 2-FCV-74-52(66), RHR SYS I(II) OUTBD INJECT VALVE. e. **VERIFY OPERATING** the desired RHR System I(II) pump(s) for Suppression Chamber Spray. When aligning RHR for suppression pool spray, discovers that both the SELECT amber light and the 2/3 Core Height light will not illuminate when attempting the line up to spray. Reports failure to SRO
	SRO	Directs using the other loop of RHR to spray the torus Calls WC to investigate the RHR select logic
	BOP	When aligning the other loop of RHR for suppression pool spray, discovers that the SELECT amber light will not remain illuminated when the "SELECT" switch is taken to "SELECT" Reports that Suppression Pool Spray cannot be initiated in either loop of RHR
	DRIVER	As WC, acknowledge initiating WO to investigate and repair problem with RHR SELECT logic.
	CREW	Reports that drywell pressure and temperature are continuing to rise.

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	**DW/T** CAUTION #1 Ambient temp may affect RPV water level indication and trend - **CHECKED** **MONITOR** and **CONTROL** DW temp below 160°F using available DW cooling – **CHECKED** WHEN DW temp CANNOT be maintained below 160°F - **CHECKED** **OPERATE** all available DW cooling - **CHECKED** **BEFORE** DW temp rises to 200° EOI-1, RPV Control at Step RC-1 – **SCRAM** **BEFORE** DW temp rises to 280°F **CONTINUE** Is suppression pool level below 19 ft. – **YES** Is DW temp within the safe area of Curve 5 – **YES** **SHUT DOWN** Recirc pumps and DW blowers Directs ATC to Shutdown 'A' Reactor Recirc pump Directs BOP to shutdown DW blowers CAUTION #2 Pump NPSH and Vortex Limits – **CHECKED** **INITIATE** DW sprays using only pumps NOT required to assure adequate core cooling by continuous injection (APPX17B) - **CANNOT**
	ATC	Reports 'A' recirc pump secured
	BOP	Reports DW blowers secured
	ATC/BOP	Reports drywell temperature and pressure continuing to rise.

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	NRC	IF the SRO decides to Rapidly Depressurize the RPV, this would initiate **Event No. 8 located on page 42 of 45**
	SRO	**EOI-2, DW/T** WHEN DW temp CANNOT be restored and maintained below 280°F **EMERGENCY RPV DEPRESSURIZATION IS REQUIRED**(EOI-1, RC/P-4; C1-1, C1-20; C5-12, C5-14) Updates crew that Emergency Depressurization is required **EOI-1, RC/L** **IF** Emergency RPV depressurization is or has been required **THEN EXIT** RC/P and **ENTER C2**, Emergency RPV Depressurization SAMG entry is required and the TSC SAM team has assumed command and control - **NO** RPV water level CANNOT be determined - **CAN** Containment water level CANNOT be maintained below 44 ft- **CAN** DW control air becomes unavailable – **AVAIL** Will the reactor remain subcritical without boron under all conditions - **YES** Is DW press above 2.4 psig - **YES** PREVENT inj from ONLY those CS and LPCI pumps NOT required to assure adequate core cooling (Appx 4) Direct ATC/BOP to terminate and prevent feedwater, condensate, CS and LPCI.
	ATC	**2-EOI APPENDIX-4** 6. **PREVENT** injection from CONDENSATE and FEEDWATER by performing the following: a. IF..... immediate injection termination from a reactor feedwater pump is required, THEN ..... **PERFORM** step 6.d for the desired pump.

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	ATC	b. LOWER RFPT 2A(2B)(2C) speed to minimum setting (approximately 600 rpm) using ANY of the following methods on Panel 2-9-5: • Using 2-LIC-46-5, REACTOR WATER LEVEL CONTROL, in MANUAL AND individual 2-SIC-46-8(9)(10), RFPT 2A(2B)(2C) SPEED CONTROL in AUTO, OR • Using individual 2-SIC-46-8(9)(10), RFPT 2A(2B)(2CSPEED CONTROL in MANUAL, OR • Using individual 2-HS-46-8A(9A)(10A), RFPT 2A(2B)(2C) SPEED CONT RAISE/LOWER switch in MANUAL GOVERNOR. c. CLOSE the following valves BEFORE RPV pressure drops below 500 psig: • 2-FCV-3-19, RFP 2A DISCHARGE VALVE • 2-FCV-3-12, RFP 2B DISCHARGE VALVE • 2-FCV-3-5, RFP 2C DISCHARGE VALVE • 2-LCV-3-53, RFW START-UP LEVEL CONTROL d. TRIP RFPTs as necessary to prevent injection by DEPRESSING the following push-buttons: • 2-HS-3-125A, RFPT 2A TRIP • 2-HS-3-151A, RFPT 2B TRIP • 2-HS-3-176A, RFPT 2C TRIP. Terminates and prevents condensate and feedwater IAW App 4 Reports when complete
	BOP	**NOTE** Following receipt of a CORE SPRAY automatic initiation signal, it is NOT necessary to wait until a pump starts before performing step 3. 3. **PREVENT** injection from CORE SPRAY following an initiation signal by **PLACING** ALL Core Spray pump control switches in STOP.

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	BOP	4. **PREVENT** injection from LPCI SYSTEM I by performing the following: NOTE Injection may be prevented by performing EITHER step 4.a or step 4.b. a. Following automatic pump start, **PLACE** RHR SYSTEM I pump control switches in STOP. **OR** b. BEFORE RPV pressure drops below 450 psig, 1) **PLACE** 3-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS.** **AND** 2) **VERIFY CLOSED** 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE. 5. **PREVENT** injection from LPCI SYSTEM II by performing the following: NOTE Injection may be prevented by performing EITHER step 5.a or step 5.b. a. Following automatic pump start, **PLACE** RHR SYSTEM II pump control switches in STOP. **OR** b. BEFORE RPV pressure drops below 450 psig, 1) **PLACE** 3-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.** **AND** 2) **VERIFY CLOSED** 3-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE. Terminates and prevents CS/LPCI IAW App. 4 Reports when complete

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	**C-2** Is suppression pool level above 5.5 ft – **YES** **OPEN** all ADS Valves (ok to exceed 100°F/hr cooldown rate) Directs BOP to open all ADS valves
	BOP	Opens all ADS valves, verifies open using alternate indications and reports 6 ADS valves open
		CRITICAL TASK Emergency Depressurize before 300°F. 1. Safety Significance Precludes failure of Primary Containment 2. Cues Procedural compliance High Drywell temperature 3. Measured by Observation-SRO updates or briefs the crew that ED is required based on Drywell temperature AND the operator opens 6 ADS/MSRVs 3. Feedback MSRV open indications RPV Pressure lowering This Critical Task is **not met** if the Crew does not ED by 300°F.

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Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	**EOI-1, RC/L** **RESTORE** and **MAINTAIN** RPV water level between +2 in. and +51 inches with ANY of the following: RCIC with CST suction if available 5C HPCI with CST suction if available 5D CS 6D, 6E LPCI 6B, 6C Directs BOP to restore and maintain RPV water level between +2 in. and +51 in. using RCIC/HPCI, Appendices 5C/5D. Supplement with CS/LPCI, Appendices 6B, 6C, 6D, and 6E.
	DRIVER	Insert Shift F2 (cs02b) to prevent auto opening of CS II inboard injection valve and Shift F3 (imf th34f) for flashing all reference legs.
	NRC	When reactor pressure lowers below 450 psig, the operators will verify that LPCI/CS injection valves open. This will initiate **Event No. 9 located on page 43 of 45.**
	ATC/BOP	Coordinate restoring RPV water level to +2 in. to +51 in. using RCIC/HPCI/CS/LPCI Trends condenser hotwell level and trips condensate pumps before pumps experience cavitation.
	ATC/BOP	Report isolation of RCIC and HPCI on low reactor pressure
	SRO	Briefs crew on current plant conditions including the potential to flash RPV level reference legs.
	ATC/BOP	Monitors RPV water level using all instrumentation Reports indication of 'notching' on RPV water level instrumentation Reports RPV water level is 'unknown'

Op Test No.: 15-01 Scenario No. 2 Event No.: 7 Page 18 of 21

Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	**EOI-1, RC/L** **IF** — **THEN** RPV water level CANNOT be determined — **EXIT** RC/L and **ENTER** C4, RPV Flooding **C-4** CAUTION #1 Ambient temp may affect RPV water level indication and trend **IF** RPV water level can be determined - **CANNOT** AND It has NOT been determined that the reactor will remain subcritical without boron under all conditions - **SUBCRITICAL**
	SRO	RPV water level can be determined - **CANNOT** AND The reactor will remain subcritical without boron under all conditions PC water level CANNOT be maintained below 105 ft - **CAN** OR Suppr chmbr press CANNOT be maintained below 55 psig- **CAN**
	SRO	DW control air becomes unavailable – **AVAILABLE** **IF** — **THEN** The reactor will remain subcritical without boron under all conditions — **B >** Is suppr pl level above 5.5 ft. – **YES** OPEN all ADS vlvs - **OPEN** (ok to exceed 100°F/hr cooldown rate Can 6 ADS vlvs be opened – **YES** **IF** — **THEN** It has been determined that the RPV has been flooded to the main steam lines — **D >**

Op Test No.: 15-01 Scenario No. 2 Event No.: 7 Page 19 of 21

Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	Can any MSRV be opened – **YES** **ISOLATE** ANY of the following NOT needed for RPV injection Injection • Main steam lines • Main steam line drains • HPCI • RCIC Directs BOP to isolate/verify isolated Main Steam lines, Main Steam line drains, HPCI and RCIC
	BOP	Verifies main steam lines, main steam line drains, HPCI, and RCIC are isolated. Reports isolated
	SRO	CAUTION #2 Pump NPSH and Vortex Limits #3 Elevated suppr chmbr press may trip RCIC #6 HPCI or RCIC suction temp above 140°F **FLOOD** the RPV to the elevation of the main steam lines with the following:
	SRO	CRD 5B CNDS 6A LPCI 6B, 6C CS 6D, 6E Directs flooding the RPV to the steam lines using available sources of injection
	ATC/BOP	Inject to the RPV using all available sources of injection Report that RPV pressure is rising Report that MSRV have reopened
	SRO	**C-4** Can ANY MSRV be opened – **YES** NOTE 7

Op Test No.: 15-01 Scenario No. 2 Event No.: 7 Page 20 of 21

Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
	SRO	Indication that the RPV is flooded to the main steam lines may include ANY of the following: • Tail pipe temperatures of open SRVs decrease to subcooled values. • Rising RPV pressure as noncondensibles are compressed. • Actuation of SRV tail pipe acoustic monitors. • MSRVs re-open and stay open at RPV pressures below 50 psig above suppression chamber pressure due to the head of water above the MSRVs. (MSRVs may open and close sluggishly if the discharge flow is subcooled.)
	SRO	Monitors for indications that the RPV is flooded Determines that the RPV is flooded **C-4** **IF** It CANNOT be determined that the RPV Is flooded to the Main Steam Lines – **CAN** **ISOLATE** the following: - **ISOLATED** • Main steam lines • Main steam line drains • HPCI • RCIC **CONTROL** RPV inj as low as practicable to maintain the steam lines flooded Directs controlling RPV injection as low as practicable to maintain the steam lines flooded
	ATC/BOP	Control RPV injection as directed.

Op Test No.: 15-01 Scenario No. 2 Event No.: 7 Page 21 of 21

Event Description: LOCA/Scram with inability to spray the Drywell/C4

Time	Position	Applicant's Actions or Behavior
		After all RPV level instruments flash (level unknown), inject into the RPV with all available sources until one of the conditions in C-4, Note 7 is met. (any or all) BR 2-12-15 1. Safety Significance Prevent fuel damage by establishing adequate core cooling 2. Cues Procedural compliance Loss of all RPV level indications 3. Measured by Observation-Indications that the Main Steam Lines are flooded are listed in C-4 Note 7 4. Feedback MSRV tail pipe temperature MSRV acoustic monitor RPV Pressure trend This Critical Task is **not met** if the Crew fails to continue to raise level and maintain pressure on the vessel.
	NRC	End of Event #7 and scenario
	DRIVER	Place simulator in FREEZE upon direction of the NRC Chief Examiner

Op Test No.: 15-01 Scenario No. 2 Event No.: 8 Page 1 of 2

Event Description: Rapid depressurization of the RPV using Turbine bypass valves

Time	Position	Applicant's Actions or Behavior
	DRIVER	When SRO makes the decision to rapidly depressurize the RPV, insert SHIFT F1(imf tc02 0) to fail the main turbine bypass valves closed
	SRO	**EOI-2, DW/T** WHEN DW temp CANNOT be restored and maintained below 280°FDW **EMERGENCY RPV DEPRESSURIZATION IS REQUIRED**(EOI-1, RC/P-4; C1-1, C1-20; C5-12, C5-14) Determines that DW temperature will exceed 280°F and won't be able to restore and maintain below 280°F **EOI-1, RC/P** **IF** Emergency RPV depressurization is anticipated AND The reactor will remain subcritical without boron under all conditions **THEN** **RAPIDLY DEPRESSURIZE** the RPV with the main turbine bypass vlvs (ok to exceed 100°F/hr cooldown Directs BOP to rapidly depressurize the RPV with the main turbine bypass valves.

Op Test No.: 15-01 Scenario No. 2 Event No.: 8 Page 2 of 2

Event Description: Rapid depressurization of the RPV using Turbine bypass valves

Time	Position	Applicant's Actions or Behavior
	BOP	**2-OI-47** **8.0 INFREQUENT OPERATIONS** **8.1 Bypass Valve Operation** **NOTES** 1) Section 8.1.1 uses the RAISE, 2-HS-47-130B and LOWER, 2-HS-47-130A for the Bypass Jack to open and close the Bypass Valves. 2) When using the Jack to operate the Bypass valves, the valves will stay open at the desired position until closed by the LOWER, 2-HS-47-130A pushbutton. EHC Auto cooldown will not close the Bypass Valves, if the BPV DEMAND is greater than 0%
	BOP	**8.1.1 Using Bypass Valve Demand** [1] To open Bypass valves **DEPRESS** the BPV demand RAISE, 2-HS-47-130B pushbutton to slowly open the Bypass Valves until the desired number of Bypass valves are open. Attempts to open the Main Turbine Bypass valves to rapidly depressurize the RPV. Reports that the Main Turbine Bypass valve will not open. Calls WC to initiate troubleshooting on the bypass valves
	NRC	End of Event #8

Op Test No.: 15-01 Scenario No. 2 Event No.: 9 Page 1 of 1

Event Description: Core Spray Loop II injection valve will fail to open on initiation signal but can be manually opened

Time	Position	Applicant's Actions or Behavior
	BOP	When reactor pressure lowers below 450 psig, checks that LPCI and CS injection valves automatically open. Reports that CS II inboard injection valve (75-53) failed to automatically open.
	BOP	Opens CS II inbd injection valve (75-53) Reports that CS II inbd injection valve is open
	NRC	End of Event #9

SIMULATOR SETUP

IC	28
Exam IC	95

Batch File or Pref File	pref/NRC/1501NRC2

Malfunctions	Description	Event #	Delay	Severity	Ramp	Initial value	Final value
TH12B	RR Pump B vibration	3	N/A	N/A	N/A	False	True
TH10B	RR Pump Seal 1 Fail	4	N/A	N/A	N/A	False	True
TH22	LOCA inside DW	7	N/A	100	20:00	False	True
RH06A	Containment Spray Logic failure A Loop	Active	N/A	N/A	N/A	True	True
RH06B	Containment Spray Logic failure B Loop	Active	N/A	N/A	N/A	True	True
TC02	Main Turb. Bypass Vlvs fail to open	8	N/A	N/A	N/A	False	True
CS02B	Core Spray Loop 2 Injection vlvs fail to auto open.	Active	N/A	N/A	N/A	True	True

Remotes	Description	Event #	Delay	Severity	Ramp	Initial value	Final value

Overrides	Description	Event #	Delay	Severity	Ramp	Initial value	Final value
	Override 2B SPE Auto	5	N/A	N/A	N/A	False	True
	Override CRD FCV to simulate air leak.	6	N/A	N/A	N/A	False	True

Batch / Pref File(s): NRC/1501NRC2

bat NRC/1501-2-4 CRD FCV 11 Air leak
bat NRC/1501-2-5 SPE Trip and other not auto start
bat NRC/1501-2-7 LOCA/Scram with inability to spray the Drywell/C4

SHIFT MANAGER TURNOVER

EQUIPMENT OOS/LCOS

- Steam Vault Exhaust Booster Fan is tagged out for lubrication PMs.

ANTICIPATED OPERATIONS/MAINTENANCE FOR ONCOMING SHIFT

- Secure Suppression Pool Cooling IAW 2-OI-74
- Support MIG performance of 2-SR-3.3.6.1.5(4A/A) Core and Containment Cooling Systems RCIC Turbine Steam Line High Flow Instrument Channel A Calibration.

NO HEATERS ARE TO BE PLUGGED INTO OUTLETS IN THE CONTROL ROOM UNTIL DETERMINED IF WE CAN USE

SPP 7.3 RISK REVIEW DOCUMENTATION ON P DRIVE FOLDER WCC-RISK/BFN

EXPECTATION FOR 1500 MEETING IS FOR THE SM TO COVER CURRENT STATUS ON ALL CONTROL ROOM DEFICIENCIES AND ANNUNCIATOR WOs THAT SHOULD BE WORKING. THIS EXPECTATION STARTED 3/26/09

DO NOT DISABLE ANY ANNUNCIATORS WITHOUT GOING THRU MANAGEMENT REVIEW.

IF ALTERNATE HEAT BALANCES ALARM COMES IN ON ANY UNIT'S ICS, REDUCE POWER BY 10 MWT (3448 IF AT RATED POWER) AND CALL REACTOR ENGINEERING IN TO PLANT TO EVALUATE.

STATUS

WORK WEEK - DIV I ☒, DIV II ☐

OUTSIDE AIR TEMP 45°F

COMMON

UNIT 1

- 100%

UNIT 2

- 100%
- Suppression Pool Cooling in service due to a HPCI Flow Rate test last shift

UNIT 3

- 100%

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

Reactivity Maneuver Plan U2 SIMULATOR

Urgent Load Reduction/Recirculation Pump Trip Contingency Plans

Operations Plan

BFN Unit 2	Reactivity Control Plan	

Attachment 7
(Page 1 of 5)
Reactivity Control Plan Form

BFN Unit: 2 **Valid Date(s):** Current **Reactivity Maneuver Plan #:** U2 SIMULATOR

Are Multiple Activations Allowed: Yes (If yes, US may make additional copies)

Prepared by: Reactor Engineer / current Reviewed by: Q.L. Engineer / current
Reactor Engineer Date Qualified Reactor Engineer Date

Approved by: RE manager / current Concurrence: WCC Risk SRO / current
RE Manager Date WCC/Risk/Us SRO Date

Approved by: O. manager / current Authorized by: S. manager / current
Ops Manager OR Supt. Date Shift Manager Date

RCP Activated: [signature] / 1/19/15 RCP Terminated: _____ / _____
Unit Supervisor Date Unit Supervisor Date

Title of Evolution: **Urgent Load Reduction/Recirculation Pump Trip Contingency Plan**

Purpose/Overview of Evolution: *Maneuver Reactor to maintain acceptable operating conditions during and following unexpected plant conditions. These Urgent Load Reduction steps do not support a shutdown using the Improved BPWS Control Rod Insertion Process.*

Maneuver Steps

Recirculation Pump Trip:

1. IF both pumps trip, SCRAM the reactor per 2-AOI-68-1A.

   For a single recirculation pump trip, IMMEDIATELY insert rod groups to lower rod line below 74% using Shove Sheets.

2. Change speed of the Operating recirculation pump, as needed, until Core Flow is 46-49% to exit POWER/FLOW region II and Operating Recirculation pump drive flow is below 46,610 gpm.

Urgent Load Reduction:

1A. Lower power by lowering core flow until either the desired operating power level is reached or core flow is ~60% of rated core flow. (If a recirculation pump trip is imminent, only lower using the pump to be tripped).

2A. Insert control rods per Shove Sheets to lower power until either the desired operating power level is reached or until Load Line is between 55% and 66%.

3A. Lower recirculation pump speed to ~28% (~480 rpm).

4A. Insert control rods per Shove Sheets until desired power level is reached or SCRAM the reactor.

Attachment 7
(Page 2 of 5)
Reactivity Control Plan Form

Reactivity Maneuver Plan #U2 SIMULATOR

Operating Experience AND General Issues:

Operating Experience

Perry Nuclear Plant scrammed on OPRM signals ~9 minutes after receiving a dual recirculation pump shift to slow speed, before control rods were inserted.

CONCLUSIONS/RECOMMENDATIONS: In the event of a Recirculation pump trip or both pumps running back to minimum speed, the control rod insertion should be accomplished as soon as practical due to potential OPRM trip.

General Issues

This should be considered a guideline, not covering all possible situations. Contact On-Call Reactor Engineer as soon as possible to provide assistance.

Note that in the event of a Recirculation Pump trip the Load Line may go over 113.6% and MFLCPR may exceed 1.0 but the insertion of the recommended control rod groups will return Load Line and MFLCPR below the required limits.

If a Powerplex case runs in the transient condition, the case is considered invalid. An automatic case may be triggered in the event of a recirculation pump trip and that case should be considered invalid and another case requested as soon as reactor power stabilizes.

If shutdown is required while operating in single loop with the OOS loop isolated, Scram unit prior to going to minimum flow on operating recirculation pump to avoid flow stratification concerns. Recommend scramming between 40 to 45% RTP.

Cautions/Error Likely Situations/Special Monitoring Requirements/Contingencies:

During SLO, reactor power and flow conditions will be near to Region 2. Operation in SLO requires the following conditions to be met:

- Reactor power $\leq$50% of rated power
- Core Flow $\leq$50% of rated core flow
- Operating pump drive flow $\leq$46,610 GPM
- Operating pump speed $\leq$100% of rated speed
- POWERPLEX using a SLO thermal limit set
- MFLCPR <0.94

The RE must be contacted to change the PowerPlex calculation using the correct Thermal Limit set while in SLO. The RE must also change the Thermal Limit set if the plant is operating with reduced feedwater heating.

In the event of change in Feedwater heating, then evaluate Final FW Temperature versus Core Thermal Power graph to determine if change required to Fuel Thermal Limits. Graph may be found on ICS as **FWTCTP**, in Appendix S of 0-TI-248 or in this Attachment.

In the event of change in steam path to turbine (such as a MSIV or turbine valve malfunction), then evaluate Dome Pressure versus Fraction Rate Thermal Power to determine if operation is within limits. Graph may be found on ICS as **RXPCTP**, in Appendix S of 0-TI-248 or in this Attachment.

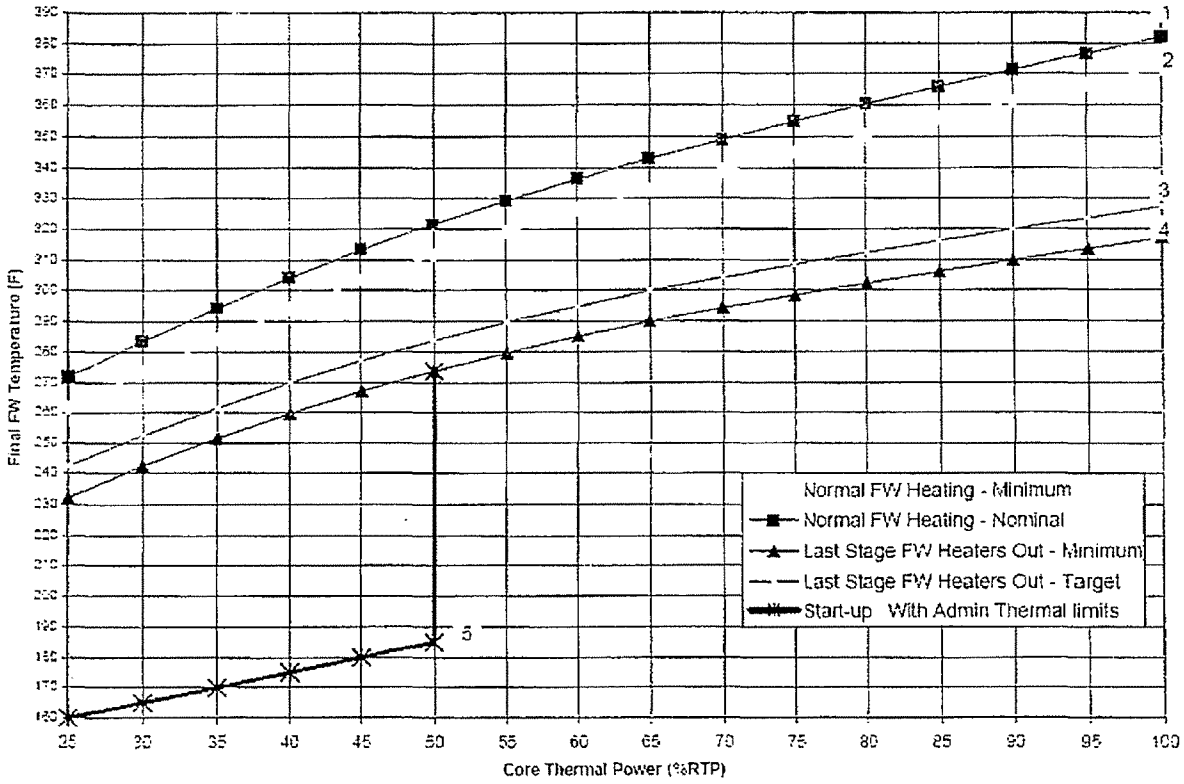
Attachment 7
(Page 3 of 5)
Reactivity Control Plan Form

Reactivity Maneuver Plan #U2 SIMULATOR

The expectation criteria shown below should be used to provide guidance on when it will be required to contact the On-Call Reactor Engineer. Document discussion and conclusions on Attachment 8 in the Comments/Notes section.	
Parameter	**Expectation (from Prediction)**
MFLCPR	major change ± 0.07, minor change** ±0.03
MAPRAT	major change ±0.15, minor change** ± 0.05
MFLPD / MFDLRX	major change ± 0.15, minor change** ± 0.05
Load Line	± 5% of predicted
Power Level	± 5% Rated Thermal Power
Core Flow	± 5% of predicted
* Major power change - when the entire RCP involves a CTP change > 15%	** Minor power change - when the entire RCP involves a CTP change 0 - 15%

Attachment 7
(Page 4 of 5)
Reactivity Control Plan Form

Reactivity Maneuver Plan #U2 SIMULATOR

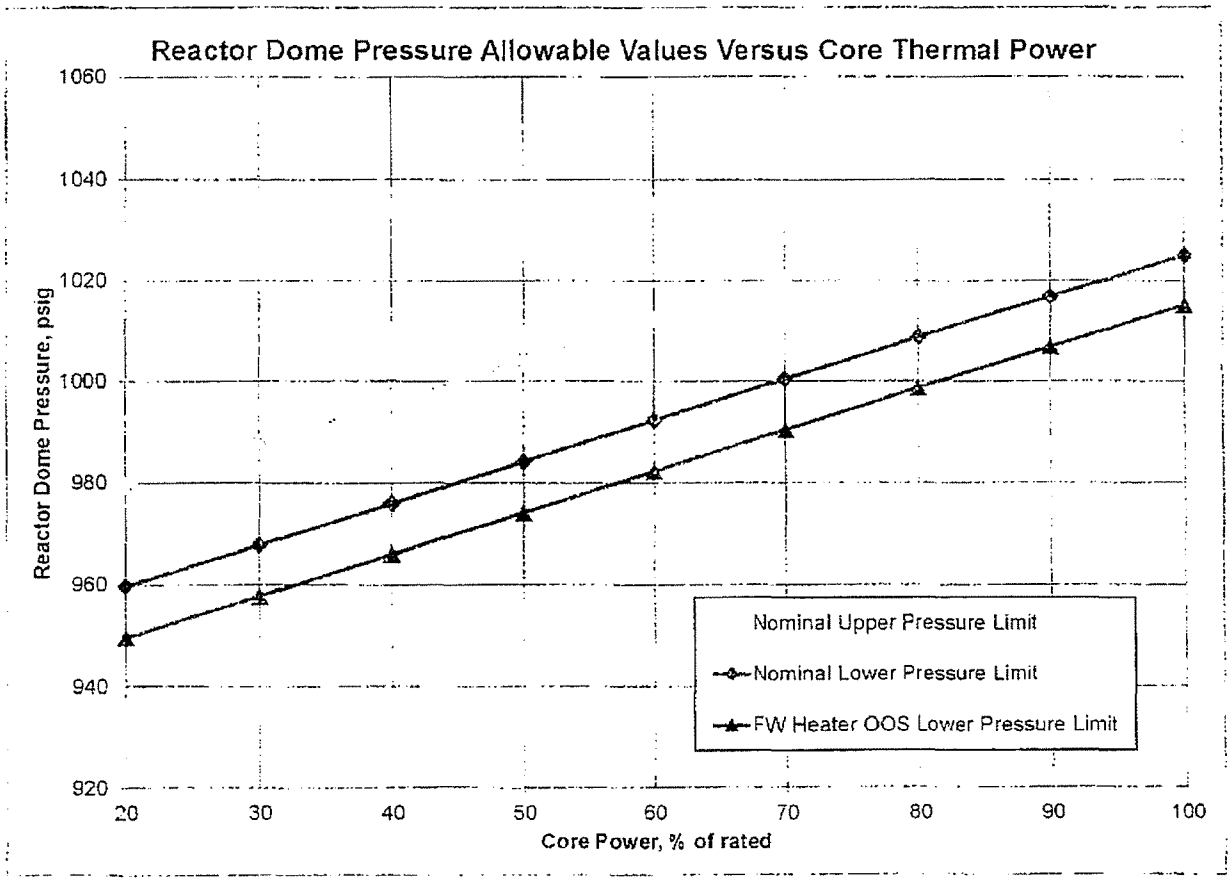


- IF >50% RTP **AND** below line #4, (Last Stage FW Heaters Out - Minimum), **OR** <50% RTP **AND** more than 5°F below line #5, **THEN** enter Tech Spec thermal limit LCOs.
- IF <50% RTP and between lines #4 **AND** #5, (Startup without FW Heaters), **THEN** ensure the following:
  - The CMSS limit set used includes FHOOS1 (and TBVOOS, if needed).
  - Rodline Load Line does not exceed 100%.
  - Power remains less than 50%.
- **IF** FW temperature is below line #2, (Normal FW Heating - Minimum), **THEN** implement a Feedwater Heater OOS limit set (FHOOS) appropriate for current core exposure.
- **IF** <50% RTP and up to 5°F below line #5, (Startup without FW Heaters), **THEN** ensure one of the following:
  - The CMSS limit set used includes FHOOS2 (and TBVOOS, if needed).
  - Rodline Load Line does not exceed 95%.
  - Power remains less than 50%.

Attachment 7
(Page 5 of 5)
Reactivity Control Plan Form

Reactivity Maneuver Plan #U2 SIMULATOR

When operating at or above line #2 (Normal FW Heating - Minimum) of the Feedwater Temperature Versus Core Thermal Power graph, Reactor Dome Pressure is to be maintained between the Nominal Upper Pressure Limit and the Nominal Lower Pressure Limit.
When operating below line #2 (Normal FW Heating - Minimum) of the Feedwater Temperature Versus Core Thermal Power graph, then Reactor Dome Pressure is to be maintained between the Nominal Upper Pressure Limit and the FW Heater OOS Lower Pressure Limit.



BFN Unit 2	Reactivity Control Plan	

Attachment 8
Reactivity Maneuver Instructions

STEP 1 of 2 **Reactivity Maneuver Plan # U2 SIMULATOR**

Description of Step: **Recirculation Pump Trip Response**

IF both pumps trip, SCRAM the reactor per 2-OI-68-1A.

For a single recirculation pump trip, IMMEDIATELY insert control rods to lower Load Line below 74% using Emergency Shove Sheet. (Stop after any rod.)

Conditions: (To be recorded at the completion of step.) Recorded: AS 1/29/15 (by RO) (Date)

*Contact the On-Call RE for parameters which do not meet the requirements in the expectation criteria as found in the Special Monitoring Requirements Section on Attachment 7.

QRE presence required in the Control Room? Yes ____ No _X_ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
*Core Power	40 - 50%	51.5%	*MFLCPR	0.68 - 0.88	.798
*Core Flow	45 – 53.5%	46.6%	*MAPRAT	0.34 - 0.54	.403
*Load Line	66 - 74%	83.3%	*MFDLRX	0.56 - 0.76	.692

Critical Parameters: (To be recorded DURING step in the OPs log.) If critical parameters are outside of the specified criteria, then discuss with the RE and record conclusions in the Comments/Notes section.

Description including frequency, method of monitoring, and contingency actions:	High	Low
Load Line: Monitor completing control rod insertions using ICS NHB or PWRFLW (Power/Flow Map) displays. If HIGH, then insert additional rods. (NOTE: May take 3-4 minutes after finishing rod insertions for heat balance to show correct power level.) If LOW, then do not insert any more control rods.	**74%**	**55%**
Reactor Pressure: Verify relationship between reactor pressure and reactor power remains within allowable region during power reduction by using ICS display **RXPCTP**. If HIGH or LOW, then stop power reduction and adjust reactor pressure before resuming power reduction.	See ICS **"RXPCTP"** display or attached chart.	

Comments / Notes:
Core Flow indication may be incorrect if the active loop jet pump flow (2-FI-68-48 or 2-FI-68-46) is less than 41 Mlbm/hr.

Step Complete and Reviewed by: _____ / _____
Unit Supervisor / Date

BFN Unit 2	Reactivity Control Plan	

Attachment 8
Reactivity Maneuver Instructions

STEP 2 of 2 **Reactivity Maneuver Plan # U2 SIMULATOR**

Description of Step: Recirculation Pump Trip Response

Change speed of the Operating recirculation pump until:

- Core Flow is 46 - 49% to exit/remain out of POWER/FLOW Map Region II
- Operating Recirculation Pump Drive Flow is ≤ 46,610 GPM
- Operating Recirculation Pump Speed is ≤ 100%

Conditions: (To be recorded at the completion of step.) Recorded: _____/_____
(by RO) (Date)

*Contact the On-Call RE for parameters which do not meet the requirements in the expectation criteria as found in the Special Monitoring Requirements Section on Attachment 7.

QRE presence required in the Control Room? Yes ____ No __X__ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
*Core Power	37 - 49%		*MFLCPR	0.67 - 0.87	
*Core Flow	46 - 49%		*MAPRAT	0.32 - 0.52	
*Load Line	65 - 74%		*MFDLRX	0.55 - 0.75	

Critical Parameters: (To be recorded DURING step in the OPs log.) If critical parameters are outside of the specified criteria, then discuss with the RE and record conclusions in the Comments/Notes section.

Description including frequency, method of monitoring, and contingency actions:	High	Low
Core Flow: Monitor while changing core flow using ICS NHB or PWRFLW (Power/Flow Map) displays. If LOW, then raise core flow. If HIGH, then lower core flow.	**50%**	**45%**
Reactor Pressure: Verify relationship between reactor pressure and reactor power remains within allowable region during power reduction by using ICS display **RXPCTP**. If HIGH or LOW, then stop power reduction and adjust reactor pressure before resuming power reduction.	See ICS **"RXPCTP"** display or attached chart.	
Load Line: Monitor while changing core flow using ICS NHB or PWRFLW displays. If HIGH, then first verify proper core flow used in calculation. Insert control rods per Shove Sheets to reduce <74%. (NOTE: May take 3-4 minutes after finishing rod inserts for heat balance to show correct power level.)	**74%**	N/A

Comments / Notes:

Operating Recirculation Pump drive flow is not to exceed 46,610 GPM and its speed is not to exceed 100% while in SLO.

Core Flow must be greater than 45% to exit Region II at the expected load line, as well as prevent loop delta temperature concerns.

Step Complete and Reviewed by:_____/_____
Unit Supervisor / Date

BFN Unit 2	Reactivity Control Plan	

Attachment 8
Reactivity Maneuver Instructions

STEP 1A of 4A **Reactivity Maneuver Plan # U2 SIMULATOR**

Description of Step: Urgent Load Reduction:

Lower power by lowering core flow until either the desired operating power level is reached or core flow is ~60% of rated core flow.
(If a recirculation pump trip is imminent, only lower using the pump to be tripped).

Conditions: (To be recorded at the completion of step.) Recorded: _____/_____
(by RO) (Date)

*Contact the On-Call RE for parameters which do not meet the requirements in the expectation criteria as found in the Special Monitoring Requirements Section on Attachment 7.

QRE presence required in the Control Room? Yes ____ No _X_ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
*Core Power	65 - 99%		*MFLCPR	0.80 - 0.95	
*Core Flow	55 - 101%		*MAPRAT	0.49 - 0.80	
*Load Line	90 - 109%		*MFDLRX	0.60 - 0.85	

Critical Parameters: (To be recorded DURING step in the OPs log.) If critical parameters are outside of the specified criteria, then discuss with the RE and record conclusions in the Comments/Notes section.

Description including frequency, method of monitoring, and contingency actions:	High	Low
Core Flow: Monitor while changing core flow using ICS NHB or PWRFLW (Power/Flow Map) displays. If LOW, then raise core flow	N/A	**55%**
Reactor Pressure: Verify relationship between reactor pressure and reactor power remains within allowable region during power reduction by using ICS display **RXPCTP**. If High or Low, then stop power reduction and adjust reactor pressure before resuming power reduction.	See ICS **"RXPCTP"** display or attached chart.	

Comments / Notes:
If desired, stop power reduction at any point before core flow reaches 60%. However, if continuing to next step, verify core flow is between 55% - 62%.

If a recirculation pump trip is a concern, insert control rods before going below 90% core flow unless flow is only reduced on the pump expected to trip.

2-AOI-6-1A, 1B, or 1C specify the power level required for loss of feedwater heaters.

Step Complete and Reviewed by:_____/_____
Unit Supervisor / Date

BFN Unit 2	Reactivity Control Plan	

Attachment 8
Reactivity Maneuver Instructions

STEP 2A of 4A — Reactivity Maneuver Plan # U2 SIMULATOR

Description of Step: **Urgent Load Reduction**

Insert control rods per Shove Sheet until either the desired operating power level is reached or until Load Line is between 55% and 66%.

Conditions: (To be recorded at the completion of step.) Recorded: _____/_____ (by RO) (Date)

*Contact the On-Call RE for parameters which do not meet the requirements in the expectation criteria as found in the Special Monitoring Requirements Section on Attachment 7.

QRE presence required in the Control Room? Yes ____ No _X_ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
*Core Power	39 - 55%		*MFLCPR	0.61 - 0.81	
*Core Flow	55 - 65%		*MAPRAT	0.32 - 0.52	
*Load Line	55 - 66%		*MFDLRX	0.54 - 0.74	

Critical Parameters: (To be recorded DURING step in the OPs log.) If critical parameters are outside of the specified criteria, then discuss with the RE and record conclusions in the Comments/Notes section.

Description including frequency, method of monitoring, and contingency actions:	High	Low
Load Line: Monitor while inserting control rods using ICS NHB or PWRFLW (Power/Flow Map) displays. If LOW, then stop inserting control rods. If HIGH, then continue inserting control rods.	**66.7%**	**55%**
Reactor Pressure: Verify relationship between reactor pressure and reactor power remains within allowable region during power reduction using ICS display **RXPCTP**. If High or Low, then stop power reduction and adjust reactor pressure before resuming power reduction.	See ICS **"RXPCTP"** display or attached chart.	

Comments / Notes:

If desired, stop power reduction after any control rod (not group) is fully inserted. However, before continuing to next Step, Load Line must be between 55% and 66%.

Note that Load Line may increase ~1.5% as flow is reduced in the next Step.

Note OPS can remove heaters during this step after power is below 45%. RE will change TL set if heaters removed from service. Before continuing to next Step, Load Line must be between 55 and 66%.

Step Complete and Reviewed by: _____/_____
Unit Supervisor / Date

Attachment 8
Reactivity Maneuver Instructions

STEP 3A of 4A **Reactivity Maneuver Plan # U2 SIMULATOR**

Description of Step: **Urgent Load Reduction**

Lower recirculation pump speed to ~28% (~480 rpm, ~38% core flow).

(Control rods may be adjusted during this step.)

Conditions: (To be recorded at the completion of step.) Recorded: _____/_____
(by RO) (Date)

*Contact the On-Call RE for parameters which do not meet the requirements in the expectation criteria as found in the Special Monitoring Requirements Section on Attachment 7.

QRE presence required in the Control Room? Yes ____ No _X_ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
*Core Power	28 - 40%		*MFLCPR	0.65 - 0.85	
*Core Flow	36 - 43%		*MAPRAT	0.24 - 0.44	
*Load Line	55 - 66%		*MFDLRX	0.46 - 0.66	

Critical Parameters: (To be recorded DURING step in the OPs log.) If critical parameters are outside of the specified criteria, then discuss with the RE and record conclusions in the Comments/Notes section.

Description including frequency, method of monitoring, and contingency actions:	High	Low
Load Line: Displayed on Heat Balance or Power/Flow Map If HIGH, then insert control rods.	**66.7%**	N/A
Reactor Pressure: Verify relationship between reactor pressure and reactor power remains within allowable region during power reduction using ICS display **RXPCTP**. If High or Low, then stop power reduction and adjust reactor pressure before resuming power reduction.	See ICS **"RXPCTP"** display or attached chart.	

Comments / Notes:

Step Complete and Reviewed by:_____/_____
Unit Supervisor / Date

BFN Unit 2	Reactivity Control Plan	

Attachment 8
Reactivity Maneuver Instructions

STEP 4A of 4A — Reactivity Maneuver Plan # U2 SIMULATOR

Description of Step: **Urgent Load Reduction**

Insert control rods per Shove Sheet until desired power level is reached or SCRAM the reactor.

Conditions: (To be recorded at the completion of step.) Recorded: _____/_____ (by RO) (Date)

*Contact the On-Call RE for parameters which do not meet the requirements in the expectation criteria as found in the Special Monitoring Requirements Section on Attachment 7.

QRE presence required in the Control Room? Yes ____ No X (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
*Core Power	14 - 24%		*MFLCPR	0.38 - 0.58	
*Core Flow	36 - 42%		*MAPRAT	0.06 - 0.26	
*Load Line	25 - 45%		*MFDLRX	0.17 - 0.37	

Critical Parameters: (To be recorded DURING step in the OPs log.) If critical parameters are outside of the specified criteria, then discuss with the RE and record conclusions in the Comments/Notes section.

Description including frequency, method of monitoring, and contingency actions:	High	Low
Load Line: Displayed on Heat Balance or Power/Flow Map If HIGH, then insert control rods	**66.7%**	N/A
Reactor Pressure: Verify relationship between reactor pressure and reactor power remains within allowable region during power reduction using ICS display **RXPCTP**. If High or Low, then stop power reduction and adjust reactor pressure before resuming power reduction.	See ICS **"RXPCTP"** display or attached chart.	

Comments / Notes:
Load Line/Power should continue to drop because of the xenon transient.
Bypass the RWM if power drop is to continue below 30%.
The unit should be scrammed or lined up to the correct RWM sequence before reaching 10% RTP.

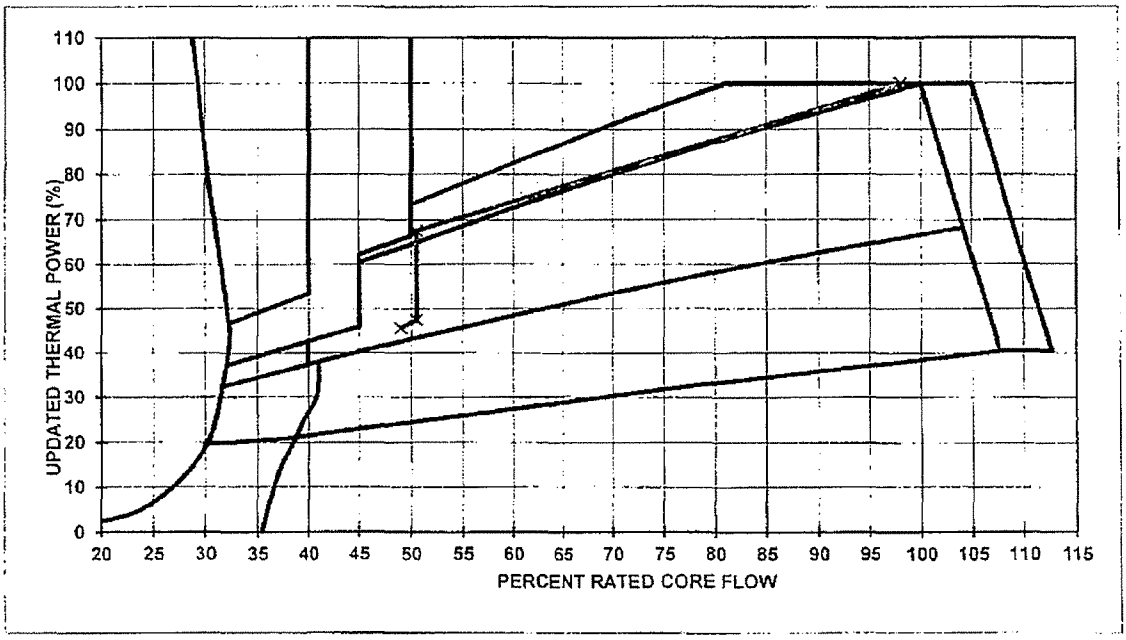
Step Complete and Reviewed by: _____/_____
Unit Supervisor / Date

Attachment 9
(Page 1 of 1)

Power to Flow Map

Recirculation Pump Trip (Steps 1 - 2)

Reactivity Control Plan # U2 SIMULATOR

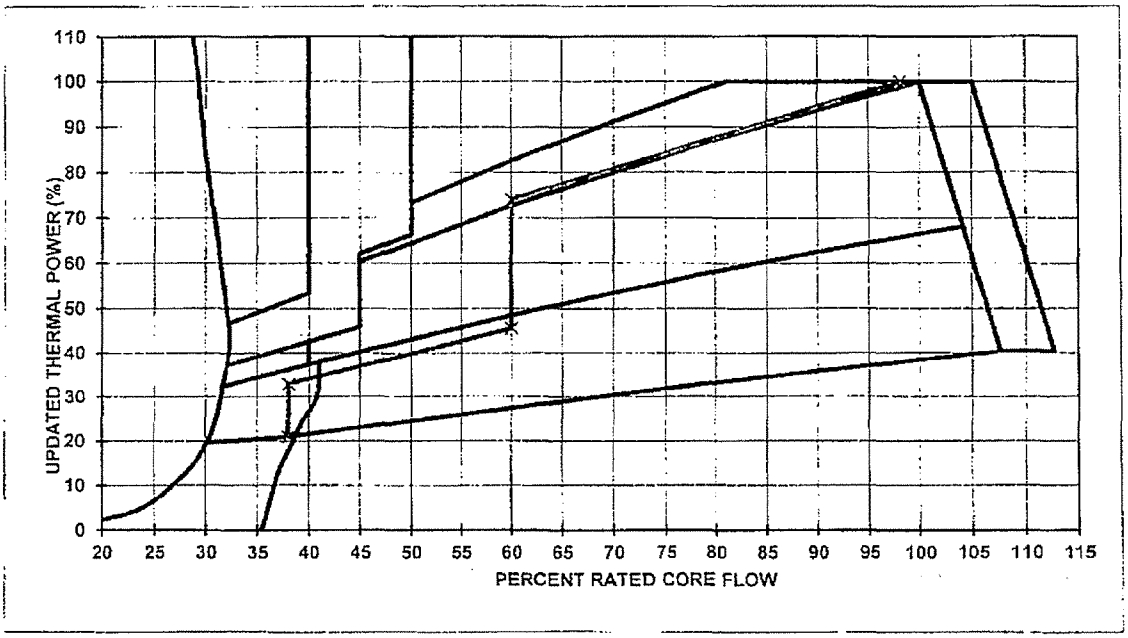


Attachment 9
(Page 1 of 1)

Power to Flow Map

Urgent Load Reduction (Steps 1A - 4A)

Reactivity Control Plan # U2 SIMULATOR



Attachment 10
(Page 1 of 1)

Recirculation Flow Maneuver Instructions

Reactivity Control Plan # U2 SIMULATOR

RCP Step #	Flow Step #	Time	**Target Power (%RTP or MWe)**	Delta ±(MWe)	**Target Flow (MLb/Hr)**	Completed (RO)

Comments / Notes:

Reviewed by: _____/_____
Unit Supervisor / Date

Attachment 1
(Page 1 of 2)

Control Rod Movement and Control Rod Drive Problem Data Sheets

Date current

Part 1: CONTROL ROD MOVEMENT DATA SHEET

RWM [1] GP	ROD NUMBER	FROM	TO	Rod Movement Completed Signoffs UO (AC) [2]	Peer Check [3]
N/A	30-39	08	00		
N/A	38-31	08	00		
N/A	30-23	08	00		
N/A	22-31	08	00		
N/A	14-39	18	00		
N/A	46-39	18	00		
N/A	46-23	18	00		
N/A	14-23	18	00		
N/A	22-47	18	00		
N/A	38-47	18	00		
N/A	38-15	18	00		
N/A	22-15	18	00		

REMARKS[4]: CONTINUOUS INSERT Page 1

NOTES:

1 RWM Group may be marked "**N/A**" when **NOT** applicable (i.e., when above the LPSP).

2 For all rod moves to the "full out" position (notch position 48), this signoff verifies coupling integrity was checked in accordance with 2-OI-85.

3 Documentation of Peer Check by a second qualified member of the plant staff (i.e., RE, STA OR UO) is required ONLY when the RWM is inoperable OR bypassed with core thermal power ≤10%.

4 Record the rod number and any problems encountered on Attachment 1, page 2 of 2, as applicable.

5 Peer Check by RE **OR** SRO [SRO to be utilized if a second RE is unavailable]. The SRO should be checking the FROM and TO control rod positions as a minimum. The RE **OR** SRO should be checking the positions identified for agreement with the Predictor Cases. Anytime the SRO feels the Peer Check is beyond his/her knowledge level, then call-in a second RE to perform the required Peer Check.

Issued By: Reactor Engineer / current — Reactor Engineer / Date

Reviewed By[5]: Unit Supervisor / current — RE OR SRO / Date

Authorization to perform the Control Rod manipulations identified on this sheet

Unit Supervisor / current — Unit Supervisor / Date

Attachment 1
(Page 1 of 2)
Control Rod Movement and Control Rod Drive Problem Data Sheets

Date current

Part 1: CONTROL ROD MOVEMENT DATA SHEET

RWM [1] GP	ROD NUMBER	FROM	TO	Rod Movement Completed Signoffs UO (AC) [2]	Peer Check [3]
N/A	14-31	48	00		
N/A	30-47	48	00		
N/A	46-31	48	00		
N/A	30-15	48	00		
N/A	22-39	48	00		
N/A	38-39	48	00		
N/A	38-23	48	00		
N/A	22-23	48	00		
N/A	30-31	48	00		
N/A	06-31	48	00		
N/A	30-55	48	00		
N/A	54-31	48	00		
N/A	30-07	48	00		

REMARKS[4]: CONTINUOUS INSERT Page 2

NOTES:

1 RWM Group may be marked "**N/A**" when **NOT** applicable (i.e., when above the LPSP).

2 For all rod moves to the "full out" position (notch position 48), this signoff verifies coupling integrity was checked in accordance with 2-OI-85.

3 Documentation of Peer Check by a second qualified member of the plant staff (i.e., RE, STA OR UO) is required ONLY when the RWM is inoperable OR bypassed with core thermal power ≤10%.

4 Record the rod number and any problems encountered on Attachment 1, page 2 of 2, as applicable.

5 Peer Check by RE **OR** SRO [SRO to be utilized if a second RE is unavailable]. The SRO should be checking the FROM and TO control rod positions as a minimum. The **RE OR SRO** should be checking the positions identified for agreement with the Predictor Cases. Anytime the SRO feels the Peer Check is beyond his/her knowledge level, then call-in a second RE to perform the required Peer Check.

Issued By: Reactor Engineer / current — Reactor Engineer / Date

Reviewed By[5]: Unit Supervisor / current — RE OR SRO / Date

Authorization to perform the Control Rod manipulations identified on this sheet

Unit Supervisor / current — Unit Supervisor / Date

Attachment 1
(Page 1 of 2)

Control Rod Movement and Control Rod Drive Problem Data Sheets

Date current

Part 1: CONTROL ROD MOVEMENT DATA SHEET

RWM [1] GP	ROD NUMBER	FROM	TO	Rod Movement Completed Signoffs UO (AC) [2]	Peer Check [3]
N/A	14-47	48	00		
N/A	46-47	48	00		
N/A	46-15	48	00		
N/A	14-15	48	00		
N/A	22-55	48	00		
N/A	38-55	48	00		
N/A	38-07	48	00		
N/A	22-07	48	00		

REMARKS[4]: CONTINUOUS INSERT Page 3

NOTES:

1 RWM Group may be marked "N/A" when NOT applicable (i.e., when above the LPSP).

2 For all rod moves to the "full out" position (notch position 48), this signoff verifies coupling integrity was checked in accordance with 2-OI-85.

3 Documentation of Peer Check by a second qualified member of the plant staff (i.e., RE, STA OR UO) is required ONLY when the RWM is inoperable OR bypassed with core thermal power ≤10%.

4 Record the rod number and any problems encountered on Attachment 1, page 2 of 2, as applicable.

5 Peer Check by RE OR SRO [SRO to be utilized if a second RE is unavailable]. The SRO should be checking the FROM and TO control rod positions as a minimum. The RE OR SRO should be checking the positions identified for agreement with the Predictor Cases. Anytime the SRO feels the Peer Check is beyond his/her knowledge level, then call-in a second RE to perform the required Peer Check.

Issued By: Reactor Engineer / current
Reactor Engineer Date

Reviewed By[5]: Unit Supervisor / current
RE OR SRO Date

Authorization to perform the Control Rod manipulations identified on this sheet

Unit Supervisor / current
Unit Supervisor Date

Facility: BFN Scenario No.: NRC - 3 Op-Test No.: 1501

Examiners:_____ Operators: SRO:_____

_____ ATC:_____

_____ BOP:_____

Initial Conditions: **Reactor Power is ≈ 3%.** Unit1 and Unit 3 are at 100% power. IRM D failed upscale last shift and is bypassed.

Turnover: Secure purging the Drywell and Suppression Chamber in accordance with 2-OI-64 Section 8.1. Continue plant startup IAW 2-GOI-100-1A section 5.4, mode change from Mode 2 to Mode 1.

Event Number	Malfunction Number	Event Type*	Event Description
1	N/A	N-BOP N-SRO	Secure form Drywell / Torus Purge.
2	N/A	R-ATC R-SRO	Power increase with Control Rods to 8% IAW GOI
3	RD07R0239 RD06R0239	C-ATC TS-SRO	Control Rod Drift in
4	OG04A	C-BOP C-SRO	Loss of SJAE 'A' / Swap to STBY SJAE 'B'
5	NM05	I-ATC TS-SRO	IRM 'B' Failure Upscale/Half Scram
6	DG03D	C-BOP TS-SRO	Loss of 4KV Shutdown Board D, D D/G fails to AUTO tie
7	FW14C	C-ATC C-SRO	Trip of RFP 2C/ recover with already warm RFP 2B
8	PC 14 (e20 0) 100 300 75	M-ALL	Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level
9	FW30	C-ATC	Failure of RFP 2B governor/pump needs tripped.
10	AD01D AD01E	C-BOP C-SRO	ADS SRV Failures

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Events

1. BOP secures Drywell Purge in accordance with 2-OI-64 Section 8.1. After the DW and Torus Purge has been secured, the scenario may continue.

2. ATC will withdraw control rods in order to raise power to 8% for a mode change from 2 to 1. Once the Chief Examiner has seen an appropriate amount of power rise he may choose to continue with the next event which will halt control rod withdrawal.

3. Control Rod 02-39 will begin to drift in to approximately position 10, and the ATC will respond IAW 2-AOI-85-5 and bypass the RWM and insert Control Rod 02-39 to position 00. The SRO will declare Control Rod 02-39 inoperable and refer to Tech Spec 3.1.3 condition C. The SRO will also refer to Tech Spec 3.1.6 condition A for BPWS and 3.3.2.1 condition C for RWM. Once the rod has been inserted and the Tech Spec call has been made the scenario may continue.

4. Loss of SJAE A, BOP operator swaps to B SJAE IAW 2-AOI-47-3, Loss of Condenser Vacuum or IAW 2-OI-66 or the hardcard. After the standby SJAE has been placed in service and Main Condenser vacuum has recovered, the scenario may continue.

5. The ATC will respond to a failure of IRM 'B' upscale and notice and report that a ½ scram failed to come in on the upscale condition. The crew will be unable to bypass IRM 'B' since IRM 'D' is currently bypassed. The SRO will refer to Tech Spec 3.3.1.1 and enter condition 'A'. The required action is to place a channel in trip in 12 hours. After the SRO has completed the Tech Spec call the scenario may continue.

6. D 4KV Shutdown Board will lose power and the D Diesel Generator will fail to automatically tie to the Shutdown Board. The BOP will manually tie the Diesel to the board. SRO will refer to Tech Specs and determine TS 3.8.1 condition A, B, and G, and TS 3.8.7.A. The ATC will be resetting RPS and PCIS. After the BOP Operator ties the Diesel to the Buss and the SRO has completed the Tech Spec call the scenario may continue.

7. The ATC will respond to a trip of the 2C RFP IAW 2-AOI-3-1 by raising the speed of the warm RFP 2B to feed the RPV. Once the ATC has entered AOI-3-1 and raised the speed on the standby Reactor Feedpump to maintain RPV Water Level the scenario may continue.

8. At the cue of the Chief Examiner initiate the next event. An unisolable leak will develop on the suppression chamber. The US will direct entry into EOI-3 on secondary containment area flood alarms and EOI-2 on suppression pool water

level. Prior to 12.75 ft, in the Suppression Pool, the US will direct HPCI to be secured and locked out. Prior to 11.5 ft in the Suppression Pool the US will transition to EOI-1 and direct a SCRAM. An ATWS will exist on the SCRAM. The crew will work through EOI-1 and C-5 to insert control rods, maintain reactor water level, and reactor pressure. The US will transition to C-2 to emergency depressurize before Suppression Pool water level lowers to 11.5 feet.

9. The US will direct terminating and preventing IAW EOI Appendix 4, and the 2B RFP governor will fail as is. The ATC/BOP will Trip the 2B RFP.

10. The BOP will report that two of the ADS SRV's failed for Emergency Depressurization. Two additional non ADS SRV's will be opened at the direction of the SRO.

The Scenario ends when Emergency Depressurization and Reactor Water Level is restored and maintained within the assigned band or upon request of Lead Examiner.

Critical Tasks 3

1. **When Suppression Pool Level cannot be maintained above 12.75 feet HPCI secured to prevent damage.**

   1. Safety Significance:
      Prevent failure of Primary Containment from pressurization of the Suppression Chamber

   2. Cues:
      Procedural compliance
      Suppression Pool Level indication

   3. Measured by:
      Observation – HPCI Auxiliary Pump placed in Pull to Lock

   4. Feedback:
      HPCI does not Auto initiate

      No RPM indication on HPCI

2. **When Suppression Pool level cannot be maintained above 11.5 feet the US determines that Emergency Depressurization is required, RO initiates Emergency Depressurization as directed by US.**

   1. Safety Significance:
      Precludes failure of Containment

   2. Cues:
      Procedural compliance
      Suppression Pool Level Trend

   3. Measured by:
      Observation - US determines (indicated by announcement or observable transition to C-2) that Emergency Depressurization is required before Suppression Pool level drops below 11.5 feet.

      AND

      Observation - RO opens at least 6 SRV's during performance of Emergency Depressurization actions.

4. Feedback:
   RPV pressure trend
   SRV status indications
   Suppression Pool temperature trend

3. With RPV pressure <MSCP, slowly increase and control injection into RPV to restore and maintain RPV level above TAF as directed by US.

1. Safety Significance:
   Maintaining adequate core cooling and preclude possibility of large power excursions.

2. Cues:
   Procedural compliance
   RPV pressure indication

3. Measured by:
   Observation - Injection not commenced until less than MSCP, and injection controlled such that power spikes are minimized, level restored and maintained greater than TAF

4. Feedback:
   RPV level trend
   RPV pressure trend
   Injection system flow rate into RPV

SHIFT MANAGER TURNOVER

EQUIPMENT OOS/LCOS

- IRM 'D'

ANTICIPATED OPERATIONS/MAINTENANCE FOR ONCOMING SHIFT

- Secure purging Drywell and Suppression Chamber IAW 2-OI-64
- Continue plant startup IAW 2-GOI-100-1A Section 5.4

NO HEATERS ARE TO BE PLUGGED INTO OUTLETS IN THE CONTROL ROOM UNTIL DETERMINED IF WE CAN USE

SPP 7.3 RISK REVIEW DOCUMENTATION ON P DRIVE FOLDER WCC-RISK/BFN

EXPECTATION FOR 1500 MEETING IS FOR THE SM TO COVER CURRENT STATUS ON ALL CONTROL ROOM DEFICIENCIES AND ANNUNCIATOR WOs THAT SHOULD BE WORKING. THIS EXPECTATION STARTED 3/26/09

DO NOT DISABLE ANY ANNUNCIATORS WITHOUT GOING THRU MANAGEMENT REVIEW.

IF ALTERNATE HEAT BALANCES ALARM COMES IN ON ANY UNIT'S ICS, REDUCE POWER BY 10 MWT (3448 IF AT RATED POWER) AND CALL REACTOR ENGINEERING IN TO PLANT TO EVALUATE.

STATUS

WORK WEEK - DIV I ☒, DIV II ☐

OUTSIDE AIR TEMP 45°F

COMMON

UNIT 1

- 100%

UNIT 2

- 3%

UNIT 3

- 100%

Op Test No.: 15-01 Scenario No. 3 Event No.: 1 Page 1 of 4

Event Description: Secure purging the Drywell and Suppression Chamber with Primary Containment Purge Filter Fan IAW 2-OI-64, Sec. 8.1

Time	Position	Applicant's Actions or Behavior
	Driver	**As Chemistry call the Unit Operator and inform him that grab samples of the Oxygen concentrations are satisfactory in both the Drywell and Suppression Chamber.**
	BOP	**2-OI-64** **8.1 Purging the Drywell and Suppression Chamber with Primary Containment Purge Filter Fan.** [24] **WHEN** both of the following instruments have stabilized **AND** Chemistry samples indicate Drywell and Suppression Chamber oxygen concentration is greater than or equal to 19.5%, **THEN STOP** PRI CTMT PURGE FILTER FAN using 2-HS-64-131 (Rx Bldg El 621'): • H2/O2 CONCENTRATION, 2-XR-76-110 (Panel 2-9-54) • H2/O2 ANALYZER, 2-MON-76-110 (Panel 2-9-55) [25] **CLOSE** the following valves (Panel 2-9-3): • DRYWELL VENT INBD ISOL VALVE, 2-FCV-64-29, using 2-HS-64-29 • DRYWELL VENT OUTBD ISOLATION VLV, 2-FCV-64-30, using 2-HS-64-30 • SUPPR CHBR VENT INBD ISOL VALVE, 2-FCV-64-32, using 2-HS-64-32 • SUPPR CHBR VENT OUTBD ISOLATION VLV, 2-FCV-64-33, using 2-HS-64-33 • DW/SUPPR CHBR AIR PURGE ISOL VLV, 2-FCV-64-17, using 2-HS-64-17 • DRYWELL ATM SUPPLY INBD ISOLATION VLV, 2-FCV-64-18, using 2-HS-64-18 • SUPPR CHBR ATM SPLY INBD ISOLATION VLV 2-FCV-64-19 using 2-HS-64-19

Op Test No.: 15-01 Scenario No. 3 Event No.: 1 Page 2 of 2

Event Description: Secure purging the Drywell and Suppression Chamber with Primary Containment Purge Filter Fan IAW 2-OI-64, Sec. 8.1

Time	Position	Applicant's Actions or Behavior
		[26] **RECORD** time purging was stopped in the Narrative log. [27] **PLACE** the following key lock switches in the NORMAL position (Panel 2-9-3): • PC PURGE DIV I RUN MODE BYPASS, 2-HS-64-24 • PC PURGE DIV II RUN MODE BYPASS, 2-HS-64-25 [28] **VERIFY** CTMT PURGE FILTER HEATER ON, 2-HS-64-133 (RB, R12-S LINE, Primary Containment Purge Unit, El 621).
	NRC	End of Event #1

Op Test No.: 15-01 Scenario No. 3 Event No.: 2 Page 1 of 2

Event Description: Power increase with Control Rods to 8% IAW GOI

Time	Position	Applicant's Actions or Behavior
	SRO	Conducts crew brief to focus on the continued reactor startup Directs ATC to continue startup IAW GOI-100-1A
	ATC	**2-GOI-100-1A** **5.4 Withdrawal of Control Rods while in Mode 2 (continued)** [67] **CONTINUE** to withdraw control rods to raise Reactor power to approximately 8% per 2-OI-85 and 2-SR-3.1.3.5(A). **2-OI-85** **6.6.3 Control Rod Notch Withdrawal** [1] **SELECT** the desired control rod by depressing the appropriate CRD ROD SELECT pushbutton, 2-XS-85-40. [2] **OBSERVE** the following for selected control rod: • CRD ROD SELECT pushbutton is brightly ILLUMINATED. • White light on the Full Core Display ILLUMINATED • Rod Out Permit light ILLUMINATED. [3] **VERIFY** ROD WORTH MINIMIZER operable and LATCHED into correct ROD GROUP when Rod Worth Minimizer is enforcing. [4] **PLACE** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH and **RELEASE** [5] **OBSERVE** control rod settles into desired position **AND** ROD SETTLE light extinguishes. [6] **IF** control rod is notch withdrawn to rod notch Position 48, **THEN**

Op Test No.: 15-01 Scenario No. 3 Event No.: 2 Page 2 of 2

Event Description: Power increase with Control Rods to 8% IAW GOI

Time	Position	Applicant's Actions or Behavior
	ATC	**PERFORM** control rod coupling integrity check as follows: [6.1] **PLACE** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH and **RELEASE**. [6.2] **CHECK** control rod coupled by observing the following: • Four rod display digital readout **AND** full core display digital readout **AND** background light remain illuminated. • CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) does not alarm. [6.3] **CHECK** control rod settles into Position 48 and ROD SETTLE light extinguishes. [6.4] **IF** control rod coupling integrity check fails, **THEN** Refer to 2-AOI-85-2. Withdraws control rods IAW 2-OI-85 and 2-SR- 3.1.3.5(A).
	NRC	End of Event #2

Op Test No.: 15-01 Scenario No. 3 Event No.: 3 Page 1 of 6

Event Description: Control Rod Drift In

Time	Position	Applicant's Actions or Behavior
	Driver	When the NRC Chief Examiner is satisfied with the reactivity change and is ready for Event No. 3, insert F3 (bat NRC/1501-3-3) to drift control rod 2243 in.
	ATC	Reports CONTROL ROD DRIFT (2-XA-55-5A, Window 28) in alarm. **2-ARP-9-5A** A.**DETERMINE** which rod is drifting from Full Core Display C. **IF** rod drifting in, **THEN** **REFER TO** 2-AOI-85-5 and 2-AOI-85-7. **2-AOI-85-5** **4.0 OPERATOR ACTIONS** **4.1 Immediate Actions** [1] **IF** multiple rods are drifting into core, **THEN** **MANUALLY SCRAM** Reactor. Refer to 2-AOI-100-1. **4.2 Subsequent Actions** **NOTE** If Reactor Power is less than 24%, the Rod Worth Minimizer (RWM) system may impose rod blocks [1] **IF** Reactor Power is less than less than 24% RTP, **THEN** **MANUALLY BYPASS** the Rod Worth Minimizer on Panel 2-9-5 as follows: (Otherwise N/A) [1.1] **PLACE** RWM SWITCH PANEL, 2-XS-85-9025, in BYPASS position. [1.2] **CHECK** the Manual Bypass light is illuminated. [1.3] **NOTIFY** the Unit Supervisor that Rod Worth Minimizer has been manually Bypassed. (Reference Tech Spec Sections 3.3.2.1 and 3.1.6) [1.4] When time permits, **PERFORM** the remaining actions to Manually Bypass the Rod Worth Minimizer per 2-OI-85. [2] **IF** a Control Rod is moving from its intended position without operator actions, **THEN** **INSERT** the Control Rod to position 00 using CONTINUOUS IN. (Otherwise N/A)

Op Test No.: 15-01 Scenario No. 3 Event No.: 3 Page 2 of 6

Event Description: Control Rod Drift In

Time	Position	Applicant's Actions or Behavior
	ATC	Identifies and reports control rod 22-43 drifting into the core Monitors the full core display for other control rod drifts
	Driver	When control rod 22-43 stops moving (stuck), insert Shift F3 (dmf rd07r2243) to delete the drift then insert Shift F4 (dmf rd06r2243) to allow the rod to be inserted
		2-AOI-85-5 Rod Drift In [1] **IF** Reactor Power is less than less than 24% RTP, **THEN MANUALLY BYPASS** the Rod Worth Minimizer on Panel 2-9-5 as follows: [1.1] **PLACE** RWM SWITCH PANEL, 2-XS-85-9025, in BYPASS position. [1.2] **CHECK** the Manual Bypass light is illuminated. [1.3] **NOTIFY** the Unit Supervisor that Rod Worth Minimizer has been manually Bypassed. (Reference Tech Spec Sections 3.3.2.1 and 3.1.6) [2] **IF** a Control Rod is moving from its intended position without operator actions, **THEN INSERT** the Control Rod to position 00 using CONTINUOUS IN. [3] **IF** a Control Rod Block occurs during rod insertion due to Rod Worth Minimizer, **THEN BYPASS** the RWM per step 4.2[1] above. [4] **NOTIFY** the Reactor Engineer to Evaluate Core Thermal Limits and Preconditioning Limits for the current Control Rod pattern. [5] **IF** another Control Rod Drift occurs before Reactor Engineering completes the evaluation, **THEN MANUALLY SCRAM** Reactor and enter 2-AOI-100-1.
	NRC	**The drifting Control Rod must be fully inserted if it is more than 2 notches from intended position.**

Op Test No.: 15-01 Scenario No. 3 Event No.: 3 Page 3 of 6

Event Description: Control Rod Drift In

Time	Position	Applicant's Actions or Behavior
	ATC	[6] **CHECK** Thermal Limits on ICS (RUNMON). [7] **ADJUST** control rod pattern as directed by Reactor Engineer and **CHECK** Thermal Limits on ICS (RUNMON). [9] **VERIFY** scram pilot air header aligned to scram inlet and outlet valves. [10] **CHECK** CRD SCRAM OUTLET, 2-FCV-085-39B, for leakage as indicated by the following: • Scram riser for affected HCU has higher than normal temperature. • CRD SCRAM OUTLET, 2-FCV-085-39B, producing flow noise. **NOTE** The CRD accumulator is required to be considered inoperable per Technical Specifications 3.1.5 when the charging water is isolated.

Op Test No.: 15-01 Scenario No. 3 Event No.: 3 Page 4 of 6

Event Description: Control Rod Drift In

Time	Position	Applicant's Actions or Behavior
		[11] **CHECK** CRD SCRAM INLET VALVE, 2-FCV-085-39A, for leakage as follows: [11.1] **CHECK** insert riser for affected HCU for higher than normal temperature. [11.2] **CLOSE** CHARGING WATER SOV, 2-SHV-085-588, AND **OBSERVE** CRD ACCUMULATOR NITROGEN SIDE PRESS, 2-PI-85-34, for a lowering trend. [4] **NOTIFY** the Reactor Engineer to Evaluate Core Thermal Limits and Preconditioning Limits for the current Control Rod pattern. Dispatches AUO to investigate the rod drift at the HCU
	Driver	As RE, acknowledge control rod 22-43 drifting in and subsequently being inserted fully into the core. Will evaluate core thermal limits and preconditioning limits. As AUO, acknowledge going to HCU for control 22-43 to investigate the rod drift

Op Test No.: 15-01 Scenario No. 3 Event No.: 3 Page 5 of 6

Event Description: Control Rod Drift In

Time	Position	Applicant's Actions or Behavior
		Evaluates Technical Specifications 3.1 REACTIVITY CONTROL SYSTEMS 3.1.3 Control Rod OPERABILITY LCO 3.1.3 Each control rod shall be OPERABLE C. One or more control rods inoperable for reasons other than Condition A or B — C.1 Fully insert inoperable control rod — 3 hr AND C.2 Disarm the associated CRD — 4 hr
NRC – T.S. 3.1.6 only applies until the rod is declared inoperable.		3.1.6 Rod Pattern Control LCO 3.1.6 OPERABLE control rods shall comply with the requirements of the banked position withdrawal sequence (BPWS).
	SRO	A. One or more OPERABLE control rods not in compliance with BPWS — A.2 Declare associated control rod inoperable — 8 hr 3.3 INSTRUMENTATION 3.3.2.1 Control Rod Block Instrumentation LCO 3.3.2.1 The control rod block instrumentation for each Function in Table 3.3.2.1-1 shall be OPERABLE. C. Rod worth minimizer (RWM) inoperable during reactor startup. — C.1 Verify ≥ 12 rods withdrawn — Immediately AND C.2.2 Verify movement of control rods is in compliance with banked position withdrawal sequence by a second licensed operator or other qualified member of the technical staff

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Event Description: Control Rod Drift In

Time	Position	Applicant's Actions or Behavior
		Updates crew on Technical Specification requirements for the inoperable control rod, RWM, and BPWS.
	Driver	As Rx Bldg AUO, report that the scram outlet valve has an air leak.
	NRC	End of Event #3

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Event Description: Loss of SJAE 'A' / Swap to STBY SJAE 'B'

Time	Position	Applicant's Actions or Behavior
	Driver	When NRC Chief Examiner is ready for Event No. 4, insert F4 (imf og04a) to isolate 'A' SJAE.
	BOP	Reports OG HOLDUP LINE INLET FLOW LOW (2-XA-55-53, Window 4) in alarm. **2-ARP-9-53** D. **VERIFY** that SJAE auto isolation has **NOT** occurred Reports that SJAE 'A' has isolated
	SRO	Directs BOP to swap to SJAE 'B' using the hard card Directs ATC to monitor main condenser vacuum
	BOP	**2-OI-66** **Appendix C** **Standby SJAE System Lineup Hard Card** **2.0 OPERATOR ACTION FOR SJAE 2B** **NOTES** Radiation Protection should be notified prior to placing a SJAE in service. If time does not permit this due to plant conditions then notification should be made when possible. 2-HS-001-0375, SJAE TRAIN PERMISSIVE (located on 2-LPNL-925-0105, U2 TB, el 586') should normally be in the position of the standby SJAE. If problems are encountered while placing a SJAE in service and time permits, operate this switch as required during the performance of this section.

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Event Description: Loss of SJAE 'A' / Swap to STBY SJAE 'B'

Time	Position	Applicant's Actions or Behavior
	BOP	[1] **VERIFY RESET** Off-Gas isolation using 2-HS-90-155, OG OUTLET/DRAIN ISOLATION VLVS. [2] **VERIFY OPEN** the following valves: • 2-HS-66-15, SJAE 2B INLET VALVE. • 2-HS-1-156A, STEAM TO SJAE 2B. [3] **VERIFY** in **AUTO/OPEN** 2-HS-66-18, SJAE 2B OG OUTLET VALVE. [4] **PLACE** 2-HS-1-152, SJAE 2B PRESS CONTROLLER, in **CLOSE** and then in **OPEN**. [5] **VERIFY OPEN** the following valves (red light illuminated): • 2-PCV-1-153/167, STEAM TO SJAE 2B STAGES 1,2, AND 3. • 2-FCV-1-152, SJAE 2B INTMD CONDENSER DRAIN. [6] **MONITOR** hotwell pressure as indicated on CONDENSATE recorder, 2-XR-002-0026 (Point 3), on Panel 2-9-6. [7] **FOR** the SJAE not being placed in service, **VERIFY CLOSED** the following valves: • 2-HS-66-14, SJAE 2A OG OUTLET VALVE. • 2-HS-1-150, SJAE 2A PRESSURE CONTROLLER. • 2-HS-1-155A STEAM TO SJAE 2A Reports 'B' SJAE in service Calls RP to report 'B' SJAE placed in service
	ATC	Reports that main condenser vacuum had started to lower but has returned to normal
	Driver	As RP, acknowledge that 'B' SJAE has been placed in service.
	NRC	End of Event #4

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Event Description: IRM 'B' Failure of Upscale/Half Scram

Time	Position	Applicant's Actions or Behavior
	Driver	When the NRC Chief Examiner is ready for Event No. 5, insert F5 (imf nm05b 100) to fail IRM 'B' upscale.
	ATC	Reports IRM B HI-HI/INOP condition with **no** reactor half scram. Immediately stops reactivity changes.
	ATC	Reports that "IRM CH B, D, F, H HI-HI/INOP" (2-XA-55-5A, Window 34) is in alarm and REACTOR CHANNEL B AUTO SCRAM (2-XA-55-5B, Window 2) failed to come in on a valid IRM Upscale condition. **Reviews ARPs** **2-ARP-9-5A** A. **STOP** any reactivity changes. B. **VERIFY** alarm by multiple indications. C. **RANGE** initiating channel or **BYPASS** initiating channel to reset half-scram. **REFER TO** 2-OI-92A. H. **NOTIFY** Reactor Engineer **2-ARP-9-5B** A. **VERIFY** channel B relays dropped out by checking scram solenoid and backup scram valve lights extinguished. Checks indications and reports IRM 'B' has failed upscale Verifies scram solenoid and backup scram valve lights did not extinguish.

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Event Description: IRM 'B' Failure Upscale/Half Scram

Time	Position	Applicant's Actions or Behavior
	SRO	Refers to Technical Specifications 3.3 INSTRUMENTATION 3.3.1.1 Reactor Protection System (RPS) Instrumentation LCO 3.3.1.1 The RPS instrumentation for each Function in Table 3.3.1.1-1 shall be OPERABLE. Table 3.3.1.1-1 Reactor Protection System Instrumentation 1. Intermediate Range Monitors a. Neutron Flux – High 2 3 G Determines that: Condition A applies Required Action A.1 Place the channel in trip in 12 hours OR A.2 Place the associated trip system in trip 12 hours. Completion time 12 hours.
	SRO	Directs ATC and BOP to insert a half scram IAW OI-99 (place the IRM mode switch out of operate)
	NRC	**The SRO will have IM's investigate and repair the IRM especially since he has 12 hours to place a channel in trip. The next event may be started before the crew has the opportunity to placing the ½ scram in on B RPS.** End of Event #5

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Event Description: Loss of 4KV Shutdown Board D, D D/G fails to AUTO tie

Time	Position	Applicant's Actions or Behavior
	Driver	When the NRC Chief Examiner is ready for Event No. 6, insert F6 to cause the loss of 4kV SD Bd D (ed09d) and a failure of 'D' DG to automatically tie to the board (dg03d). After diesel has started, insert Shift F6 (dmf ed09d) to delete to overcurrent trip of the board.
	ATC	Reports a reactor half scram and loss of RPS 'B'
	BOP	Recognizes and reports that 'D' 4kV Shutdown Board is de-energized and 'D' Diesel Generator failed to automatically tie to the board. Verifies no lockout conditions on the board and closes 'D' Diesel Generator output breaker Reports 'D' 4kV Shutdown Board re-energized Call WC to investigate the loss of 'D' 4kV Shutdown Board and the failure of 'D' to automatically tie to the board. Calls to have RPS 'B' restored
	Driver	As WC, acknowledge initiating investigation of the loss of 'D' 4kV Shutdown Board and the failure of 'D' Diesel Generator to automatically tie to the board. As outside US, acknowledge restoring power to RPS 'B'
		Refers to Technical Specifications 3.8 ELECTRICAL POWER SYSTEMS 3.8.1 AC Sources - Operating LCO 3.8.1 The following AC electrical power sources shall be OPERABLE: a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System;

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Event Description: Loss of 4KV Shutdown Board D, D D/G fails to AUTO tie

Time	Position	Applicant's Actions or Behavior
	SRO	b. Unit 1 and 2 diesel generators (DGs) with two divisions of 480 V load shed logic and common accident signal logic OPERABLE; A. One required offsite circuit inoperable. — A.1 Verify power availability from the remaining OPERABLE offsite transmission network — 1 hr AND Once /8 hr
	SRO	B. One required Unit 1 and 2 DG inoperable. — B.1 Verify power availability from the offsite — 1 hr AND G. One required offsite circuit inoperable. AND One Unit 1 and 2 DG Inoperable — G.1 Declare the affected 4.16 kV shutdown board inoperable — Immediately 3.8 ELECTRICAL POWER SYSTEMS 3.8.7 Distribution Systems – Operating LCO 3.8.7 The following AC and DC electrical power distribution subsystems shall be OPERABLE: a. Unit 1 and 2 4.16 kV Shutdown Boards; A. One Unit 1 and 2 4.16 kV Shutdown Board inoperable. — A.1 Restore the Unit 1 and 2 4.16kV Shutdown Bd to OPERABLE status — 5 day Briefs crew on Technical Specification requirements based on the loss of 4kV Shutdown Board 'D'
	Driver	Insert Shift F7 (mrf rp02 reset) to reset RPS 'B' circuit protectors. As outside US, call and report that RPS 'B' has been restored
	SRO	Directs ATC to reset RPS and PCIS IAW OI-99

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Event Description: Loss of 4KV Shutdown Board D, D D/G fails to AUTO tie

Time	Position	Applicant's Actions or Behavior
	ATC	**2-OI-99** **8.5 Restoration to Normal Following RPS Bus Power Loss or Transfer** **NOTES** 1) This section provides instructions for resetting the various system isolations and reopening affected valves to allow those systems to be restored to normal operation in accordance with their respective operating instructions. 2) The following steps are performed at Panel 2-9-5 unless otherwise noted.
		3) When RPS Bus power is lost to some scram discharge volume level switches, their RTD heater is de-energized. Following the restoration of power, a time delay, dependent on how long the level switch was de-energized, prevents resetting the half scram signal. This may take up to 37 seconds after RPS power is restored. Precaution 3.0 O can be referred to for more information on these level switches [1] **OBTAIN** Unit Supervisor/SRO's permission to restore to normal. [2] **MOMENTARILY PLACE** SCRAM RESET, 2-HS-99-5A-S5, as follows: [2.1] RESET FIRST position. (Group 2/3) [2.2] RESET SECOND position. (Group 1/4) [2.3] NORMAL position. [3] **CHECK** the following conditions: A. All eight SCRAM SOLENOID GROUP A/B LOGIC RESET lights ILLUMINATED. □ B. The following four lights ILLUMINATED: • SYSTEM A BACKUP SCRAM VALVE, 2-IL-99-5A/AB. • SYSTEM B BACKUP SCRAM VALVE, 2-IL-99-5A/CD. C. Scram Discharge Volume vent and drain valves indicate OPEN. D. Points SOE033 and SOE035 on ICS computer or on the First Out Printer reads "NOTTRIP" for RPS "A".

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Event Description: Loss of 4KV Shutdown Board D, D D/G fails to AUTO tie

Time	Position	Applicant's Actions or Behavior
	ATC	E. Points SOE034 and SOE036 on ICS computer or on the First Out Printer reads "NOTTRIP" for RPS "B". [4] At Panel 2-9-4, **RESET** PCIS trip logic as follows: [4.1] **MOMENTARILY PLACE** PCIS DIV I RESET, 2-HS-64-16A-S32, to left and right RESET positions. [4.2] **CHECK** the following red lights ILLUMINATED: • MSIV GROUP A1. • MSIV GROUP B1. [4.3] **MOMENTARILY PLACE** PCIS DIV II RESET, 2-HS-64-16A-S33, to left and right RESET positions. [4.4] **CHECK** the following red lights ILLUMINATED: • MSIV GROUP A2. • MSIV GROUP B2. Resets RPS and PCIS IAW OI-99 Reports RPS and PCIS have been reset
	BOP	**2-AOI-70-1 Loss of Reactor Building Closed Cooling Water** **3.0 AUTOMATIC ACTIONS** A. RBCCW SECTIONALIZING VALVE, 2-FCV-70-48, closes automatically on RBCCW Pump discharge header pressure at or below 57 psig. **4.1 Immediate Actions** [1] **IF** RBCCW Pump(s) has tripped, **THEN** Perform the following: • **SECURE** RWCU Pumps. • **VERIFY** RBCCW SECTIONALIZING VLV, 2-FCV-70-48 **CLOSED**.

		2-AOI-99-1 Loss of Power to One RPS Bus **Automatic Actions** A. RPS trip logic A(B) half-scram occurs. B. PCIS Group 1 half-trip logic de-energizes. D. PCIS Group 3 isolation, RWCU: E. PCIS Group 6 isolation, Pri Cont Vent and Purge and RB Vent F. Group 8 isolation, TIP. G. Control Room Emergency Ventilation System start. H. Standby Gas Treatment System starts. **4.1 Immediate Action** [1] **STOP** all testing with potential RPS half-scrams or PCIS logic isolation signals. **4.2 Subsequent Actions** [1] **VERIFY** automatic actions occur. [2] **VERIFY** Steam Tunnel Booster FAN operating by observation of MAIN STEAM LINE TUNNEL TEMPERATURE,2-TIS-1-60A. [4] **IF** desired to place RPS Bus B on Alternate Supply, **THEN PERFORM** Step 4.2[9]. [6] **IF** desired to Startup and Load RPS MG Set 2B, **THEN PERFORM** Step 4.2[11]. (Otherwise N/A)
		[7] **IF** Alternate RPS Supply **AND** RPS MG Set unavailable, **THEN PERFORM** the following [7.1] **ATTEMPT** to determine the cause of loss of RPS Circuit Protector by using the indicating lights inside the RPS cabinets.(Otherwise N/A) [7.2] **CONTACT** Electrical Maintenance to correct the cause. [9] **RESTORE** Alternate Power to RPS Bus B as follows: [9.1] **VERIFY** memory lights inside RPS Circuit Protector cabinets are RESET. RPS CIRCUIT PROT RESET PB CAB 2C1, 2-HS-099-0002C1 RPS CIRCUIT PROT RESET PB CAB 2C2, 2-HS-099-0002C2

		[9.2] **VERIFY** Circuit Protectors 2C1 and 2C2 are RESET. RPS CIRCUIT PROTECTOR 2C2, 2-HS-099-0002C1/1 RPS CIRCUIT PROTECTOR 2C2, 2-HS-099-0002C2/1 [9.3] **VERIFY** ALTERNATE SOURCE AVAILABLE amber light ILLUMINATED. [9.4] In Battery Board Room No. 2 **PLACE** RPS BUS B NORMAL/ALTERNATE TRANSFER SWITCH, 2-XS-099-0002B, to ALT. [9.5] **NOTIFY** Unit 2 Operator that RPS 2B is on Alternate power supply. [9.6] **PROCEED** to Step 4.2[12].
	NRC	End of Event #6

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Event Description: Trip of RFP 2C/ recover with already warm RFP 2B

Time	Position	Applicant's Actions or Behavior
	Driver	When the NRC Chief Examiner is ready for Event No. 7, insert F7 (imf fw14c) to trip reactor feedpump 2C
	ATC	Reports RFPT TRIPPED (2-XA-55-6C, Window 29) in alarm. Monitors indications and reports RPT 'C' tripped. Monitors reactor water level
	SRO	Directs entering AOI-3-1 to control reactor water level
		2-AOI-3-1 **4.2 Subsequent Actions** **5.0 LOW REACTOR WATER LEVEL OR LOSS OF FEEDWATER** [1] **IF** Feedwater Control System has failed, **THEN PERFORM** the following: [1.1] **PLACE** individual RFPT Speed Control Raise/Lower switches in Manual Governor (depressed position with amber light illuminated). [1.2] **ADJUST** RFP Discharge flows with RFPT Speed Control Raise/Lower switches as necessary to maintain Reactor Water Level. Verifies '2B' RFPT speed control switch in manual and raises RFPT speed to control and maintain reactor water level. Places '2B' RFPT in automatic control Reports '2B' RFPT in service
	SRO	Calls WC to investigate the trip of '2C' RFPT
	Driver	As WC, acknowledge WO to investigate the trip of '2C' RFPT
	NRC	End of Event #7

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Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	Driver	When the NRC Chief Examiner is ready for Event No. 8, insert F8 (bat NRC/1501-3-8) to insert a torus leak and ATWS
	ATC/BOP	Reports multiple room flood alarms in secondary containment and SUPPR CHAMBER WATER LEVEL ABNORMAL (2-XA-55-3B, Window 15) in alarm
		2-ARP-9-3B A. **CHECK** Suppression Pool level using multiple indications. B. **IF** level is low, **THEN** **DISPATCH** personnel to check for leaks. E. **REFER TO** Tech Spec 3.6.2.2. F. **IF** level is above -1" or below -6.25" **AND NOT** in Mode 4 or Mode 5 **THEN** (otherwise N/A) **ENTER** 2-EOI-2 Flowchart.
	BOP	Reports suppression pool water level lowering Calls AUO to check for leaks in reactor building pump rooms and torus area
	SRO	Enters EOI-3 on secondary containment flood alarms **EOI-3** **IF** SAMG entry is required and the TSC SAM team has assumed command and control – **NO** Rx Zone ventilation exh radiation lvl is above 72 mR/hr - **NO** Refuel Zone ventilation exh radiation lvl is above 72 mR/hr - **NO** Rx Zone ventilation is isolated AND Rx Zone ventilation exh radiation lvl is below 72 mR/hr - **NO** Refuel Zone ventilation is isolated AND Refuel Zone ventilation exh radiation lvl is below 72 mR/hr – **NO** CAUTION #7 Spent fuel pool temp and level

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Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	**SC/L** WHEN any floor drain sump water level is above 66 in. - **YES** WHEN any area water level is above 2 in. - **YES** **RESTORE** and **MAINTAIN** floor drain sump water lvls Below 66 in. using all available sump pumps - **CHECKED** **RESTORE** and **MAINTAIN** area water lvls below 2 in. using all available sump pumps - **CHECKED** WHEN any floor drain sump water lvl cannot be restored and maintained below 66 in - **YES** WHEN any area water lvl cannot be restored and maintained below 2 in. – **YES** **ISOLATE** all systems that are discharging into the area EXCEPT systems required: For damage control OR To be operated by EOIs - **CHECKED**
	Driver	After being dispatched to check water levels, wait 5 minutes and report that water level is approximately 4 inches and rising in the southwest quad. Water is flowing in from the torus area. Source of the leak in unknown
	SRO	Will emergency depressurization reduce discharge into Secondary Cntmt – **NO** WHEN water lvls in 2 or more areas are above 20 in. Enters EOI-2 on Supp Pl Lvl below -6.25 in . SAMG entry is required and the TSC SAM team has assumed command and control - **NO** SAMG entry is required - **NO** CAUTION **#4** PC press vs pump NPSH - **CHECKED**

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Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	DW sprays have been initiated - **NO** Suppr chmbr sprays have been initiated - **NO** PC water level CANNOT be restored and maintained below 105 ft - **CAN** OR Suppr chmbr press CANNOT be restored and maintained below 55 psig - **CAN** **SP/L** Primary Containment Flooding is required - **NO** AND SAMG entry is NOT required **MONITOR** and **CONTROL** suppr pl lvl between -1 in. and -6 in. (APPX 18) Directs BOP to control suppression pool water level IAW App. 18 Can suppr pl lvl be maintained above-6 in. – NO **IF** / **THEN** Suppr pl lvl CANNOT be Maintained above 12.75 ft → **SECURE** HPCI irrespective of whether adequate core cooling Is assured Sets a trigger value, on suppression pool level, for securing HPCI Briefs crew on current plant conditions including securing HPCI at the trigger value for SPL.
	BOP	EOI APPENDIX-18 **SUPPRESSION POOL WATER INVENTORY REMOVAL AND MAKEUP** NOTE: All panel operations performed at Control Room Panel 2-9-3 unless otherwise stated. 1. IF ..... Suppression Pool Water makeup is required, THEN ... **CONTINUE** in this procedure at Step 5.

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Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	BOP	5. IF ..... Directed by SRO to Emergency Makeup to the Suppression Pool from Standby Coolant, THEN ... **CONTINUE** in this procedure at Step 9 using RHR Loop I OR Step 10 using RHR Loop II. 6. IF ..... Directed by SRO to add water to suppression pool, THEN ... **MAKEUP** water to Suppression Pool as follows: a. **VERIFY OPEN** 2-FCV-73-40, HPCI CST SUCTION VALVE. b. **OPEN** 2-FCV-73-30, HPCI PUMP MIN FLOW VALVE. Adds water to the suppression pool IAW App. 18 Monitors Suppression Pool water level and reports that level is continuing to lower.
	SRO	Directs securing HPCI
	BOP	Secures HPCI by placing HPCI Aux Oil Pump in PTL.
		When Suppression Pool Level cannot be maintained above 12.75 feet HPCI secured to prevent damage. 1. Safety Significance: Prevent failure of Primary Containment from pressurization of the Suppression Chamber 2. Cues: Procedural compliance Suppression Pool Level indication 3. Measured by: Observation – HPCI Auxiliary Pump placed in Pull to Lock 4. Feedback: HPCI does not Auto initiate No RPM indication on HPCI This Critical Task is **not met** if the Crew fails to place the HPCI AOP in PTL at 12.75 ft.

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Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	**MAINTAIN** suppr pl lvl above 11.5 ft (APPX 18) **BEFORE** Suppr pl lvl drops to 11.5 ft **CONTINUE**
	SRO	As Suppression Pool level lowers, the SRO will take the conservative action to start the shutdown with 2-AOI-100-1. Directs the ATC to enter AOI-100-1 and insert control rods in accordance with 2-OI-85;
	ATC	**2-OI-85 Control Rod Drive System Section 6.7 Control Rod Insertion.** [4] **PERFORM** the following to insert the control rod as appropriate. Control Rod Continuous Insertion per Section 6.7.3. **6.7.3 Continuous Insertion of Control Rod** [1] **VERIFY** Section 6.7.1 has been performed. [2] **SELECT** desired control rod by depressing appropriate CRD ROD SELECT pushbutton, 2-XS-85-40. [3] **OBSERVE** the following for selected control rod: □ CRD ROD SELECT pushbutton is brightly ILLUMINATED. □ White light on Full Core Display ILLUMINATED [4] **PLACE** AND **HOLD** CRD CONTROL SWITCH, 2-HS-85-48, to ROD IN. [5] **WHEN** control rod notch reaches even rod notch position prior to desired final control rod notch position, **THEN RELEASE** CRD CONTROL SWITCH, 2-HS-85-48. [6] **OBSERVE** the control rod settles into desired position **AND** ROD SETTLE light extinguishes.

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Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	Before Torus Level reaches 11.5 feet the SRO will enter EOI-1 and direct the ATC to initiate a manual reactor scram.
	ATC	**Reactor Scram OATC Hard Card** **1.0 IMMEDIATE ACTIONS** [1] **DEPRESS** REACTOR SCRAM A and B, 2-HS-99-5A/S3A and 2-HS-99-5A/S3B, on Panel 2-9-5. [2] **IF** scram is due to a loss of RPS, **THEN PLACE** REACTOR MODE SWITCH, 2-HS-99-5A-S1, in START & HOT STBY **AND PAUSE** for approximately 5 seconds (Otherwise N/A) [3] Refuel Mode One Rod Permissive Light check: [3.1] **PLACE** REACTOR MODE SWITCH, 2-HS-99-5A-S1, in REFUEL. [3.2] **CHECK** illuminated REFUEL MODE ONE ROD PERMISSIVE light, 2-XI-85-46. [3.3] **IF** REFUEL MODE ONE ROD PERMISSIVE light, 2-XI-85-46, is **NOT** illuminated, **THEN CHECK** all control rod positions at Full-In Overtravel, or Full-In. (Otherwise N/A) [4] **PLACE** REACTOR MODE SWITCH, 2-HS-99-5A-S1, in SHUTDOWN.

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Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	ATC	[5] **REPORT** the following status to the US: • Reactor Scram • Mode Switch is in Shutdown • "All rods in" or "rods out" • Reactor Water Level and trend (recovering or lowering) • Reactor pressure and trend • MSIV position (Open or Closed) • Power level Completes immediate operator actions and makes scram report including 'rods out' and 'power level <5%. **2.0 SUBSEQUENT ACTIONS:** [1] **IF** all control rods **CAN NOT** be verified fully inserted, **THEN PERFORM** the following (otherwise N/A): [1.1] **INITIATE** ARI by Arming and Depressing BOTH of the following: • ARI Manual Initiate, 2-HS-68-119A • ARI Manual Initiate, 2-HS-68-119B [1.2] **VERIFY** the Reactor Recirc Pumps (if running) at minimum speed at Panel 2-9-4. [1.3] **REPORT** "ATWS Actions Complete" and power level. Completes subsequent actions
	SRO	Enters EOI-1, RPV Control at Step RC-1 SAMG entry is required and the TSC SAM team has assumed command and control - **NO** **VERIFY** RX scram Directs ATC to initiate a manual reactor scram

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Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	EOI-1 **RC/Q** **MONITOR** and **CONTROL** reactor power - CHECKED The reactor will remain subcritical without boron under all conditions - **NO** The reactor is subcritical - **NO** AND NO boron has been injected **VERIFY** reactor mode switch in SHUTDOWN - **CHECKED** **INITIATE** ARI - **CHECKED**
	SRO	Will tripping Recirc pumps cause trip of Main Turbine, RFP, HPCI, or RCIC – NO Is reactor power above 5% OR unknown – NO **BEFORE** suppr pl temp rises to 110°F **CONTINUE** – CHECKED **RESET** ARI **DEFEAT** ARI logic trips if necessary (APPX 2) – CHECKED **INSERT** control rods using ANY of the following methods: Scram valves opened But SDV is full 1. RESET scram DEFEAT RPS logic trips if necessary 1F 2.DRAIN SDV 3. RECHARGE accumulators 4. INITIATE reactor scram Manual control rod Insertion methods 1. DRIVE control rods BYPASS RWM if necessary 1D Directs ATC to perform App. 1F and 2 and to drive control rods with App. 1D
	ATC	Directs personnel to perform App. 2 and the outside portions of App. 1F

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Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	Driver	Acknowledge performing App. 2 and the outside portions of App. 1F. Wait 3 minutes then insert Shift F8 (bat app02) to defeat ARI logic. Wait 5 minutes then insert Shift F9 (bat app01f) to defeat RPS logic
	SRO	EOI-1 **RC/L** CAUTION **#1** Ambient temp may affect RPV water lvl indication and trend - **CHECKED** **MONITOR** and **CONTROL** RPV water lvl - **CHECKED**
	SRO	**VERIFY** each as required: • PCIS isolations (Groups 1, 2 and 3) • ECCS • RCIC It has NOT been determined that the reactor will remain subcritical without boron under all conditions — EXIT RC/L and ENTER C5, Level/Power Control C-5 CAUTION **#1** Ambient temp may affect RPV water lvl indication and trend RPV water lvl CANNOT be determined - **CAN** The reactor will remain subcritical without boron under all conditions - **NO** PC water lvl CANNOT be maintained below 105 ft - **CAN** OR Suppr chmbr press CANNOT be maintained below - **CAN** 55 psig DW Control Air becomes unavailable - **AVAIL**

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 8 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
		INHIBIT ADS Is ANY main steam line open - YES **BYPASS** the following isolation interlocks: • MSIV low low low RPV water lvl (APPX 8A) • RB ventilation low RPV water lvl (APPX 8E) Directs BOP to inhibit ADS Calls for App 8A and 8E to be performed
	Driver	Acknowledge performing App 8A and App8E. Wait 5 minutes then insert Shift F10 (bat app08a) and Shift F11 (bat app08e). Call US and report App 8A and 8E are complete.
	BOP	Inhibits ADS Reports ADS inhibited

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 9 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	Suppr pl temp is above 110°F - **BELOW** AND Reactor power is above 5% OR unknown - **BELOW** AND An MSRV is open or cycling OR DW press is above 2.4 psig - **NO** AND RPV water lvl is above -162 in. - **YES** Is reactor power above 5% OR unknown – **NO** Emergency RPV depressurization is required – **NO** Reactor power is above 5% - **BELOW** OR unknown AND RPV water lvl is above -50 in. CAUTION **#5** Rapid RPV inj may cause core damage **#2** Pump NPSH and Vortex limits **#3** Elevated suppr chmbr press may trip RCIC **#6** HPCI or RCIC suction temp above 140°F **MAINTAIN** RPV water lvl between -180 in. and +51 in. with the following inj sources CNDS and FW 5A 1210 psig Directs ATC to maintain RPV water level +2 in. to +51 in. using App. 5A Condensate and Feedwater

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 10 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	ATC	Maintains RPV water level +2 in to +51 in IAW App 5A When it is reported that App 2 and the outside portions of App 1F are complete, continues with App 1F **EOI Appendix-1F** [2] **WHEN** RPS Logic has been defeated, **THEN RESET** Reactor Scram. [3] **VERIFY OPEN** Scram Discharge Volume vent and drain valves
	ATC	**EOI Appendix-1D** [1] **VERIFY** at least one CRD pump in service. [3] **VERIFY** REACTOR MODE SWITCH in SHUTDOWN. [4] **BYPASS** Rod Worth Minimizer. [5] **REFER TO** Attachment 2 and **INSERT** control rods in the area of highest power as follows: [5.1] **SELECT** control rod. [5.2] **PLACE** CRD NOTCH OVERRIDE switch in EMERG ROD IN position UNTIL control rod is NOT moving inward. [5.3] **REPEAT** Steps 1.0[5.1] and 1.0[5.2] for each control rod to be inserted Completes control room portions of App 1F and inserts control rods IAW App 1D Reports driving control rods

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 10 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	**RC/P** DW press is above 2.4 psig - **NO** Emergency RPV depressurization is anticipated - **YES** AND The reactor will remain subcritical without boron under all conditions - **NO** Emergency RPV depressurization is or has been required - **NO** RPV water lvl CANNOT be determined - **CAN** Is ANY MSRV cycling - **NO** Steam cooling is required - **NO** Suppr pl temp and lvl CANNOT be maintained in a safe area of Curve 3 at the existing RPV press - **CAN**

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 11 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	Suppr pl lvl CANNOT be maintained in the safe area - **CAN** of Curve 4 DW control air becomes unavailable - **AVAIL** Boron inj is required - **NO** AND The main condenser is available AND There has been no indication of a steam line break **STABILIZE** RPV press below 1073 psig with the main turbine bypass vlvs (APPX 8B) Directs BOP to control reactor pressure 800 psig to 1000 psig in accordance with Appendix 8B
	BOP	Verifies that main turbine bypass valves are controlling reactor pressure 800 psig to 1000 psig Reports that suppression pool water level is continuing to lower
	NRC	**Ensure that the failure of the Reactor Feedpump B Governor is prior to performing Appendix 4 Stop and Prevent**
	Driver	**When App 4 is directed, insert F9 (imf fw30b 55.7) to fail RFP 'B' Woodward governor.**

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 12 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	Sets a trigger valve and briefs the crew on the requirement to emergency depressurize the RPV before reaching 11.5 ft. in the torus. EOI-2 **SP/L** WHEN suppr pl lvl CANNOT be maintained above 11.5 ft. **EMERGENCY RPV DEPRESSURIZATION IS REQUIRED**(EOI-1, RC/P-4; C1-1, C1-20; C5-12, C5-14) EOI-1 **RC/P** Emergency RPV depressurization is or has been required — **EXIT** RC/P and **ENTER** C2, Emergency Depressurization Enters C2 for Emergency Depressurization
	SRO	SAMG entry is required and the TSC SAM team has assumed command and control - **NO** RPV water lvl CANNOT be determined - **CAN** Containment water lvl CANNOT be maintained below 44 ft- **CAN** DW control air becomes unavailable – **AVAIL** Will the reactor remain subcritical without Boron under all conditions – NO WHEN all inj into the RPV is stopped and prevented EXCEPT from RCIC, CRD, and SLC per C5, Level/Power Control, Step C5-22

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 12 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
		C-5 Emergency RPV depressurization is Required **STOP** and **PREVENT** ALL inj into RPV EXCEPT from RCIC, CRD and SLC (APPX 4) Directs ATC to terminate and prevent condensate and feedwater using APP 4 Directs BOP to terminate CS and LPCI using App 4
	Driver	When App 4 is directed, insert F9 (imf fw30b 55.7) to fail RFP 'B' Woodward governor.
	NRC	When ATC is using App 4 to terminate and prevent condensate and feedwater, he will recognize the failure of 'B' RFP speed to lower. This will start **Event No. 9.**

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 13 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	BOP	**EOI APPENDIX-4** NOTE Following receipt of a CORE SPRAY automatic initiation signal, it is NOT necessary to wait until a pump starts before performing step 3. 3. **PREVENT** injection from CORE SPRAY following an initiation signal by **PLACING** ALL Core Spray pump control switches in STOP. 4. **PREVENT** injection from LPCI SYSTEM I by performing the following: NOTE Injection may be prevented by performing EITHER step 4.a or step 4.b. a. Following automatic pump start, **PLACE** RHR SYSTEM I pump control switches in STOP. **OR** b. BEFORE RPV pressure drops below 450 psig, 1) **PLACE** 2-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS.** **AND** 2) **VERIFY CLOSED** 2-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE. 5. **PREVENT** injection from LPCI SYSTEM II by performing the following: NOTE Injection may be prevented by performing EITHER step 5.a or step 5.b. a. Following automatic pump start, **PLACE** RHR SYSTEM II pump control switches in STOP. **OR** b. BEFORE RPV pressure drops below 450 psig, 1) **PLACE** 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.** **AND** 2) **VERIFY CLOSED** 2-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE.

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 14 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	Driver	Insert F10 (bat NRC/1501-3-10) to prevent two ADS valves from opening
	BOP	Terminates and prevents injection on 9-3 IAW App 4. Reports terminate and prevent complete
	ATC	6. **PREVENT** injection from CONDENSATE and FEEDWATER by performing the following: c. **CLOSE** the following valves BEFORE RPV pressure drops below 500 psig: • 2-FCV-3-19, RFP 2A DISCHARGE VALVE • 2-FCV-3-12, RFP 2B DISCHARGE VALVE • 2-FCV-3-5, RFP 2C DISCHARGE VALVE • 2-LCV-3-53, RFW START-UP LEVEL CONTROL Terminates and prevents injection on 9-6 IAW App 4. Reports terminate and prevent complete
	SRO	**C-2** Is suppr pl lvl above 5.5 ft. – YES **OPEN** all ADS vlvs Directs BOP to open all ADS valves
	NRC	When SRO directs opening all ADS valves, **Event No. 10** would start
	SRO	C-2 Are at least 4 MSRVs open – YES The reactor is NOT subcritical - >**A**

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 15 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
		When Suppression Pool level cannot be maintained above 11.5 feet the US determines that Emergency Depressurization is required, RO initiates Emergency Depressurization as directed by US. 1. Safety Significance: Precludes failure of Containment 2. Cues: Procedural compliance Suppression Pool Level Trend 3. Measured by: Observation - US determines (indicated by announcement or observable transition to C-2) that Emergency Depressurization is required before Suppression Pool level drops below 11.5 feet. **AND** Observation - RO opens at least 6 SRV's during performance of Emergency Depressurization actions. 4. Feedback: RPV pressure trend SRV status indications Suppression Pool temperature trend This Critical Task is **not met** if Emergency Depressurization is not initiated until Suppression Pool Level gets to 11.5 feet.

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 16 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	SRO	**C-5** Can at least two MSRVs be opened per C2, Emergency RPV Depressurization – **YES** WHEN RPV press **is below MSCP** (Table 1A) **Table 1A** Minimum Steam Cooling Press 6 or more 190 psig Briefs crew that injection to the RPV will begin when RPV pressure is less than 190 psig
	SRO	CAUTION **#5** Rapid RPV inj may cause core damage **#2** Pump NPSH and Vortex limits **#3** Elevated suppr chmbr press may trip RCIC **#6** HPCI or RCIC suction temp above 140°F **START** and **SLOWLY RAISE** RPV inj with the following inj sources to restore and maintain RPV water lvl above -180 in. CNDS and FW 5A 1210 psig Directs ATC to start and slowly raise injection to the RPV, using condensate IAW App 5A, when reactor pressure lowers to less than 190 psig.

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 17 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
		During an ATWS, when conditions with Emergency Depressurization required, Terminate and Prevent RPV injection from ECCS and Feedwater until reactor pressure is below the MSCP as directed by US. 1. Safety Significance: Prevention of fuel damage due to uncontrolled feeding. 2. Cues: Procedural compliance. 3. Measured by: Observation - No ECCS injection prior to being less than the MSCP. **AND** Observation - Feedwater terminated and prevented until less than the MSCP. 4. Feedback: Reactor power trend, power spikes, reactor short period alarms. Injection system flow rates into RPV. This Critical Task is **not met** if the Crew ~~injects too fast and causes power oscillations or APRM downscale clear (>5% power).~~ fails to recognize and take action to secure injection to the reactor if the conditions of C5-5 or C5-15 are met. BL 2/12/1

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 18 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	ATC	When reactor pressure lowers to less than 190 psig, slowly starts injection to the RPV IAW App 5A Reports injection to the RPV
	SRO	Determines that RPV water level is above -180 in. and rising Can RPV water lvl be restored and maintained above -180 in. –**YES** Was RPV water lvl lowered for Step C5-11 – **NO** **>D** Maintain RPV water lvl between -180 in and +51 in. with the following inj sources: CNDS and FW 5A Directs ATC to restore RPV water level to +2 in to +51 in. using condensate App 5A

Op Test No.: 15-01 Scenario No. 3 Event No.: 8 Page 19 of 19

Event Description: Loss of Torus Water level /SCRAM (ATWS)and ED on Torus water level

Time	Position	Applicant's Actions or Behavior
	ATC	Continues to restore RPV water level to +2 in to +51 in using condensate **Appendix-1F** **1.0 INSTRUCTIONS (continued)** [4] **DRAIN** SDV UNTIL the following annunciators clear: • WEST CRD DISCH VOL WTR LVL HIGH HALF SCRAM (Panel 2-9-4, 2-XA-55-4A, Window 1). □ • EAST CRD DISCH VOL WTR LVL HIGH HALF SCRAM (Panel 2-9-4, 2-XA-55-4A, Window 29). **NOTES** 1) If EOI Appendix 2 has been executed, ARI initiation or reset will NOT be possible or necessary in Step 1.0[6]. 2) If reactor pressure is greater than 600 psig, SRO may direct performance of step 1.0[6] prior to accumulators being fully recharged. [6] **WHEN** CRD Accumulators are recharged, **THEN INITIATE** manual Reactor Scram and ARI.
	ATC	Monitors for indication that the Scram Discharge Volumes are drained. Reports when SDV are drained Reports 'initiating a manual reactor scram' Initiates a manual reactor scram Reports rod movement Resets Reactor Scram and verifies Scram Discharge Volume vent and drain valves open Scans full core display and reports all control rods inserted.
	NRC	End of Event #8 and scenario
	Driver	Place simulator in FREEZE upon direction of the NRC Chief Examiner

Op Test No.: 15-01 Scenario No. 3 Event No.: 9 Page 1 of 1

Event Description: Failure of RFP 2B governor/pump needs tripped.

Time	Position	Applicant's Actions or Behavior
	ATC	**EOI APPENDIX-4** 6. **PREVENT** injection from CONDENSATE and FEEDWATER by performing the following: b. **LOWER** RFPT 2A(2B)(2C) speed to minimum setting (approximately 600 rpm) using ANY of the following methods on Panel 2-9-5: • Using 2-LIC-46-5, REACTOR WATER LEVEL CONTROL, in MANUAL AND individual 2-SIC-46-8(9)(10), RFPT 2A(2B)(2C) SPEED CONTROL in AUTO, **OR** • Using individual 2-SIC-46-8(9)(10), RFPT 2A(2B)(2C) SPEED CONTROL in MANUAL, **OR** • Using individual 2-HS-46-8A(9A)(10A), RFPT 2A(2B)(2C)SPEED CONT RAISE/LOWER switch in MANUAL GOVERNOR. Attempts to lower RFPT 'B' speed using App 4 Reports that speed cannot be lowered in manual or automatic a. IF ..... Immediate injection termination from a reactor feedwater pump is required, THEN ..... **PERFORM** step 6.d for the desired pump. d. **TRIP** RFPTs as necessary to prevent injection by **DEPRESSING** the following push-buttons: • 2-HS-3-151A, RFPT 2B TRIP Trips 2B RFPT Reports 2B RFPT tripped
	NRC	End of Event #9

Op Test No.: 15-01 Scenario No. 3 Event No.: 10 Page 1 of 1

Event Description: ADS SRV Failures

Time	Position	Applicant's Actions or Behavior
	BOP	Opens six ADS valves Observes acoustic monitor and determines that only four ADS valves have opened Reports that only four ADS valves have opened
	SRO	**C-2** Can 6 ADS vlvs be opened – NO **OPEN** additional MSRVs as necessary to establish 6 MSRVs open (ok to exceed 100°F/hr cooldown rate) Directs BOP to open additional MSRVs as necessary to get six MSRVs open
	BOP	Opens two additional MSRVs Reports that two additional MSRVs have been opened and that six total MSRVs are now open
	NRC	End of Event #10

Scenario Setup

IC	9
Exam IC	96

Batch File or Pref File	1501NRC3

Malfunctions	Description	Event #	Delay	Severity	Ramp	Initial value	Final value
RD07R2243	Rod Drift In 22-43	3	N/A	N/A	N/A	N/A	N/A
RD06R2243	Rod Stuck 22-43	3	00:35	N/A	N/A	N/A	N/A
OG04A	SJAE A Trip	4	N/A	N/A	N/A	N/A	N/A
NM05B	IRM B Fails Upscale	5	N/A	100	N/A	N/A	100
DG03D	D Diesel Fails to Auto Tie to S/D Bus	Active	N/A	N/A	N/A	N/A	N/A
FW14C	Feed Pump C Trip	7	N/A	N/A	N/A	N/A	N/A
PC14	Torus Water Leak	8	N/A	100	5:00	N/A	N/A
AD01D	ADS Valve Failure	10	N/A	N/A	N/A	N/A	N/A
AD01E	ADS Valve Failure	10	N/A	N/A	N/A	N/A	N/A

Remotes	Description	Event #	Delay	Severity	Ramp	Initial value	Final value

Overrides	Description	Event #	Delay	Severity	Ramp	Initial value	Final value
ZDI0HS2110D22A	S/D Bus D Norm Feeder Bkr Trip	6	0	N/A	N/A	CLOSE	TRIP
ZLO0HS2110D22A	S/D Bus D Norm Feeder Bkr White Light	6	0	N/A	N/A	OFF	ON

Batch / Pref File(s):

Attachment 5
(Page 25 of 39)

A2 Startup Sequence Control Rod Movement Data Sheet

Date Today

RWM GP	ROD NUMBER	FROM	TO	Rod Movement Completed Signoffs UO (AC) [1]	Peer Check [2]
36	02-35	00	12	OP	RR
36	26-59	00	12	OP	RR
36	34-59	00	12	OP	RR
36	58-35	00	12	OP	RR
36	58-27	00	12	OP	RR
36	34-03	00	12	OP	RR
36	26-03	00	12	OP	RR
36	02-27	00	12	OP	RR
37	06-47	00	12	OP	RR
37	14-55	00	12	OP	RR
37	46-55	00	12	OP	RR
37	54-47	00	12	OP	RR
37	54-15	00	12	OP	RR
37	46-07	00	12	OP	RR
37	14-07	00	12	OP	RR
37	06-15	00	12	OP	RR

REMARKS[3]: _____

_____

_____

NOTES:

1 For all rod moves to the "full out" position (notch position 48), this signoff verifies coupling integrity was checked in accordance with 2-OI-85.

2 Documentation of Peer Check by a second qualified member of the plant staff (i.e., RE, STA OR UO) is required ONLY when the RWM is inoperable OR bypassed with core thermal power ≤10%.

3 Record the rod number and any problems encountered, as applicable.

Attachment 5
(Page 26 of 39)

A2 Startup Sequence Control Rod Movement Data Sheet

Date Today

RWM GP	ROD NUMBER	FROM	TO	Rod Movement Completed Signoffs UO (AC) [1]	Peer Check [2]
38	02-35	12	48		
38	26-59	12	48		
38	34-59	12	48		
38	58-35	12	48		
38	58-27	12	48		
38	34-03	12	48		
38	26-03	12	48		
38	02-27	12	48		
39	06-47	12	48		
39	14-55	12	48		
39	46-55	12	48		
39	54-47	12	48		
39	54-15	12	48		
39	46-07	12	48		
39	14-07	12	48		
39	06-15	12	48		

REMARKS[3]: _____

_____

_____

NOTES:

1 For all rod moves to the "full out" position (notch position 48), this signoff verifies coupling integrity was checked in accordance with 2-OI-85.

2 Documentation of Peer Check by a second qualified member of the plant staff (i.e., RE, STA OR UO) is required ONLY when the RWM is inoperable OR bypassed with core thermal power ≤10%.

3 Record the rod number and any problems encountered, as applicable.

Attachment 5
(Page 27 of 39)

A2 Startup Sequence Control Rod Movement Data Sheet

Date Today

RWM GP	ROD NUMBER	FROM	TO	Rod Movement Completed Signoffs UO (AC) [1]	Peer Check [2]
40	02-43	00	12		
40	18-59	00	12		
40	42-59	00	12		
40	58-43	00	12		
40	58-19	00	12		
40	42-03	00	12		
40	18-03	00	12		
40	02-19	00	12		
41	10-51	00	12		
41	50-51	00	12		
41	50-11	00	12		
41	10-11	00	12		

REMARKS[3]: _____

_____

_____

NOTES:

1 For all rod moves to the "full out" position (notch position 48), this signoff verifies coupling integrity was checked in accordance with 2-OI-85.

2 Documentation of Peer Check by a second qualified member of the plant staff (i.e., RE, STA OR UO) is required ONLY when the RWM is inoperable OR bypassed with core thermal power ≤10%.

3 Record the rod number and any problems encountered, as applicable.

Attachment 5
(Page 28 of 39)

A2 Startup Sequence Control Rod Movement Data Sheet

Date Today

RWM GP	ROD NUMBER	FROM	TO	Rod Movement Completed Signoffs UO (AC) [1]	Peer Check [2]
42	02-43	12	48		
42	18-59	12	48		
42	42-59	12	48		
42	58-43	12	48		
42	58-19	12	48		
42	42-03	12	48		
42	18-03	12	48		
42	02-19	12	48		
43	10-51	12	48		
43	50-51	12	48		
43	50-11	12	48		
43	10-11	12	48		

REMARKS[3]: _____

_____

_____

NOTES:

1 For all rod moves to the "full out" position (notch position 48), this signoff verifies coupling integrity was checked in accordance with 2-OI-85.

2 Documentation of Peer Check by a second qualified member of the plant staff (i.e., RE, STA OR UO) is required ONLY when the RWM is inoperable OR bypassed with core thermal power ≤10%.

3 Record the rod number and any problems encountered, as applicable.

Facility: BFN | Scenario No.: NRC – 4 | Op-Test No.: 1501

Examiners:_____ Operators: SRO:_____

_____ ATC:_____

_____ BOP:_____

Initial Conditions: Reactor Power is 90%. EECW Pump A3 is out of service for maintenance.

Turnover: Complete Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9); start at step 7.3.

Raise reactor power to 100% after 3-SR-3.3.1.1.8(9).

Event No.	Malfunction Number	Event Type*	Event Description
1	N/A	N-BOP	Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9). Failure of RPS B to trip.
2	EG13A	C-BOP	Bus Duct Cooling Fan 3A trip
3	ED10B	C-BOP C-ATC TS-SRO	Loss of 480V S/D Board 3B and failure of RBCCW sectionalizing valve to auto-close.
4	MC04	C-BOP R-ATC C-SRO	Loss of Condenser Vacuum and power reduction.
5	RC03	C-BOP	RCIC Suction Pressure Trip
6	ED01	M-ALL	Loss of Offsite Power
7	DG01A	C-BOP	DG 3EA Fails to Auto start
8	TH21	M-All	LOCA
9	HP04	C-BOP	HPCI Steam Supply Valve fails to auto open.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

revd 4/7/15

Critical Tasks 2

1. RPV Level maintained above TAF ((-)162 inches)

1. Safety Significance:
   Maintaining adequate core cooling

2. Cues:
   RPV level indication

3. Measured by:
   Reactor level indication above (-)162 inches

4. Feedback:
   RPV level trend
   HPCI injection valve open indication

2. When Suppression Chamber Pressure exceeds 12 psig, initiate Drywell Sprays while in the safe region of the Drywell Spray Initiation Limit (DSIL) curve and before Drywell temperature rises to 280°F.

1. Safety Significance:
   Precludes failure of containment

2. Cues:
   Procedural compliance
   High Drywell Pressure and Suppression Chamber Pressure

3. Measured by:
   Observation - US directs Drywell Sprays IAW with EOI Appendix 17B
   AND
   Observation - RO initiates Drywell Sprays

4. Feedback:
   Drywell and Suppression Pressure lowering
   RHR flow to containment

Events

1. BOP will conduct Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9). When 3-SR-3.3.1.1.8(9) has been secured and the Tech Spec LCO declared. The Crew will call to have the RPS Logic Fuses pulled to insert a half scram. At the direction of the lead examiner the scenario may continue.

2. Bus Duct Cooling Fan 3A will trip and annunciator 3-XA-55-7A window 31, GEN BUS DUCT FAN FAILURE, will be received. The BOP operator will place the 3B Bus Duct Cooling Fan in service. When the 3B Bus Duct Cooling Fan is in service the scenario may continue.

3. The crew will respond to a loss of 480V Shutdown Board 3B. This will cause a loss of RPS B, loss of 480V RMOV BD 3B, 3C and 3E. The crew will need to restore power to the 480V RMOV Boards, reset RPS, reset PCIS and restore systems. The SRO will refer to Technical Specification 3.8.7 and determine conditions A, B, C, and D are required. Loss of the Shutdown Board will also result in entry into T.S 3.5.1 for Division 2 RHR LPCI because the power supply to the valves has been placed on its alternate source. PAM instrumentation LCO 3.3.3.1 and ODCM 1 / 2.1.1 for Radioactive Liquid Monitors. When power has been restored to the RMOV boards, the crew will respond to a trip of RBCCW Pump 3B IAW 3-AOI-70-1, and notice the RBCCW sectionalizing valve failing to auto close and manually closing the sectionalizing valve. When the Tech Spec calls are completed and the lead examiner is ready the scenario may continue.

4. Condenser Vacuum will begin to degrade causing the Crew to enter 3-AOI-47-3 and direct reducing reactor power in an attempt to maintain condenser vacuum. Condenser Vacuum will continue to degrade. The SRO will set a trigger value to trip the main turbine and scram the reactor before an automatic turbine trip occurs at approximately 24.3 inched Hg.

5. If the Crew attempts to place RCIC in service, it will trip on low suction pressure. It will remain unavailable from that point forward.

6. After the Reactor Scram on vacuum, a Loss of Offsite Power will occur. The crew will respond to the Reactor Scram IAW 3-AOI-100-1 and 0-AOI-57-1A.

7. During the LOOP DG 3EA will fail to automatically start and will have to be manually started and after it starts auto tie to the buss.

6. Sometime after the LOOP a LOCA will develop requiring the crew to use systems to maintain Reactor Level and Containment parameters.

7. The HPCI Steam Supply Valve, 3-FCV-73-16, will fail to OPEN on an automatic HPCI initiation signal, but can be initiated manually.

The scenario ends when Drywell Sprays have been initiated and Reactor Level is maintained above TAF ((-)162 inches) or upon request of Lead Examiner.

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Event Description: Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).

Time	Position	Applicant's Actions or Behavior
	BOP	**7.3 Turbine Control Valve, 3-FCV-1-75 (CV #1) Test** **NOTE** Indicator light 3-IL-099-5A-DS15B on Panel 9-17, Bay 1, will extinguish when jumper is installed in Step 7.3[1]. [1] **PERFORM** the following in Panel 3-9-17 (Bay 1), to simulate Turbine Control Valve, 3-FCV-1-80 (CV #2), is CLOSED: [1.1] **REMOVE** the back cover from RPS CH B1 CONTROL VALVE 3A FAST CLOSURE, 3-RLY-099-05AK08F (H3), if required (Otherwise N/A) [1.2] **INSTALL** jumper across contacts 3 to 4 on relay 3-RLY-099-05AK08F. Calls operator in Aux Instrument Room to install jumper on relay 99-05AK08F
	Driver	As operator in AIR, acknowledge jumpering contacts 3 to 4 on relay 3-RLY-099-05AK08F. Insert Trigger 1 (*irf rp15b jumpered)*
	BOP	[3] **CHECK** the following indications: • RPT SYS A TURB CONTROL VLV, 3-IL-099-5A-DS15A, on Panel 9-15, Bay 1, is illuminated. • RPT SYS A TURB CONTROL VLV, 3-IL-099-5A-DS15B, on Panel 9-17, Bay 1, is extinguished. [4] **ENSURE** Reactor power less than 95%. [5] **RECORD** valve position in terms of percent below. • CV-1, 3-ZI-1-75_____% • CV-2, 3-ZI-1-80_____% • CV-3, 3-ZI-1-85_____% • CV-4, 3-ZI-1-89_____% Calls operator in Aux Instrument Room to verify indications on panels 9-15 and 9-17 Verifies reactor power less than 95% Records control valve position

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Event Description: Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).

Time	Position	Applicant's Actions or Behavior
	Driver	As operator in AIR, report that 3-IL-099-5A-DS15A is illuminated and 3-IL-099-5A-DS15 is extinguished.
	BOP	**CAUTION** If power is not simulated, 3-HS-47-158 should be held in until reactor water level, reactor pressure, and neutron flux signals have stabilized to prevent flux spiking, which would cause a reactor scram. [6] **NOTIFY** the UO that performance of the following step will result in a channel A Half Scram. [7] **DEPRESS** and **HOLD** CV-1 TEST push-button, 3-HS-47-158, on Panel 3-9-7 until Step 7.3[12]. Updates crew that the next step will cause a channel A half scram Depresses and hold CV-1 TEST pushbutton [8] **CHECK** the following on Panel 3-9-5: • 3-IL-99-5A/AB, SYSTEM A BACKUP SCRAM VALVE, light on Panel 3-9-5 is extinguished. • 3-IL-99-5A/CD, SYSTEM B BACKUP SCRAM VALVE, light on Panel 3-9-5 is extinguished. • SCRAM SOLENOID GROUP A LOGIC RESET 1 red light on Panel 3-9-5 is extinguished. • SCRAM SOLENOID GROUP A LOGIC RESET 2 red light on Panel 3-9-5 is extinguished. • SCRAM SOLENOID GROUP A LOGIC RESET 3 red light on Panel 3-9-5 is extinguished. • SCRAM SOLENOID GROUP A LOGIC RESET 4 red light on Panel 3-9-5 is extinguished.

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Event Description: Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).

Time	Position	Applicant's Actions or Behavior
	BOP	[9] **CHECK** the following Annunciators are in alarm: • Annunciator REACTOR CHANNEL A AUTO SCRAM (3-XA-55-5B, window 1) is in alarm. • Annunciator TURB CONTROL VLV FAST CLOSURE HALF SCRAM (3-XA-55-4A, window 15) is in alarm. • Annunciator RPT SYS A TRIP 3-XA-68-72 (3-XA-55-4A window 11) is in alarm. Checks appropriate backup scram valve lights are extinguished and all four solenoid group A logic lights are extinguished
	BOP	Checks appropriate alarms are in alarm [10] **CHECK** RPT SYS A TURB CONTROL VLV light indicator 3-IL-099-5A-DS15A, on Panel 9-15, Bay 1, is extinguished [11] **CHECK** the following on ICS: • ICS point SOE042 displays TRIP condition. • ICS point SOE035 displays TRIP condition. • ICS point DIG081 displays TRIP condition Calls operator in aux instrument room to verify indication on panel 9-15 Verifies appropriate ICS points display TRIP condition
	Driver	As operator in AIR, report that 3-IL-099-5A-DS15A, on Panel 9-15, Bay 1, is extinguished.

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Event Description: Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).

Time	Position	Applicant's Actions or Behavior
	BOP	[12] **WHEN** Rx Water Level, Rx Pressure, and Neutron Flux signals have stabilized, **THEN** **RELEASE** CV-1 TEST push-button, 3-HS-47-158. [13] **RESET** RPS HALF SCRAM SIGNAL on 3-9-5. [14] **RESET** the following Panel annunciators: • **RESET** affected annunciators 3-HS-55-4 on Panel 3-9-4. • **RESET** affected annunciators 3-HS-55-5 on Panel 3-9-5. Releases TEST push-button Resets half scram signal and panel annunciators [15] **CHECK** the following on Panel 3-9-5: • All four SYSTEM A and SYSTEM B BACKUP SCRAM VALVE lights on Panel 3-9-5 are illuminated. • All eight SCRAM SOLENOID GROUP A & B LOGIC RESET lights on Panel 3-9-5 are illuminated. [16] **CHECK RESET** the following Annunciators: • REACTOR CHANNEL A AUTO SCRAM (3-XA-55-5B, window 1). • TURB CONTROL VLV FAST CLOSURE HALF SCRAM (3-XA-55-4A, window 15). • RPT SYS A TRIP 3-XA-68-72 (3-XA-55-4A window 11).
	BOP	Checks backup scram valve lights illuminated, scram solenoid lights illuminated and annunciators reset [17] **CHECK** the following on Panel 3-9-15: • Relay RPS CH A1 CONTROL VALVE 3A FAST CLOSURE, 3-RLY-099-05AK08E in Panel 9-15, Bay 1, is energized. • RPT SYS A TURB CONTROL VLV light indicator, 3-IL-099-5A-DS15A, on Panel 9-15, Bay 1, is illuminated.

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Event Description: Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).

Time	Position	Applicant's Actions or Behavior
		[18] **CHECK** the following on ICS: • ICS point SOE042 displays NOT TRIP. • ICS point SOE035 displays NOT TRIP. • ICS point DIG081displays NOT TRIP. Calls operator in aux instrument room to verify 3-RLY-099-05AK08E in Panel 9-15, Bay 1, is energized and 3-IL-099-5A-DS15A, on Panel 9-15, Bay 1, is illuminated. Verifies ICS computer points are indicating NOT TRIP
	Driver	As operator in aux instrument room report 3-RLY-099-05AK08E in Panel 9-15, Bay 1, is energized and 3-IL-099-5A-DS15A, on Panel 9-15, Bay 1, is illuminated.
	BOP	[20] **PERFORM** the following for Relay 3-RLY-099-05AK08F (Panel 3-9-17, Bay 1, H3): [20.1] **REMOVE** jumper from contacts 3 to 4 on relay 3-RLY-099-05AK08F. [20.2] **INSTALL** cover on back of relay if removed in Step 7.3[1] (Otherwise N/A). [21] **CHECK** RPT SYS A TURB CONTROL VLV light indicator, 3-IL-099-5A-DS15B, on Panel 9-17, Bay 1, is illuminated. (N/A this step if turbine first stage pressure is less than 30%.) Calls operator in aux instrument room to remove jumper and verify 3-IL-099-5A-DS15B, on Panel 9-17, Bay 1, is illuminated
	Driver	As operator in aux instrument room, insert *mrf rp15b norm* and report jumper removed and 3-IL-099-5A-DS15B, on Panel 9-17, Bay 1, is illuminated

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Event Description: Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).

Time	Position	Applicant's Actions or Behavior
	BOP	NOTE Failure to satisfactorily complete any step designated by (AC) requires immediate notification of the Unit Supervisor. The Cognizant Engineer should be notified in a timely manner. **7.4 Turbine Control Valve, 3-FCV-1-80 (CV #2) Test** [1] **PERFORM** the following in Panel 3-9-15 (Bay 1), to simulate Turbine Control Valve, 3-FCV-1-75 (CV #1), is CLOSED **NOTE** Indicator light 3-IL-099-5A-DS15A on Panel 9-15, Bay 1, will extinguish when jumpers are installed in Step 7.4[21]. [1.1] **REMOVE** the back cover from RPS CH B1 CONTROL VALVE 3A FAST CLOSURE, 3-RLY-099-05AK08E (H3), if required (Otherwise N/A) [1.2] **INSTALL** jumper across contacts 3 to 4 on relay 3-RLY-099-05AK08E. Calls operator in Aux Instrument Room to install jumper on relay 99-05AK08E
	Driver	As operator in AIR, acknowledge jumpering contacts 3 to 4 on relay 3-RLY-099-05AK08E. *Insert* **Trigger 11** *(mrf rp15a jumpered)*
	BOP	[3] **CHECK** the following indications: • RPT SYS A TURB CONTROL VLV, 3-IL-099-5A-DS15A, on Panel 9-15, Bay 1, is extinguished. • RPT SYS A TURB CONTROL VLV, 3-IL-099-5A-DS15B, on Panel 9-17, Bay 1, is illuminated. [4] **ENSURE** Reactor power less than 95%. [5] **RECORD** valve position in terms of percent below. • CV-1, 3-ZI-1-75_____% • CV-2, 3-ZI-1-80_____% • CV-3, 3-ZI-1-85_____% • CV-4, 3-ZI-1-89_____%

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Event Description: Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).

Time	Position	Applicant's Actions or Behavior
	BOP	Calls operator in Aux Instrument Room to verify indications on panels 9-15 and 9-17 Verifies reactor power less than 95% Records control valve position
	Driver	As operator in AIR, report that 3-IL-099-5A-DS15A is extinguished and 3-IL-099-5A-DS15 is illuminated
	BOP	**CAUTION** If power is not simulated, 3-HS-47-159 should be held in until reactor water level, reactor pressure, and neutron flux signals have stabilized to prevent flux spiking, which would cause a reactor scram. [6] **NOTIFY** the UO that performance of the following step will result in a channel A Half Scram. [7] **DEPRESS** and **HOLD** CV-1 TEST push-button, 3-HS-47-159, on Panel 3-9-7 until Step 7.4[12]. Updates crew that the next step will cause a channel B half scram Depresses and hold CV-2 TEST pushbutton [8] **CHECK** the following on Panel 3-9-5: • 3-IL-99-5A/AB, SYSTEM A BACKUP SCRAM VALVE, light on Panel 3-9-5 is extinguished. • 3-IL-99-5A/CD, SYSTEM B BACKUP SCRAM VALVE, light on Panel 3-9-5 is extinguished. • SCRAM SOLENOID GROUP B LOGIC RESET 1 red light on Panel 3-9-5 is extinguished • SCRAM SOLENOID GROUP B LOGIC RESET 2 red light on Panel 3-9-5 is extinguished. • SCRAM SOLENOID GROUP B LOGIC RESET 3 red light on Panel 3-9-5 is extinguished. • SCRAM SOLENOID GROUP B LOGIC RESET 4 red light on Panel 3-9-5 is extinguished. **Notes that B scram solenoid logic lights are illuminated.** **Informs SRO that a Channel B half scram did not occur.**

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Event Description: Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).

Time	Position	Applicant's Actions or Behavior
	SRO	Directs that the surveillance procedure be stopped Directs that jumper be removed to place system back to initial conditions
	Driver	As operator in aux instrument room, insert *mrf rp15a norm* and report that jumper across contacts 3 to 4 on relay 3-RLY-099-05AK08E has been removed
	Driver	**As operator in AIR, report that Relay 5A-K8B and 5A-K8F did not open (they are still shut)**
	SRO	Refers to Technical Specifications 3.3 INSTRUMENTATION 3.3.1.1 Reactor Protection System (RPS) Instrumentation LCO 3.3.1.1 The RPS instrumentation for each Function in Table 3.3.1.1-1 shall be OPERABLE. 9. Turbine Control Valve Fast Closure, Trip Oil Pressure Low >30% RTP 2 E One or more required channels inoperable. A.1 Place channel in trip. 12 hours OR A.2 ------NOTE---------- Not applicable for Functions 2.a, 2.b, 2.c, 2.d, or 2.f. ---------- Place associated trip system in trip. 12 hours Updates crew on Technical Specification requirements

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Event Description: Conducts Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9).

Time	Position	Applicant's Actions or Behavior
	SRO	Contacts the Work Control Center to pull fuse FU1-1-80CA (5A-F8B) in accordance with 3-OI-99, Illustration #3.
	Driver	As WCC respond to the request to pull the fuse. **Insert Trigger 12 to pull the fuse -**
	NRC	End of Event #1

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Event Description: Bus Duct Cooling Fan 3A trip

Time	Position	Applicant's Actions or Behavior
	Driver	When the NRC Chief Examiner is ready for Event No. 2, insert **Trigger 2** (malfunction to cause 'A' Bus Duct Cooling Fan to trip).
		Reports GEN BUS DUCT FAN FAILURE (3-XA-55-7A, Window 31) in alarm **ARP-9-7A** A. **VERIFY** Main Bus Cooling Fans, 3-HS-262-1A or 3-HS-262-2A, indicates running on Panel 3-9-8 **AND** **START** GEN BUS DUCT HX FAN A(B) using 3-HS-2-6-2-1A(2A), on panel 3-9-8 to start the standby fan. Reports 'A' Bus Duct Cooling Fan tripped Starts 'B' Bus Duct Cooling Fan Reports 'B' Bus Duct Cooling Fan in service Dispatches personnel to check 'A' Bus Duct Cooling Fan breaker and fan motor
	Driver	Acknowledge checking breaker and fan motor for 'A' Bus Duct Cooling Fan.
	NRC	End of Event #2

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

	Driver	When the NRC Chief Examiner is ready for Event #3, **insert Trigger 3** (malfunction to cause of loss of 480V S/D Board 3B).
	CREW	Responds to numerous alarms Diagnoses a loss of 480V Shutdown Board 3B and 480V RMOV Boards 3B and 3C and 3E.
	ATC	Reports that Reactor Power, Reactor Pressure and Reactor Level are stable following the board loss. Reports a loss of RPS 'B' and Ch. 'B' half scram.
	BOP	Responds to the following alarms; 8B-30, 8C-24, and 8C-31 480V SHUTDOWN BD 3B UV OR XFR (3-XA-55-8B, Window 30) **A. Overcurrent - trips and locks out normal Bkr and prevents manual transfer to alternate.** B. **IF** 480V Shutdown Bd 3B is lost, **THEN** Manually **TRANSFER** to alternate source by placing CS in **ALTERNATE** position on Panel 3-9-8. D. **IF** manual transfer is **NOT** accomplished, **THEN** **REFER** to Tech Spec 3.8.7 and 3.8.8 **Determines and reports that 3B 480V S/D Bd. cannot be transferred to alternate**

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
		Refers US to TS 3.8.7 and 3.8.8 Dispatches personnel to investigate the loss of 3B 480V S/D Bd 480V REACTOR MOV BD 3B OR 3E UV (3-XA-55-8C, Window 24) A. **CHECK** light indications for loss of any 480V equipment. D. **IF** undervoltage or transfer has occurred, **THEN** 1. **REFER TO** TS Section 3.8.7 2. **RESET** possible half-scram. **REFER TO** 3-OI-99. E. **REFER TO** 0-OI-57B to re-energize or transfer board. 480V REACTOR MOV BD 3C UV OR XFR (3-XA-55-8C, Window 31) A. **VERIFY** automatic action: B. **CHECK** light indications for loss of 480V equipment. Checks that Diesel Aux Board 3EB auto-transfers to 480 S/D Bd A. E. **REFER TO** 0-OI-57B to re-energize or transfer the board.
	BOP BOP	
		Directs entry into AOI-99-1, Loss of Power to One RPS Bus **AOI-99-1** **4.0 OPERATOR ACTIONS** **4.1 Immediate Action** [1] **STOP** all testing with potential RPS half-scrams or PCIS logic isolation signals.

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	BOP	**4.2 Subsequent Actions** **NOTES** 1) If power cannot be restored promptly to a de-energized RPS Bus, plant operation may continue until repairs are made provided all plant operational limits are met 2) Loss of RPS will isolate 3-RM-90-256, Drywell Air Monitor, and TS LCO 3.4.5 Condition B should be entered. [1] **VERIFY** automatic actions occur.
	SRO	[2] **VERIFY** Steam Tunnel Booster FAN operating by observation of MAIN STEAM LINE TUNNEL TEMPERATURE, 3-TIS-1-60A. [4] **IF** desired to place RPS Bus B on Alternate Supply, **THEN PERFORM** Step 4.2[9]. (Otherwise N/A) Dispatches personnel to transfer RMOV Bds 3B, 3C, and 3E to the alternate power source, then transfer RPS 'B' to alternate.
	Driver	After being dispatched to restore power, **wait 5 minutes then insert (bat) to restore power to RMOV Bds 3B/3C/3E. Then insert (bat) to restore power to RPS 'B' and reset ATU Gross Failures** Call US and report power restored to RPS 'B' and RMOV Bds 3B, 3C, and 3E. ATU GROSS FAILURES reset in AIR
	SRO	Updates the crew on power restoration Directs ATC to reset RPS logic half scram and PCIS

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	ATC	**AOI-99-1** **4.2 Subsequent Actions** [12] **RESET** the RPS trip logic half scram at Panel 3-9-5 as follows: **NOTE** The eight CONTROL ROD TEST SCRAM SOLENOID GROUP A and B LIGHTS SHOULD ILLUMINATE
	ATC	[12.1] **MOMENTARILY PLACE** SCRAM RESET, 3-HS-99-5A-S5, as follows: [12.2] RESET FIRST position. (Group 2/3) [12.3] RESET SECOND position. (Group 1/4) [12.4] NORMAL position. [13] **VERIFY** the following: [13.1] All eight SCRAM SOLENOID GROUP A/B LOGIC RESET lights ILLUMINATED. [13.2] The following four lights ILLUMINATED: [13.2.1] SYSTEM A BACKUP SCRAM VALVE, 3-IL-99-5A/AB. □ [13.2.2] SYSTEM B BACKUP SCRAM VALVE [13.3] Scram Discharge Volume vent and drain valves indicate OPEN.

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	BOP	[14] RESET PCIS trip logic at Panel 3-9-4 as follows: [14.1] **MOMENTARILY PLACE** PCIS DIV I RESET, 3-HS-64-16A-S32, to left and right RESET positions. [14.2] **CHECK** the following red lights ILLUMINATED: [14.2.1] MSIV GROUP A1, 3-IL-64-A1 [14.2.2] MSIV GROUP B1, 3-IL-64-B1 [14.3] **MOMENTARILY PLACE** PCIS DIV II RESET, 3-HS-64-16A-S33, to left and right RESET positions. [14.4] **CHECK** the following red lights ILLUMINATED: [14.4.1] MSIV GROUP A2, 3-IL-64-A2 [14.4.2] MSIV GROUP B2, 3-IL-64-B2
		[16] **RESET** the secondary containment isolation logic at Panel 3-9-25, as follows: [16.1] **PLACE** the REACTOR ZONE FANS AND DAMPERS switch, 3-HS-64-11A, to OFF. [16.2] **PLACE** REFUEL ZONE FANS AND DAMPERS Switch, 3-HS-64-3A, to OFF. [16.3] **VERIFY** only one SBGT trains operating. [17] **START** the Refuel Zone supply and exhaust fans, at Panel 3-9-25, as follows: [17.1] **PLACE** REFUEL ZONE FANS AND DAMPERS Switch, 3-HS-64-3A, in SLOW A (SLOW B) position. [18] **START** the Reactor Building supply and exhaust fans, at Panel 3-9-25, as follows: [18.1] **PLACE** the REACTOR ZONE FANS AND DAMPERS switch, 3-HS-64-11A, to the SLOW A(B) position.

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
		[19] **SECURE** remaining SBGT train per 0-OI-65 section 7.1. ◷ [20] **IF** fans transfer to fast speed is required after five minutes, **THEN**: **PLACE** the REACTOR ZONE FANS AND DAMPERS switch, 3-HS-64-11A, to the FAST A(B) position. [21] **IF** fans transfer to fast speed is required after five minutes, **THEN**: **PLACE** the REFUEL ZONE FANS AND DAMPERS switch, 3-HS-64-3A, to the FAST A(FAST B) position. [22] **REFER** to 3-OI-99 to restore remaining affected systems to operation following RPS Bus Power loss and **RETURN** to Step 4.2[23]

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to restore remaining affected systems IAW OI-99 Refers to Technical Specifications 3.8 ELECTRICAL POWER SYSTEMS 3.8.7 Distribution Systems – Operating LCO 3.8.7 The following AC and DC electrical power distribution subsystems shall be OPERABLE: b. Unit 3 480 V Shutdown Boards; c. Unit 3 480 V RMOV Boards 2A, 3B, 2D, and 3E; B. One Unit 3 480 V Shutdown Board inoperable. OR 480 V RMOV Board 3B inoperable — B.1 Restore Board to OPERABLE status — 8 hours C. Unit 3 480 V RMOV Board 3E inoperable — C.1 Declare the affected RHR subsystem Inoperable — Immediately D. One Unit 3 DG Auxiliary Board inoperable. — D.1 Restore Unit 3 DG Auxiliary Board to OPERABLE status. — 5 days AND 12 days from discovery of failure to meet LCO
	NRC	Tech Spec Actions C.1 and D.1 are required because the alternate power alignment is not credited in the safety analysis.

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	BOP	**OI-99** **8.5 Restoration to Normal Following RPS Bus Power Loss or Transfer** **NOTE** Steps 8.5[5] through 8.5[22] can be performed in any order. [5] **VERIFY** the green lights are ILLUMINATED on all 5 of the QLVPS located at Panel 9-14. [6] **RESTORE** Reactor and Refuel Zone Ventilation to normal operation. REFER TO 3-AOI-64-2D, Group 6 Ventilation System Isolation.
		AOI-64-2D **4.2 Subsequent Actions** [10] **WHEN** initiating signal has been corrected AND necessary repairs have been made, **THEN** [10.1] **VERIFY** PCIS RESET: • **RESET** PCIS DIV I RESET, 3-HS-64-16A-S32. • **RESET** PCIS DIV II RESET, 3-HS-64-16A-S33. [10.2] **RESET** Reactor/Refuel isolation logic as required: • **PLACE** REFUELING ZONE FANS AND DMPRS, 3-HS-64-3A in OFF. • **PLACE** REACTOR ZONE FANS AND DMPRS, 3-HS-64-11A in OFF. [10.3] **START** Reactor/Refuel zone ventilation as required: • **PLACE** REACTOR ZONE FANS AND DAMPERS switch, 3-HS-64-11A, in SLOW A (SLOW B). • **PLACE** REFUEL ZONE FANS AND DAMPERS Switch, 3-HS-64-3A, in SLOW A (SLOW B).

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
		[10.4] **VERIFY** for the fans started the dampers open and fans start as indicated by illuminated red lights above the following switches: • The two green lights A(B) above REFUEL ZONE FANS AND DAMPERS Switch, 3-HS-64-3A, extinguish and the two red lights A(B) illuminate. • The two green lights A(B) above REACTOR ZONE FANS AND DAMPERS Switch 3-HS-64-11A, extinguish and the two red lights A(B) illuminate. • REACTOR ZONE SPLY OUTBD ISOL DMPR, 3-HS-64-13. • REACTOR ZONE SPLY INBD ISOL DMPR, 3-HS-64-14. • REACTOR ZONE EXH INBD ISOL DMPR, 3-HS-64-42.
	BOP	• REACTOR ZONE EXH OUTBD ISOL DMPR, 3-HS-64-43. • REACTOR ZONE FANS AND DAMPERS, 3-HS-64-11A. • REFUEL ZONE SPLY OUTBD ISOL DMPR, 3-HS-64-5. • REFUEL ZONE SPLY INBD ISOL DMPR, 3-HS-64-6. • REFUEL ZONE EXH OUTBD ISOL DMPR, 3-HS-64-9. • REFUEL ZONE EXH INBD ISOL DMPR, 3-HS-64-10.
	BOP	[11] **NOTIFY** RADCON of the isolation restoration AND **REQUEST** surveys Restores ventilation and contacts radcon for surveys

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	Driver	As Radcon, acknowledge that ventilation has been restored and surveys need to be performed.
	BOP	**OI-99** **8.5 Restoration to Normal Following RPS Bus Power Loss or Transfer** [7] **RESTORE** Standby Gas Treatment System to standby readiness. REFER TO 0-OI-65, Section 7.0. Calls Unit 1 to have Standby Gas Treatment restored to standby readiness.
	Driver	As Unit 1 operator, acknowledge securing SBGT. Insert (bat) to secure SBGT trains.
	BOP	[8] At Panel 3-9-3, **PLACE** PSC head tank pumps in service as follows: • **PLACE** PSC PUMP SUCTION INBD ISOL VALVE, 3-HS-75-57A, in AUTO After OPEN. □ • **PLACE** PSC PUMP SUCTION OUTBD ISOL VALVE, 3-HS-75-58A, in AUTO After OPEN. □ • **PLACE** PSC HEAD TANK PUMPS 2A & 3B, 3-HS-75-75A & 3-HS-75-76A in AUTO. **NOTE** 3-FCV-64-139 and 3-FCV-64-140 opens and closes automatically when the Drywell DP Compressor starts and stops.

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
		[10] At Panel 3-9-3, **RESTORE** Drywell DP Compressor to automatic operation as follows: [10.1] **DEPRESS** DRYWELL DP COMP SUCTION VLV RESET pushbutton, 3-HS-64-139A. [10.2] **DEPRESS** DRYWELL DP COMP DISCH VLV RESET pushbutton, 3-HS-64-140A. [10.3] **VERIFY OPEN** DRYWELL INBD ISOLATION VLV using 3-HS-64-31. [10.4] **VERIFY OPEN** SUPPR CHBR INBD ISOLATION VLV using 3-HS-64-34. [11] At Panel 3-9-4, **RESTORE** Drywell Floor and Equipment Drain Systems to normal operation as follows: [11.1] **NOTIFY** Radwaste Operator that Drywell Equipment and Floor Drain Sump isolation valves are being reopened. [11.2] **PLACE** DW EQPT DRAIN INBD ISOL VALVE, 3-HS-77-15A, in AUTO After OPEN. [11.3] **PLACE** DW EQPT DRAIN OUTBD ISOL VALVE, 3-HS-77-15B, in AUTO After OPEN.
	BOP	[11.4] **PLACE** DW FLOOR DRAIN INBD ISOL VALVE, 3-HS-77-2A, in AUTO After OPEN. [11.5] **PLACE** DW FLOOR DRAIN OUTBD ISOL VALVE, 3-HS-77-3B, in AUTO After OPEN. [12] **IF** DW Radiation Monitor CAM, 3-RM-90-256 was secured due to a preplanned transfer, **THEN** (otherwise **N/A**)

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
		[13] **IF** DW Radiation Monitor CAM, 3-RM-90-256, isolated due to loss of RPS, **THEN** (otherwise **N/A**) **MOMENTARILY DEPRESS** the following RESET pushbuttons on Panel 3-9-2 and verify the associated valves open. • UPPER INBD SUPPLY ISOL VALVE RESET, 3-HS-90-254A-A (opens FCV-90-254A). • LOWER INBD SUPPLY ISOL VALVE RESET, 3-HS-90-254B-A (opens FCV-90-254B). • OUTBD RETURN ISOL VALVE RESET, 3-HS-90-257A-A (opens FCV-90-257A). • OUTBD SUPPLY ISOL VALVE RESET, 3-HS-90-255A (opens FCV-90-255). • INBD RETURN ISOL VALVE RESET, 3-HS-90-257B-A (opens FCV-90-257B). [14] At Panel 3-9-54, **PLACE** H2/O2 Analyzer in service per 3-OI-76. [15] At Panel 3-9-55, **VERIFY** PATH A VENT FLOW CONT, 3-FIC-84-20, in AUT0 with setpoint at 100 scfm.

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	BOP	[19] At Panels 3-9-10 and 3-9-11, **RESTORE** Radiation Monitoring System as follows: [19.1] **DEPRESS** applicable RESET pushbuttons. [19.2] **RESTORE** Radiation Monitoring System to normal. REFER TO 3-OI-90, Section 5.0. [21] At Panel 3-9-14, **VERIFY** APRM and RBM Memory lights **RESET** (If current plant conditions allow). [22] At Panel 3-9-13, **DEPRESS** TIP ISOLATION RESET pushbutton. [14] **RESET** PCIS trip logic at Panel 3-9-4 as follows: [14.1] **MOMENTARILY** PLACE PCIS DIV I RESET, 3-HS-64-16A-S32, to left and right RESET positions. [14.2] **VERIFY** the following red lights ILLUMINATED: [14.2.1] MSIV GROUP A1. [14.2.2] MSIV GROUP B1. [14.3] **MOMENTARILY** PLACE PCIS DIV II RESET, 3-HS-64-16A-S33, to left and right RESET positions.
	NRC	This completes restoration from the loss of RPS 'B' with the exception of RWCU.

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	BOP	**Loss of I&C Bus B** Enters 3-AOI-57-5B **3.0 AUTOMATIC ACTIONS** A. Panel 3-9-2 Cabinet 3 transfers to Alt. Pwr. Supply. B. RFP A and B min flow vlvs open causing FW flow to lower. C. Loss of 1/2 pwr sources to RFPT 3B Gov and Final Driver D. Loss of RFPT/RFP Vib Mon Equip for all three RFPT/RFPs. E. SJAE 3B isolates if in service. F. Reactor/Refuel zone ventilation isolates. G. Drywell Leak Detection System isolates. H. ±24V DC neutron monitoring battery chargers B1-3 & B2-3 trip. I. LP FW Htrs ext bypass vlvs open causing MWe to lower. J. FPD vlvs 78-64 & 67, Close. 78-65. K. RWCU filler demin 3B isolates. L. Loss of RM-90-259B (Control Bay Vent Rad Mon.). M. Loss of pwr to RR monitoring relay 3-RLY-068-MMR3/B, and digital frequency relay 3-RLY-068-DFR3/B. These relays will fail to initiate a trip to the 2 out of 3 logic trip system. Reports that I&C Bus has a loss of power and that the ± 24V DC Neutron Monitor Battery chargers tripped.
	SRO	Acknowledges the report of the I&C Bus loss. Evaluates the operability of the SRMs due to a loss of the 24V DC chargers.

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	NRC	**3B RBCCW Pump is not in service but looks like it is because control power is not lost.** **Once the RMOV Boards get transferred the sectionalizing valve on RBCCW will have power to operate, however it does not go closed.**
	ATC	Reports RBCCW PUMP DISCH. HDR PRESS LOW (3-XA-55-4C, Window 12) in alarm. **Recognizes an entry into 3-AOI-70-1 Loss of Reactor Building Closed Cooling Water.** **3.0 AUTOMATIC ACTIONS** RBCCW SECTIONALIZING VLV, 3-FCV-70-48, closes automatically on RBCCW Pump discharge header pressure δ 57 psig. **ARP-9-4C** A. **VERIFY** 3-FCV-70-48 CLOSING/CLOSED. B. **VERIFY** RBCCW pumps A and B in service. Recognizes and reports that sectionalizing valve 70-48 is not closing and attempts to close 70-48. If power has not been restored the valve will not move. Once the power has been transferred the ATC will have to give the valve a closed signal from the control switch. Reports 70-48 closed Contacts Work Control for a work order to investigate the failure of the 70-48 valve

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	BOP	Contacts Unit 1 to have the spare RBCCW Pump aligned and started to Unit 3, REFER TO 3-OI-70. **3-AOI-70-1** [5] **IF** RBCCW flow was restored to two pump operation, **THEN PERFORM** the following (Otherwise N/A): [5.1] **REOPEN** RBCCW SECTIONALIZING VLV, 3-HS-70-48A [5.2] **RESTORE** the RWCU system to operation. (REFER TO 3-OI-69).
	SRO	**List of LCOs entered on a loss of S/D Bus 3B.** 1. 3.8.7 Power Distribution a. B, 8 hour b. C, Immediately declare RHR inop 3.5.1 c. D, 5 day 2. 3.5.1 A.1 RHR Loop II; 7 day (RMOV Board E on Alt.) 3. ODCM 1/2.1.1 Radioactive Liquid Effluent Table 1.1 D. (3-RM-132 Raw Cooling Water, RBCCW, RHRSW Disch Rad monitors have lost power) 4. 3.3.3.1 PAM Instrumentation A.1 Drywell Temperature; 30 Day These LCOs were in until the RMOV Boards are transferred to alternate. Then they were exited. 5. 3.4.5 Leakage Detection – places the unit in TS 3.0.3

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Event Description: Loss of 480V S/D Board 3B and the RBCCW Sectionalizing valve does not close at the low pressure signal.

Time	Position	Applicant's Actions or Behavior
	Driver	Acknowledge investigating the failure of the 70-48 valve to automatically close. Also the request to have the spare RBCCW Pump placed in service to Unit 3. **Insert Remote function SW02**
	NRC	End of Event #3

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
	Driver	When the NRC Chief Examiner is ready for Event No. 4, insert malfunction for a loss of condenser vacuum.
	BOP	Reports OG HOLDUP LINE INLET FLOW HIGH (3-XA-55-53, Window 14) in alarm. **ARP-9-53** A. **VERIFY** holdup line flow on: 2. 3-FR-66-20, Off-gas flow to holdup volume, Panel 9-8. Checks off-gas flow and reports flow is high
	ATC	Reports degrading condenser vacuum
	SRO	Directs entering AOI-47-3 **AOI-47-3** **NOTE** Turbine trip is expected around 24.3 inches Hg as indicated on 3-XR-002-0026 due to differences between instrument taps for turbine trip and indicated vacuum. **4.2 Subsequent Actions** [1] **IF** ANY EOI entry condition is met, **THEN** **ENTER** the appropriate EOI(s). **CAUTION** [NRC/C] Operations outside of the allowable regions shown on the Recirculation System Operating Map could result in thermal-hydraulic power oscillations and subsequent fuel damage. **REFER TO** 3-GOI-100-12A for required actions and monitoring to be performed during a power reduction. [NCO 940245001]

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
		[2] **IF** unable to maintain hotwell pressure below -25 inches Hg as indicated on 3-XR-002-0026, with Reactor power less than 30%, **THEN** **TRIP** the main turbine. [3] **IF** condenser vacuum is lost, **THEN** **OPEN** the HOTWELL SAMPLE TO FL DR, 3-DRV-043-1019 (557'@ T-10 C-Line) and CON DEMIN SAMPLE TO FL DR, 3-DRV-043-1020 (557'@ T-6 G-Line), to establish flow through the sample lines.
	SRO	[4] **REDUCE** reactor power in an attempt to maintain condenser vacuum. [5] **VERIFY** automatic actions Sets a trigger value, on main condenser vacuum, to initiate a manual reactor scram and main turbine trip. Directs ATC to initiate any of the **RR Power Runback** in an attempt to maintain main condenser vacuum.
	ATC	**Initiates** any of the **Reactor Recirc Power Runbacks** and reports reactor power lowering. Monitors main condenser vacuum and reports that vacuum is continuing to degrade.

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
	BOP	**AOI-47-3** **4.2 Subsequent Actions** [6] **CHECK** CCW pumps for proper operation. [7] **VERIFY CLOSED** CONDENSER VAC BREAKERS 1A and 1B, 3-HS-66-1A, Panel 9-8. [8] **CHECK** OFF-GAS FLOW TO 6-HOUR HOLDUP VOLUME, 3-FR-66-20, Pnl 9-8, between 20 and 180 scfm. [9] **IF VERIFY OPEN**, 3-FCV-66-28, OFF-GAS SYSTEM ISOLATION VALVE [10] **IF** SJAE 3A is in service , **THEN VERIFY** the following: • 3-PCV-001-0151 and 3-PCV-001-0166 OPEN using STEAM TO SJAE 3A STAGES 1,2, AND 3, 3-ZI-1-151/166 on Panel 3-9-7. • SJAE 3A INTMD CONDENSER DRAIN, 3-ZI-1-150, on Panel 3-9-7, indicates OPEN. • 3-FCV-066-0011 OPEN using SJAE 3A INLET VALVE, 3-HS-66-11 on Panel 3-9-8. • Main Steam supply pressure at SJAE 3A STAGE I & II STEAM PRESS, 3-PI-001-0150, on 3-LPNL-925-0105, is being maintained between 190 and 225 psig. (TB EL 586' T12-C) [11] **IF** SJAE 3B is in service, **THEN VERIFY** the following **N/A** [12] **IF** a failure of the in-service SJAE is indicated, **THEN PLACE** the standby SJAE in service as follows: **N/A** **Verifies proper operation of CCW and in-service SJAE**

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
	SRO	Directs a manual reactor scram and main turbine trip
	ATC	Initiates a manual reactor scram **AOI-100-1** **Reactor Scram OATC Hard Card** **1.0 IMMEDIATE ACTIONS** [1] **DEPRESS** REACTOR SCRAM A and B, 3-HS-99-5A/S3A and 3-HS-99-5A/S3B, on Panel 3-9-5. [2] **IF** scram is due to a loss of RPS, **THEN** **PLACE** REACTOR MODE SWITCH, 3-HS-99-5A-S1, in START & HOT STBY **AND PAUSE** for approximately 5 seconds (Otherwise N/A)
		[3] Refuel Mode One Rod Permissive Light check: [3.1] **PLACE** REACTOR MODE SWITCH, 3-HS-99-5A-S1, in REFUEL. [3.2] **CHECK** illuminated REFUEL MODE ONE ROD PERMISSIVE light, 3-XI-85-46. [3.3] **IF** REFUEL MODE ONE ROD PERMISSIVE light, 3-XI-85-46, is **NOT** illuminated, **THEN** **CHECK** all control rod positions at Full-In Overtravel, or Full-In. (Otherwise N/A)

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
		[4] **PLACE** REACTOR MODE SWITCH, 3-HS-99-5A-S1, in SHUTDOWN. [5] **REPORT** the following status to the US: • Reactor Scram • Mode Switch is in Shutdown • "All rods in" or "rods out" • Reactor Water Level and trend (recovering or lowering) • Reactor pressure and trend • MSIV position (Open or Closed) • Power level Completes immediate operator actions and makes scram report Continues to monitor main condenser vacuum

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
	BOP	**Reactor Scram BOP Unit Operator Hard Card** **1.0 SUBSEQUENT ACTIONS: PANELS 3-9-7 & 3-9-8** **NOTES** 1) To OPEN PCB 224 with the control room handswitch, ONE of the following is required: 3-XA-55-8A window 7, GEN REVERSE PWR FIRST RELAY OPERATION 3-EA-57-136, WITH GENERATOR PCB 224 CNTR W/REV BYPASS, 3-HS-242-224A, placed in TRIP. OR GENERATOR PCB 224 CNTR W/REV BYPASS, 3-HS-242-224A, placed in BYPASS. 2) The following steps are not required to be performed in order, but only as required to maintain stable conditions.
	BOP	[1] At ≤ 50 MWe, or as directed by the Unit Supervisor, **VERIFY TRIPPED** the Main Turbine as follows: [1.1] **DEPRESS** the TRIP pushbutton, 3-HS-47-67D on Panel 3-9-7. [1.2] **VERIFY OPEN** GENERATOR PCB 224. [1.3] **VERIFY TRIPPED** VOLTAGE REGULATOR [2] **ANNOUNCE** Reactor SCRAM over PA system. Trips the main turbine and announces the reactor scram over the PA system. Reports the main turbine tripped.

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
		2.0 SUBSEQUENT ACTIONS: PANELS 3-9-3 **NOTE** The following steps are not required to be performed in order, but only as required to maintain stable conditions [1] **MONITOR** and **CONTROL** RPV pressure to keep below 1073 psig and stable. [2] **IF** any PCIS isolation signal is received, **THEN** **VERIFY** PCIS isolations using any of the following: (Otherwise N/A) • Containment Isolation Status System on Panel 3-9-4 Verifies that main turbine bypass valves are controlling reactor pressure Checks CISS panel and reports 2,3,6, and 8 PCIS isolations
	SRO	Enters EOI-1 on RPV Water Level below +2" **Verify** RX scram **RC/Q** **Monitor** and **Control** reactor power The reactor is subcritical AND NO boron has been injected **THEN** **EXIT** RC/Q and **ENTER** AOI-100-1, Reactor Scram

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
	SRO	Directs ATC to enter 3-AOI-100-1 **RC/L** CAUTION: Ambient temp may affect RPV water level indication and trend – **CHECKED** **MONITOR** and **CONTROL** RPV water level – **CHECKED** **VERIFY** each as required • PCIS isolations (Groups 1, 2, and 3) – **CHECKED** It has NOT been determined that the reactor will remain subcritical without boron under all conditions – **SUBCRITICAL** RPV water level CANNOT be determined – **CAN** PC water level CANNOT be maintained below 105 ft - **CAN** OR Suppression chamber press CANNOT be maintained below 55 psig - **CAN** CAUTION #2 Pump NPSH and Vortex Limits #3 Elevated suppression chamber press may trip RCIC #6 HPCI or RCIC suction temp above 140°F – **CHECKED** RESTORE and MAINTAIN RPV water level between +2 in and +51 in with ANY of the following CNDS and FW 5A CRD 5B RCIC with CST suction if available 5C HPCI with CST suction if available 5D CNDS 6A CS 6D,6E LPCI 6B, 6C

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
	SRO	Directs ATC to restore and maintain reactor level between +2 in and +51 in using Condensate and Feedwater in accordance with Appendix 5A **RC/P** DW press is above 2.4 psig - **NO** Emergency RPV depressurization is anticipated - **NO** AND The reactor will remain subcritical without boron under all conditions Emergency RPV depressurization is or has been required - **NO** RPV water level CANNOT be determined - **CAN** Is ANY MSRV cycling - **NO** Steam cooling is required - **NO** Suppr pl temp and level CANNOT be maintained in a safe area of Curve 3 at the existing RPV press - **CAN** Suppression pool level CANNOT be maintained in the safe area - **CAN** of Curve 4 DW control air becomes unavailable - **AVAIL** Boron injection is required - **NO** AND The main condenser is available AND There has been no indication of a steam line break

		STABILIZE RPV press below 1073 psig with the main turbine bypass vlvs (APPX 8B)

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to control reactor pressure 800 psig to 1000 psig in accordance with Appendix 8B
	BOP	Recognizes and reports that main turbine bypass valves have closed due to the loss of vacuum
	ATC	Recognizes and reports Reactor Feedwater Pumps tripped due to loss of vacuum
	SRO	Directs BOP to restore and maintain RPV water level between +2 in. and +51 in. with RCIC using App 5C EOI-1 RC/P **AUGMENT** RPV press control as necessary with ANY of the following MSRVs ONLY when suppr level is above 5.5 ft 11A Directs BOP to maintain RPV pressure 800 psig to 1000 psig using MSRVs, App. 11A

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Event Description: Loss of Condenser Vacuum

Time	Position	Applicant's Actions or Behavior
		Appendix-11A 1.0 INSTRUCTIONS [[3] **OPEN** MSRVs using the following sequence to control RPV pressure as directed by SRO: 1 3-PCV-1-179 MSL A RELIEF VALVE 2 3-PCV-1-180 MSL D RELIEF VALVE 3 3-PCV-1-4 MSL A RELIEF VALVE 4 3-PCV-1-31 MSL C RELIEF VALVE 5 3-PCV-1-23 MSL B RELIEF VALVE 6 3-PCV-1-42 MSL D RELIEF VALVE 7 3-PCV-1-30 MSL C RELIEF VALVE 8 3-PCV-1-19 MSL B RELIEF VALVE 9 3-PCV-1-5 MSL A RELIEF VALVE 10 3-PCV-1-41 MSL D RELIEF VALVE 11 3-PCV-1-22 MSL B RELIEF VALVE 12 3-PCV-1-18 MSL B RELIEF VALVE 13 3-PCV-1-34 MSL C RELIEF VALVE
	BOP	**Controls RPV pressure 800 psig to 1000 psig IAW App 11A**
	NRC	**End of Event #4**

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Event Description: RCIC Isolation

Time	Position	Applicant's Actions or Behavior
	BOP	**EOI APPENDIX-5C** **CAUTION** • Operating RCIC turbine below 2100 rpm may result in unstable system operation and equipment damage. • High Suppression Chamber pressure may trip RCIC. • Operating RCIC Turbine with suction temperatures above 140°F may result in equipment damage.
	BOP	3. **VERIFY RESET** and **OPEN** 3-FCV-71-9, RCIC TURB TRIP/THROT VLV. 4. **VERIFY** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller in AUTO with setpoint at 620 gpm. 5. **OPEN** the following valves: • 3-FCV-71-39, RCIC PUMP INJECTION VALVE • 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE • 3-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV. 6. **PLACE** 3-HS-71-31A, RCIC VACUUM PUMP, handswitch in START. 7. **OPEN** 3-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV, to start RCIC Turbine.

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Event Description: RCIC Isolation

Time	Position	Applicant's Actions or Behavior
		8. **CHECK** proper RCIC operation by observing the following: a. RCIC Turbine speed accelerates above 2100 rpm. b. RCIC flow to RPV stabilizes and is controlled automatically at 620 gpm. c. 3-FCV-71-40, RCIC TESTABLE CHECK VLV, opens by observing 3-ZI-71-40A, DISC POSITION, red light illuminated. d. 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE, closes as flow rises above 120 gpm. 10. **ADJUST** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller as necessary to control injection.
	Driver	**Insert Trigger 5 to cause the Inboard Steam Supply Valve to close.**
	BOP	Starts RCIC IAW App 5C and restores and maintains RPV water level +2 in to +51 in. Notices that RCIC has isolated and is unavailable for level or pressure control. Updates Crew that RCIC is unavailable.
	NRC	End of Event #5

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Event Description: Loss of Offsite Power

Time	Position	Applicant's Actions or Behavior
	Driver	When the NRC Chief Examiner is ready for Event No. 6, **insert Trigger 6** (loss of offsite power with a failure of 'A' Diesel Generator to automatically start)
	CREW	Recognize and report that a loss of offsite power has occurred.
	SRO	Directs entry into AOI-57-1A
	BOP	**AOI-57-1A** **4.0 OPERATOR ACTIONS** **4.1 Immediate Actions** **NOTE** Performing this instruction, in conjunction with an earthquake, may require resetting the individual Diesel Generator's 86G Lockout Relay and the Field Breaker(both locally at the Diesel Generator electrical cabinet). [1] **VERIFY** Diesel Generators have started and tied to respective 4kV Shutdown Boards, **THEN** **DISPATCH** personnel to Diesel Generators
	NRC	When the BOP operator checks on the status of the Diesel Generators, it would initiate Event No. 8, Failure of the 'A' Diesel Generator to automatically start.
	BOP	Dispatches personnel to monitor the Diesel Generators
	Driver	As AUO, acknowledge monitoring diesel generators

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Event Description: Loss of Offsite Power

Time	Position	Applicant's Actions or Behavior
	BOP	[2] **VERIFY** two EECW Pumps (not using the same EECW strainer) are in service supplying Diesel Generators. [3] **IF** two EECW Pumps (not using the same EECW strainer) are not in service supplying Diesel Generators, **THEN PERFORM** Attachment 9 (Cooling water is required to be established within 8 minutes) (Otherwise N/A). [4] **PERFORM** the following to ensure at least one train of Diesel Generator Room Fans are energized: • **VERIFY** 480V DSL Aux Board A or B energized. **NOTE** The following subsequent actions may be performed out of order, depending on plant conditions.
	BOP	Performs actions IAW AOI-57-1A. Recognizes Diesel Generator 'A' failed to start. Starts 'A' D/G and verifies tied to 4kV S/D Bd. **4.2 Subsequent Actions** **NOTES** 1) SBO Unit does attachment 12 only; the other two units perform subsequent actions of AOI. 2) If a Unit is in a Station Blackout condition, performance of this instruction will also require implementation of 1(2)(3)-AOI-30B-1, Reactor Building Ventilation Failure, on the Unit in Station Blackout. 3) The following is the preferred pump combinations of Unit 1 and Unit 3 RHR pumps used in SDC: 1B/2D, 1A/3C, 1A/2D, 1B/3C. By using these pumps it ensures that a loss of a Diesel during a station blackout would not result in a loss of Shutdown cooling for both Unit 1 and Unit 3.

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Event Description: Loss of Offsite Power

Time	Position	Applicant's Actions or Behavior
		[1] **IF** ANY EOI entry condition is met, **THEN REFER TO** the appropriate EOI(s). (Otherwise N/A) [2] **IF** any Unit is under a "Station Blackout" **THEN ONLY PERFORM** Attachment 12 for that Unit: - **NA** [3] **VERIFY** automatic actions and **PERFORM** any that failed to occur. [4] **REFER TO** 1(2)(3)-AOI-78-1, FPC System Failure for a complete Loss of AC POWER, as necessary. **NOT NEC** **NOTES** 1) EECW supply valves to the Control Air Compressors and RBCCW are air operated. If initial air pressure is low, air compressors may trip on high temperature, until cooling water flow is established. 2) At US discretion, the 0-FCV-67-53 valve can be placed in the open position with hand switch. The valve will automatically come open once EECW pressure is above setpoint. **REFER TO** OI-67 for valve operation.
	BOP	3) The North header supply to Unit 1 RBCCW, the North header supply to Unit 3 RBCCW and the South header supply to Unit 3 RBCCW are normally isolated with a manual valve; therefore no flow will occur when either 1-FCV-67-50, 3-FCV-67-50 or 3-FCV-67-51 opens. [5] **WHEN** EECW header pressure is restored above the reset pressure setpoint (psig) for the valves listed below, **THEN** Common / Unit 1 / Unit 2 / Unit 3 0-FCV-67-53: 106 FCV-67-50: 90 / 91 / 92 FCV-67-51: 107 / 109 / 113

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Event Description: Loss of Offsite Power

Time	Position	Applicant's Actions or Behavior
		RESET EECW supplies to Control Air Compressors and RBCCW, at Unit 1 Panel 1-LPNL-925-0032 and Unit 2,3 Panels 2(3)-25-32. **REFER TO** the EECW to the RCW Crossties for Control Air & RBCCW section of 0-OI-67. [6] **START** Control Air Compressors A, D and G as required and **MONITOR** system pressure. **REFER TO** 0-AOI-32-1. [6.1] **IF** an air compressor trips on high temperature, **THEN** (Otherwise N/A) **NOTIFY** Unit Supervisor for instructions. [8] **PLACE** RPS MG Sets A and B in service. **REFER TO** 1(2,3)-OI-99. [9] **START** the Diesel Driven Fire Pump. **REFER TO** 0-OI-26. Calls for Control Air Compressors and EECW to be reset and for RPS to be reenergized.
	Driver	As outside personnel, acknowledge restoring control air, resetting EECW and restoring RPS. Wait 5 minutes, then insert (bat) Call control room and report that control air has been restored, EECW has been reset and RPS has been restored.
	ATC/BOP	Reports that MSIVs are closed IF bulk suppression pool temperature reaches 95°F, notifies SRO of EOI-2 entry condition.
	SRO	When suppression pool temperature reaches 95°F, enters EOI-2 Enters EOI-2 on Supp Pl Temp above 95°F .

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Event Description: Loss of Offsite Power

Time	Position	Applicant's Actions or Behavior
	SRO	SAMG entry is required and the TSC SAM team has assumed command and control - **NO** SAMG entry is required - **NO** CAUTION **#4** PC press vs pump NPSH - **CHECKED** DW sprays have been initiated - **NO** Suppression chamber sprays have been initiated - **NO** PC water level CANNOT be restored and maintained below 105 ft - **CAN** OR Suppression chamber press CANNOT be restored and maintained below 55 psig - **CAN** **SP/T** CAUTION **#2** Pump NPSH and Vortex Limits **MONITOR** and **CONTROL** suppr pl temp below 95°F using available suppr pl cooling (APPX 17A) – **CHECKED** WHEN suppr pl temp CANNOT be maintained below 95°F **OPERATE** all available suppr pl cooling using only RHR pumps NOT required to assure adequate core cooling by continuous injection (APPX 17A) Directs BOP to put all available suppression pool cooling in service IAW App 17A
	BOP	EOI APPENDIX-17A NOTE: Placing a BYPASS SEL switch in BYPASS in step 1 below prevents automatic opening of the affected RHR loop's outboard injection valve. This makes LPCI mode of that RHR loop inoperable.

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Event Description: Loss of Offsite Power

Time	Position	Applicant's Actions or Behavior
	BOP	1. IF.....Adequate core cooling is assured, **OR** Directed to cool the Suppression Pool irrespective of adequate core cooling, THEN.....**BYPASS** LPCI injection valve open interlock AS NECESSARY: • **PLACE** 3-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in BYPASS. • **PLACE** 3-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in BYPASS. 2. **PLACE** RHR SYSTEM I(II) in Suppression Pool Cooling as follows: a. **VERIFY** at least one RHRSW pump supplying each EECW header. b. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger(s). c. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1350 and 4500 gpm RHRSW flow: • 3-FCV-23-34, RHR HX 2A RHRSW OUTLET VLV • 3-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV • 3-FCV-23-40, RHR HX 3C RHRSW OUTLET VLV • 3-FCV-23-52, RHR HX 2D RHRSW OUTLET VLV d. IF ..... Directed by SRO, THEN.....**PLACE** 3-XS-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD in MANUAL OVERIDE e. IF .....LPCI Initiation signal exists, THEN.....**MOMENTARILY PLACE** 3-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT in SELECT. f. IF ..... 3-FCV-74-53(67), RHR SYS I(II) LPCI INBD INJECT VALVE, is OPEN, THEN..... **VERIFY CLOSED** 3-FCV-74-52(66), RHR SYS I(II) LPCI OUTBD INJECT VALVE. g. **OPEN** 3-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV h. **VERIFY** desired RHR pump(s) for Suppression Pool Cooling are operating.

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Event Description: Loss of Offsite Power

Time	Position	Applicant's Actions or Behavior
	BOP	**CAUTION** RHR system flows below 7000 gpm or above 10000 gpm for one-pump operation may result in excessive vibration and equipment damage. i. **THROTTLE OPEN** 3-FCV-74-59(73), RHR SYS I(II) SUPPR POOL CLG/TEST VLV, to maintain EITHER of the following as indicated on 3-FI-74-50(64), RHR SYS I(II) FLOW: • Between 7000 and 10000 gpm for one-pump operation. **OR** • At or below 13000 gpm for two-pump operation. ____ j. **VERIFY CLOSED** 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE. k. **MONITOR** RHR Pump NPSH using Attachment 1. l. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers. Places RHR in Suppression Pool Cooling IAW App 17A Reports Suppression Pool Cooling in service Contacts Chemistry to reports RHRSW aligned to in service RHR Heat Exchangers.
	Driver	As Chemistry, acknowledge that RHRSW has been aligned to RHR Heat Exchangers.
	SRO	Refers to Technical Specifications for SPT 3.6 CONTAINMENT SYSTEMS 3.6.2.1 Suppression Pool Average Temperature LCO 3.6.2.1 Suppression pool average temperature shall be: a. <95°F when any OPERABLE intermediate range monitor (IRM) channel is > 70/125 divisions of full scale on Range 7 and no testing that adds heat to the suppression pool is being performed;

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Event Description: Loss of Offsite Power

Time	Position	Applicant's Actions or Behavior		
	SRO	A. Suppression pool average temperature ≥ 95°F but ≤110°F. AND Any OPERABLE IRM channel > 70/125 divisions of full scale on Range 7 AND Not performing testing That adds heat to the suppression pool	Verify suppression pool temperature ≤110°F AND Restore suppression pool average temperature to ≤95°F	Once/hr 24 hours
	NRC	End of Event #6		

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Event Description: DG A Fails to Auto start

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes and reports that 'A' Diesel Generator has failed to start Starts 'A' Diesel Generator Verifies the 'A' Diesel Generator ties to 4kV Shutdown Board 'A' Reports that 'A' Diesel Generator has been started and that the diesel generators are tied to all 4kV Shutdown Boards.
	NRC	End of Event #7

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	Driver	When the NRC Chief Examiner is ready for Event No. 8, **insert Trigger 8** (LOCA and a failure of the HPCI steam supply valve to open automatically).
	ATC	Reports reactor water level lowering
	BOP	Reports drywell pressure rising
	SRO	Reenters EOI-1on reactor water level **RESTORE** and **MAINTAIN** RPV water level between +2 in. and +51 in. with ANY of the following: CRD 5B RCIC with CST suction if available 5C HPCI with CST suction if available 5D Directs BOP to start HPCI IAW App 5D Directs ATC to maximize CRD IAW App 5B
	NRC	When BOP operator starts **HPCI** OR if HPCI gets an initiation signal due to rising drywell pressure or low reactor water level **refer to Event 9 page 62.**

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
		EOI Appendix-5D **1.0 INSTRUCTIONS** [4] **VERIFY** at least one SGTS train in operation. **CAUTIONS** 1) Operating HPCI Turbine below 2400 rpm may result in unstable system operation and equipment damage. 2) Operating HPCI Turbine with suction temperatures above 140°F may result in equipment damage. [1] **VERIFY** 3-FIC-73-33, HPCI SYSTEM FLOW/CONTROL, controller is in one of the following configurations, as desired: • in AUTO and set for 5300 gpm for rapid injection • in AUTO and set for approximately 2500 gpm for slower injection • in MANUAL with output at approximately 50% for slower injection.
		NOTE HPCI Auxiliary Oil Pump will NOT start UNTIL 3-FCV-73-16, HPCI TURBINE STEAM SUPPLY VLV, starts to open. [2] **IF** high reactor water level trip logic is actuated, **THEN** [2.1] **DEPRESS** HPCI TURBINE TRIP RX LEVEL HIGH RESET pushbutton. [2.2] **CHECK** HPCI TURBINE TRIP LEVEL HIGH amber light has extinguished. [3] **PLACE** HPCI AUXILIARY OIL PUMP handswitch in START. [4] **PLACE** HPCI STEAM PACKING EXHAUSTER handswitch in START. [5] **OPEN** the following valves: • 3-FCV-73-30, HPCI PUMP MIN FLOW VALVE • 3-FCV-73-44, HPCI PUMP INJECTION VALVE.

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	[6] **OPEN** 3-FCV-73-16, HPCI TURBINE STEAM SUPPLY VLV, to start HPCI Turbine. [7] **CHECK** proper HPCI operation by observing the following: A. HPCI Turbine speed accelerates. B. 3-FCV-73-45, HPCI TESTABLE CHECK VLV, opens by observing 3-ZI-73-45A, DISC POSITION, red light illuminated. C. HPCI flow to RPV stabilizes and is controlled automatically at the setpoint. (N/A if controller in manual). D. 3-FCV-73-30, HPCI PUMP MIN FLOW VALVE, closes as flow exceeds approximately 1200 gpm. [8] **ADJUST** 3-FIC-73-33, HPCI SYSTEM FLOW/CONTROL, controller as necessary to control injection.
	BOP	[9] **VERIFY** HPCI Auxiliary Oil Pump stops and the shaft-driven oil pump operates properly. [10] **WHEN** HPCI Auxiliary Oil Pump stops, **THEN** **PLACE** HPCI AUXILIARY OIL PUMP handswitch in AUTO. Injects to the reactor vessel with HPCI IAW App 5D
		EOI Appendix-5B **1.0 INSTRUCTIONS** [2] **IF** BOTH of the following exists, • CRD is NOT required for rod insertion, **AND** • Maximum injection flow is required, **THEN** **LINE UP** ALL available CRD pumps to the RPV as follows: [2.2] **IF** CRD Pump 3B is available, **THEN** **VERIFY** RUNNING CRD Pump 3B.

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	ATC	**CAUTION** Failure to maintain CRD system pressure above 1450 psig on 3-PI-85-13A could result in pump runout. [2.3] **OPEN** the following valves to increase CRD flow to the RPV: • 3-PCV-85-23, CRD DRIVE WATER PRESS CONTROL VLV • 3-PCV-85-27, CRD CLG WATER PRES CONTROL VLV • 3-FCV-85-50, CRD EXH RTN LINE SHUTOFF VALVE. [2.4] **ADJUST** 3-FIC-85-11, CRD SYSTEM FLOW CONTROL to control injection WHILE maintaining 3-PI-85-13A, CRD ACCUM CHG WTR HDR PRESS, above 1450 psig, if possible.
	ATC	Maximizes CRD flow to the RPV IAW App 5B Reports that RPV water level is continuing to lower
	SRO	**EOI-1, RC/L** RPV water level can be restored and maintained above (-)162 inches. **INHIBIT** ADS AND The ADS timer has initiated Directs BOP to Inhibit ADS
	BOP	Inhibits ADS. Verifies inhibited and reports ADS inhibited.

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
		#3 Elevated suppression chamber press may trip RCIC **#6** HPCI or RCIC suction temp above 140°F **IF** RPV water level CANNOT be restored and maintained between +2 in. and +51 in.
	SRO	**THEN RESTORE** and **MAINTAIN** RPV water level above (-)162 inches. **AUGMENT** RPV water level control as necessary with ANY of the following: SLC (boron tank) 7B Directs ATC to initiate SLC from the boron tank IAW App 7B
		EOI Appendix-7B **1.0 INSTRUCTIONS** [2] **IF** RPV injection is needed immediately ONLY to prevent or mitigate fuel damage, **THEN** **CONTINUE** at Step 1.0[10] to inject SLC Boron Tank to RPV
	ATC	[10] **UNLOCK** and **PLACE** 3-HS-63-6A, SLC PUMP 3A/3B, control switch in START-A or START-B (Panel 9-5). [11] **CHECK** SLC injection by observing the following: • Selected pump starts, as indicated by red light illuminated above pump control switch. • Squib valves fire, as indicated by SQUIB VALVE A and B CONTINUITY blue lights extinguished. □ • SLC SQUIB VALVE CONTINUITY LOST Annunciator in alarm (3-XA-55-5B, Window 20).

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	ATC	• 3-PI-63-7A, SLC PUMP DISCH PRESS, indicates above RPV pressure. • System flow, as indicated by 3-IL-63-11, SLC FLOW, red light illuminated, • SLC INJECTION FLOW TO REACTOR Annunciator in alarm (3-XA-55-5B, Window 14). Injects SLC to the RPV IAW App 7B
	SRO	EOI-1, RC/L Can RPV water level be restored and maintained above -162 in. NO C1, Alternate Level Control Enter C1, Alternate Level Control
	BOP	Reports drywell temperature and pressure continuing to rise
		Re-enters EOI-2 on Drywell Temperature and Pressure **PC/H** H2 and O2 monitoring system is inoperable - **OPERABLE** Offsite radioactivity release rate reaches ODCM limits - **NO** OR H_2 is NO longer detected in PC (2.4% on control room indicators) - **DETECTED** Verify H_2O_2 analyzer in service (APP 19) When H_2 is detected in PC (2.4% on control room indicators continue – **STOPS** **SP/L** Primary Containment Flooding is required - **NO** AND SAMG entry is NOT required

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	SRO	**MONITOR** and **CONTROL** suppression pool level between -1 in. and -6 in. (APPX 18) - **CHECKED** Can suppression pool level be maintained above -6 in. – **YES**
	SRO	Can suppression pool level be maintained below -1 in. – **YES** **PC/P** **MONITOR** and **CONTROL** PC press below 2.4 psig using the Vent system (AOI-64-1) – **CHECKED** WHEN PC press CANNOT be maintained below 2.4 psig – **CONTINUES** **BEFORE** suppression chamber press rises to 12 psig **CONTINUE** - **CONTINUES** CAUTION **#2** PUMP NPSH and Vortex Limits INITIATE suppression chamber sprays using only pumps NOT required to assure adequate core cooling by continuous injection (APPX 17C) Directs BOP to initiate Suppression Chamber Sprays using APP 17C
		EOI APPENDIX-17C 1. BEFORE Suppression Chamber pressure drops below 0 psig, **CONTINUE** in this procedure at Step 6. 2. IF ..... Adequate core cooling is assured **OR** Directed to spray the Suppression Chamber irrespective of adequate core cooling, THEN ... **BYPASS** LPCI injection valve open interlock as necessary:

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	• **PLACE** 3-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS**. • **PLACE** 3-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.** 3. IF ..... Directed by SRO to spray the Suppression Chamber using Standby Coolant Supply, THEN ... **CONTINUE** in this procedure At Step 7 using RHR Loop I OR At Step 8 using RHR Loop II. 4. IF ..... Directed by SRO to spray the Suppression Chamber using Fire Protection, THEN ... **CONTINUE** in this procedure at Step 9. 5. **INITIATE** Suppression Chamber Sprays as follows: a. **VERIFY** at least one RHRSW pump supplying each EECW header. b. IF.....EITHER of the following exists: • LPCI Initiation signal is NOT present, **OR** • Directed by SRO, THEN...**PLACE** keylock switch 3-XS-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE. c. **MOMENTARILY PLACE** 3-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT, switch in SELECT. d. IF.....3-FCV-74-53(67), RHR SYS I(II) INBD INJECT VALVE, is OPEN, THEN...**VERIFY CLOSED** 3-FCV-74-52(66), RHR SYS I(II) OUTBD INJECT VALVE. e. **VERIFY OPERATING** the desired RHR System I(II) pump(s) for Suppression Chamber Spray.

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	f. **VERIFY OPEN** 3-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV. g. **OPEN** 3-FCV-74-58(72), RHR SYS I(II) SUPPR CHBR SPRAY VALVE. h. IF.....RHR System I(II) is operating ONLY in Suppression Chamber Spray mode, THEN...**CONTINUE** in this procedure at Step 5.k. k. **MONITOR** RHR Pump NPSH using Attachment 2. l. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger(s). m. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1350 and 4500 gpm flow: • 3-FCV-23-34, RHR HX 2A RHRSW OUTLET VLV • 3-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV • 3-FCV-23-40, RHR HX 3C RHRSW OUTLET VLV • 3-FCV-23-52, RHR HX 2D RHRSW OUTLET VLV. n. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers Initiates and reports Suppression Chamber sprays in service IAW App 17C Calls Chemistry to report that RHRSW is aligned to in-service RHR Heat Exchangers
	Driver	As Chemistry, acknowledge that RHRSW is aligned to RHR heat exchangers

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	SRO	**DW/T** CAUTION **#1** Ambient temp may affect RPV water level indication and trend **MONITOR** and **CONTROL** DW temp below 160°F using available DW cooling DW - **CHECKED** WHEN DW temp CANNOT be maintained below 160°F - **CONTINUES** **OPERATE** all available DW cooling DW – **IN SERVICE** **BEFORE** DW temp rises to 200°F – **CONTINUES** Verifies reactor scrammed
	BOP	Reports Suppression Chamber pressure is greater than 12 psig
	SRO	**PC/P** WHEN suppression chamber press exceeds 12 psig - **CONTINUES** Is suppression pool level below 19 ft. – **YES** Is DW temp within the safe area of Curve 5 Verifies in the safe area – **YES** **SHUTDOWN** Recirc pumps and DW blowers Verifies recirc pumps shutdown and directs BOP to shutdown DW blowers
	BOP	Secures all DW blowers and reports all DW blowers shutdown

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	SRO	**#2** Pump NPSH and Vortex Limits **INITIATE** DW sprays using only pumps NOT required to assure adequate core cooling by continuous injection (APPX 17B Directs BOP to initiate DW Sprays IAW App 17B
	BOP	**EOI APPENDIX-17B** 1. BEFORE drywell pressure drops below 0 psig, **CONTINUE** in this procedure at Step 7. 6. **INITIATE** Drywell Sprays as follows: e. **VERIFY OPERATING** the desired System I(II) RHR pump(s) for Drywell Spray. f. **OPEN** the following valves: • 3-FCV-74-60(74), RHR SYS I(II) DW SPRAY OUTBD VLV • 3-FCV-74-61(75), RHR SYS I(II) DW SPRAY INBD VLV. g. **VERIFY CLOSED** 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE. h. IF.....Additional Drywell Spray flow is necessary, THEN...**PLACE** the second System I(II) RHR Pump in service. Initiates and reports DW Sprays in service IAW App 17B Reports DW pressure and temperature lowering

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
		Critical Task **When Suppression Chamber Pressure exceeds 12 psig, initiate Drywell Sprays while in the safe region of the Drywell Spray Initiation Limit (DSIL) curve and before Drywell temperature rises to 280°F.** 1.Safety Significance: Precludes failure of containment 2.Cues: Procedural compliance High Drywell Pressure and Suppression Chamber Pressure 3. Measured by: Observation - US directs Drywell Sprays IAW with EOI Appendix 17B **AND** Observation - RO initiates Drywell Sprays 4.Feedback: Drywell and Suppression Pressure lowering RHR flow to containment This Critical Task is **not met** if DW Pressure reaches 26 psig or DW Temperature reaches 280°F before Sprays are initiated.
		Briefs crew on current plant status. **C/1** CAUTION #1 Ambient temp may affect RPV water level indication and trend Emergency RPV depressurization is required – **NO** It has NOT been determined that the reactor will remain subcritical without boron under all conditions – **HAS** RPV water level CANNOT be determined – **CAN** PC water level CANNOT be maintained below 105 ft - **CAN**

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	SRO	OR Suppression chamber press CANNOT be maintained - **CAN** below 55 psig Verifies ADS inhibited CAUTION #2 Pump NPSH and Vortex Limits #3 Elevated suppression chamber press may trip RCIC #6 HPCI or RCIC suction temp above 140°F **RESTORE** and **MAINTAIN** RPV level above -162" using ANY of the following
	SRO	LPCI system I (pumps A or C) 6B LPCI system II (pumps B or D) 6C CS system I (pumps A or C) 6D CS system II (pumps B or D) 6E Directs BOP to align CS and LPCI for injection to the RPV IAW Appendices 6B, 6C, 6D and 6E
	BOP	Verifies that LPCI and CS are aligned with pumps running. Reports LPCI and CS aligned Reports all four diesels have started Calls for AUO to monitor diesel generators
	Driver	As AUO, acknowledge monitoring diesel generators for proper operation.

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	SRO	**C-1** Can 2 or more **CNDS**, **LPCI** or **CS** injection subsystems be lined up – **YES** WHEN RPV water level drops to -162 in. Direct crew to report when RPV water level lowers to -162 in. Is ANY CNDS, LPCI or CS injection subsystem lined up for injection with at least one pump running – **YES** Is ANY RPV injection source lined up with at least one pump running – **YES** **BEFORE** RPV water level drops to -180 in. **CONTINUE** – **CONTINUES** **EMERGENCY RPV DEPRESSURIZATION IS REQUIRED** Updates crew that emergency depressurization is required
		EOI-1, RC/L **IF** Emergency RPV depressurization is or has been required **THEN EXIT** RC/P and **ENTER C2**, Emergency RPV Depressurization Enters C2, Emergency RPV Depressurization SAMG entry is required and the TSC SAM team has assumed command and control - **NO** RPV water level CANNOT be determined - **CAN** Containment water level CANNOT be maintained below 44 ft- **CAN**

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	SRO	DW control air becomes unavailable – **AVAIL** Will the reactor remain subcritical without boron under all conditions - **YES** Is DW press above 2.4 psig - **NO** Is suppression pool level above 5.5 ft – **YES**
		OPEN all ADS vlvs (ok to exceed 100°F/hr cooldown rate) Directs BOP to open all ADS valves
	BOP	Opens all ADS valves, verifies open using alternate indications and reports 6 ADS valves open
	SRO	**C-1** INJECT into the RPV with ANY available sources Directs injection of water to the RPV using all available sources **C-2** Can 6 ADS vlvs be opened - **YES** IF Less than 4 MSRVs are open - **NO** AND RPV press is 70 psi or more above suppression chamber press The reactor is NOT subcritical – **SUBCRITICAL** WHEN the reactor will remain subcritical without boron under all conditions – **SUBCRITICAL** WHEN shutdown cooling RPV press interlock clears – **STOP**

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Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	When RPV pressure lowers below 450 psig, verifies and reports that LPCI and CS injection valves have opened. Report water injection into the RPV and reactor water level rising
	SRO	**C-1** **IF** RPV water level can be restored and maintained above -162 in. **THEN** **EXIT** this procedure and **ENTER** EOI-1, RPV Control, at Step RC/L-1 Exits C-1, re-enters EOI-1 RC/L Directs coordinating injection of LPCI and CS to RESTORE and MAINTAIN RPV water level between +2 in. and +51 in. using LPCI and CS, Appendices 6B, 6C, 6D, and 6E
		1. RPV Level maintained above TAF (-162 inches) 1.Safety Significance: Maintaining adequate core cooling 2.Cues: RPV level indication 3.Measured by: Reactor level indication above -162 inches 4.Feedback: RPV level trend HPCI/RCIC injection valve open indication This Critical Task is **not met** if RPV Level remains below -162 inches.
	ATC/BOP	Coordinate restoring RPV level to +2 in. to +51 in. using App. 6B, 6C, 6D, and 6E

Op Test No.: 15-01 Scenario No. 4 Event No.: 8 Page 17 of 17

Event Description: LOCA

Time	Position	Applicant's Actions or Behavior
	NRC	Once RPV level has been restored, the scenario can end.
	Driver	When NRC Chief Examiner directs, place the simulator in FREEZE

Op Test No.: 15-01 Scenario No. 4 Event No.: 9 Page 1 of 1

Event Description: HPCI Steam Supply Valve fails to auto open

Time	Position	Applicant's Actions or Behavior
	NRC	HPCI may receive an initiation signal from either reactor low water level -45 in. or drywell high pressure 2.45 psig.
	BOP	Recognize and report HPCI failure to initiate (initiation signal present and not injecting to the reactor vessel) Recognizes that the HPCI Steam Supply valve (73-16) is not open Opens HPCI Steam Supply valve and verifies HPCI injection to the Reactor Vessel. Reports that HPCI is injecting to the RPV Calls Work Control to request a work order on the steam supply valve for HPCI
	Driver	As Work Control, acknowledge investigating failure of 73-16, HPCI Steam Supply valve.
	NRC	End of Event #9

SIMULATOR SETUP

IC	28
Exam IC	188

Batch File or Pref File	G:\1501NRC

Malfunctions	Description	Event #	Delay	Severity	Ramp	Initial value	Final value
EG13A	Bus Duct Cooling Fan Trip	2	N/A	N/A	N/A	N/A	N/A
ED10B	S/D Board Loss	3	N/A	N/A	N/A	N/A	N/A
S&M	Sectionalizing Valve fails to close.	3	N/A	N/A	N/A	N/A	N/A
MC04	Loss of Condenser Vacuum	4	N/A	50	N/A	N/A	N/A
RC03	RCIC Suc Press Trip	5	N/A	N/A	N/A	N/A	N/A
ED01	LOOP	6	N/A	N/A	N/A	N/A	N/A
DG01A	DG A fails to Auto Start	Active	N/A	N/A	N/A	N/A	N/A
TH21	LOCA	8	N/A	5	15:00	N/A	N/A
HP04	HPCI Steam Supply Valve fails to auto open	Active	N/A	N/A	N/A	N/A	N/A

Remotes	Description	Event #	Delay	Severity	Ramp	Initial value	Final value

Overrides	Description	Event #	Delay	Severity	Ramp	Initial value	Final value

Batch / Pref File(s): 1501NRC

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

Reactivity Maneuver Plan U3 NRC Exam

Urgent Load Reduction/Recirc Pump Trip Contingency Plans

Operations Plan

Attachment 7
(Page 1 of 4)

Reactivity Control Plan Form

BFN Unit: 3 **Valid Date(s):** 10/28/14 – 05/2/15 **Reactivity Maneuver Plan #: U3 NRC Exam**

Are Multiple Activations Allowed: Yes (If yes, US may make additional copies)

Prepared by: Reactor Engineer / Today
Reactor Engineer Date

Reviewed by: Qualified RE Engineer / Today
Qualified Reactor Engineer Date

Approved by: R.E. Supervisor / Today
RE Supervisor Date

Concurrence: John W. SRO / Today
WCC/Risk/US SRO Date

Approved by: O.P. Manager / Today
Ops Manager or Supt. Date

Authorized by: Mr Shift Manager / Today
Shift Manager Date

RCP Activated: _____ / _____
Unit Supervisor Date

RCP Terminated: _____ / _____
Unit Supervisor Date

Title of Evolution: **Urgent Load Reduction/Recirc Pump Trip Contingency Plan**

Purpose/Overview of Evolution: *Maneuver Reactor to maintain acceptable operating conditions during and following unexpected plant conditions.*

Maneuver Steps

Recirc Pump Trip:

1. **IF both pumps trip, SCRAM the reactor per 3-AOI-68-1A**

   For a single recirculation pump trip, IMMEDIATELY insert rod groups to lower rod line below 95%.

2. **Change core flow with the Operating recirculation pump to exit POWER/FLOW region 2 and prevent loop delta temperature concerns (>45%).**

Urgent Load Reduction:

1A. Lower power by reducing core flow until either the desired operating power level is reached or core flow is 74% to 75% of rated core flow. (If a recirculation pump trip is imminent, only lower using the pump to be tripped).

2A. Insert control rods by groups per Emergency Shove Sheet to obtain the desired power level.

Attachment 7
(Page 2 of 4)
Reactivity Control Plan Form

Reactivity Maneuver Plan #: U3 NRC Exam

Maneuver Steps (continued)

Urgent Load Reduction (continued):

3A. Lower core flow to 46% core flow. (If a recirculation pump trip is imminent, only lower using the pump to be tripped.)

4A. Insert control rods Emergency Shove Sheet until load line is between 55% and 66.7%.

5A. Reduce recirculation pump speed to ~28% (~480 rpm).

6A. SCRAM the reactor or continue control rod insertion until SCRAM.

Attachment 7
(Page 3 of 4)

Reactivity Control Plan Form

Reactivity Maneuver Plan #: U3 NRC Exam

Operating Experience AND General Issues:

Operating Experience

Perry Nuclear Plant scrammed on OPRM signals ~9 minutes after receiving a dual recirc pump shift to slow speed, before control rods were inserted.

CONCLUSIONS/RECOMMENDATIONS: In the event of a Recirc pump trip or both pumps running back to minimum speed, the control rod insertion should be accomplished as soon as practical due to potential OPRM trip.

General Issues

This should be considered a guideline, not covering all possible situations. Contact On-Call Reactor Engineer as soon as possible to provide assistance.

Note that in the event of a Recirc Pump trip the loadline may go over 113.6% and MFLCPR may exceed 1.0 but the insertion of the recommended control rod groups will return loadline and MFLCPR below the required limits.

If a Powerplex case runs in the transient condition, the case is considered invalid. An automatic case may be triggered in the event of a recirc pump trip and that case should be considered invalid and another case requested as soon as reactor power stabilizes.

If shutdown is required while operating in single loop with the OOS loop isolated, Scram unit prior to going to minimum flow on operating recirc pump to avoid flow stratification concerns. Recommend scramming between 40 to 45% RTP.

Attachment 7
(Page 4 of 4)

Reactivity Control Plan Form

Reactivity Maneuver Plan #: U3 NRC Exam

Cautions/Error Likely Situations/Special Monitoring Requirements/Contingencies:

During SLO, reactor power and flow conditions will be near to Region 2.
RE must calculate and substitute core flow value when reducing flow in the active jet pump loop below 41 Mlbm/hr per 3-SR-3.4.1(SLO).

Prerequisites for starting an idle Recirc Pump, (3-OI-68):

- Operating recirc pump flow is below 46,600 gpm.
- Operating recirc pump speed is less than 860 RPM speed.
- Reactor operating conditions are outside of Region 1,2 and 3.
- 10% margin between reactor power and APRM rod block setpoint.

The RE must be contacted to change the PowerPlex calculation using the correct Thermal Limit set while in SLO. (#15 SLO NSS BOC to NEOC RPTOOS). The RE must also change the Thermal Limit set if the plant is operating with reduced feedwater heating. (#16 - TLO NSS ICF BOC to NEOC RPTOOS, FHOOS)

Attachment 8

Reactivity Maneuver Instructions

STEP 1 of 2 **Reactivity Maneuver Plan # U3 NRC Exam**

Description of Step: Recirc Pump Trip Response

IF both pumps trip, SCRAM the reactor per 3-OI-68-1A.

For a single recirculation pump trip, IMMEDIATELY insert control rod groups to lower Load Line below 95% using Emergency Shove Sheet.
(Case reflects inserting 2 groups)

Conditions : To be recorded at the Completion of Step Recorded: _____/_____
(by RO) (Date)

QRE presence required in the Control Room? Yes ____ No __X__ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
MW Electric	N/A		MFLCPR	0.85 - 0.95	
MW Thermal	1800 - 1900		MAPRAT	0.50 - 0.65	
Core Flow	45 - 51.5%		MFDLRX	0.60 - 0.75	
Loadline	79 - 87				
Core Power	50 - 55%		Other		

Critical Parameters: To be recorded DURING Step. **IF** parameters are outside of the predictions, **THEN** discuss with the RE **AND** record conclusions in the Comments / Notes section.

Description including frequency, method of monitoring, **AND** contingency actions	High	Low
Load Line: Displayed on Heat Balance or Power/Flow Map If HIGH, then insert rods.	**95%**	N/A

Comments / Notes:
Core Flow indication may be incorrect if the active loop jet pump flow (3-FI-68-48 or 3-FI-68-46) is less than 41 Mlbm/hr.

Step Complete **AND** Reviewed by:_____/_____
Unit Supervisor / Date

Attachment 8

Reactivity Maneuver Instructions

STEP 2 of 2 **Reactivity Maneuver Plan # U3 NRC Exam**

Description of Step: Recirc Pump Trip Response

Change speed of the Operating recirculation pump until:

- core flow is 46 - 50% to exit/remain out of POWER/FLOW Map Region II
- operating recirculation pump drive flow is below 46,600 gpm

Conditions : To be recorded at the Completion of Step Recorded: _____/_____ (by RO) (Date)

QRE presence required in the Control Room? Yes ____ No __X__ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
MW Electric	N/A		MFLCPR	0.70 - 0.85	
MW Thermal	1750 - 1850		MAPRAT	0.50 - 0.65	
Core Flow	48-52%		MFDLRX	0.60 - 0.75	
Loadline	79 - 86				
Core Power	51 - 56%		Other		

Critical Parameters: To be recorded DURING Step. **IF** parameters are outside of the predictions, **THEN** discuss with the RE **AND** record conclusions in the Comments / Notes section.

Description including frequency, method of monitoring, **AND** contingency actions	High	Low
Core Flow: Displayed on Heat Balance or Power/Flow Map If LOW, then raise core flow	N/A	**45%**

Comments / Notes:

Recirculation Pump flow must be kept below 46,600 gpm while in SLO.

Core flow must be greater than 45% to exit Region II at the expected load line, as well as prevent loop delta temperature concerns.

Step Complete **AND** Reviewed by:_____/_____

Unit Supervisor / Date

Attachment 8

Reactivity Maneuver Instructions

STEP 1A of 6A **Reactivity Maneuver Plan # U3 NRC Exam**

Description of Step: Urgent Load Reduction:

Lower power by reducing core flow to ~74% or until the desired operating power level is reached. (If a recirculation pump trip is imminent, only lower using the pump to be tripped).

Conditions : To be recorded at the Completion of Step Recorded: _____/_____
(by RO) (Date)

QRE presence required in the Control Room? Yes ____ No __X__ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
MW Electric	N/A		MFLCPR	0.90 - 0.97	
MW Thermal	2450 - 2700		MAPRAT	0.50 - 0.60	
Core Flow	≥ 60%		MFDLRX	0.65 - 0.75	
Loadline	100 - 108				
Core Power	70 - 78%		Other		

Critical Parameters: To be recorded DURING Step. **IF** parameters are outside of the predictions, **THEN** discuss with the RE **AND** record conclusions in the Comments / Notes section.

Description including frequency, method of monitoring, **AND** contingency actions	High	Low
Core Flow: Displayed on Heat Balance or Power/Flow Map If LOW, then stop lowering core flow.	N/A	**55%**
Load Line: Displayed on Heat Balance or Power/Flow Map If HIGH, then stop flow reduction and allow load line calculation to stabilize to confirm. If still HIGH, then proceed to next step to insert rods.	**113.6%**	N/A
MFLCPR: Displayed on CSUM if HIGH, then stop flow reduction and proceed to next step to insert rods.	0.985	N/A

Comments / Notes:

If desired, stop power reduction at any point between 100% and 70%. However, if continuing to next step, verify core flow is between 56% - 62%.

If a recirc pump trip is a concern, insert control rods before going below 90% core flow unless flow is only reduced on the pump expected to trip.

3-AOI-6-1A, 1B, or 1C specify the power level required for loss of feedwater heaters.

Step Complete **AND** Reviewed by:_____/_____
Unit Supervisor / Date

Attachment 8

Reactivity Maneuver Instructions

STEP 2A of 6A **Reactivity Maneuver Plan # U3 NRC Exam**

Description of Step: Urgent Load Reduction:

Insert control rods by groups per Emergency Shove Sheet till either the desired power level is reached or Load line is below 90%. Stop after completion of any rod group. (Case shows 2 rod groups inserted)

Conditions : To be recorded at the Completion of Step Recorded: _____/_____
(by RO) (Date)

QRE presence required in the Control Room? Yes____ No _X_ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
MW Electric	N/A		MFLCPR	0.80 - 0.90	
MW Thermal	1950 - 2150		MAPRAT	0.40 - 0.50	
Core Flow	60%		MFDLRX	0.50 - 0.60	
Loadline	80 - 95%				
Core Power	50 - 70%		Other		

Critical Parameters: To be recorded DURING Step. **IF** parameters are outside of the predictions, **THEN** discuss with the RE **AND** record conclusions in the Comments / Notes section.

Description including frequency, method of monitoring, **AND** contingency actions	High	Low
Load Line: Displayed on Heat Balance or Power/Flow Map If LOW, then stop inserting control rods.	N/A	**55%**

Comments / Notes:

3-AOI-6-1A, 1B or 1C specify the power level required for loss of feedwater heaters.

Step Complete **AND** Reviewed by:_____/_____
Unit Supervisor / Date

Attachment 8

Reactivity Maneuver Instructions

STEP 3A of 6A **Reactivity Maneuver Plan # U3 NRC Exam**

Description of Step: Urgent Load Reduction:

Lower core flow to 46% core flow. (If a recirculation pump trip is imminent, only lower using the pump to be tripped. Stop flow reduction when the pump to be tripped is at ~28% speed and then trip the pump.)

Conditions : To be recorded at the Completion of Step Recorded: _____/_____
(by RO) (Date)

QRE presence required in the Control Room? Yes ____ No _X_ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
MW Electric	N/A		MFLCPR	0.80 - 0.90	
MW Thermal	1590		MAPRAT	0.40 - 0.50	
Core Flow	46%		MFDLRX	0.50 - 0.60	
Loadline	75%				
Core Power	46%		Other		

Critical Parameters: To be recorded DURING Step. **IF** parameters are outside of the predictions, **THEN** discuss with the RE **AND** record conclusions in the Comments / Notes section.

Description including frequency, method of monitoring, **AND** contingency actions	High	Low
Core Flow: Displayed on Heat Balance or Power/Flow Map If LOW, then stop lowering core flow.	N/A	**45%**
Load Line: Displayed on Heat Balance or Power/Flow Map If HIGH, then insert control rods.	95%	N/A

Comments / Notes:

3-AOI-6-1A, 1B, or 1C specify the power level required for loss of feedwater heaters.

Step Complete **AND** Reviewed by:_____/_____
Unit Supervisor / Date

Attachment 8

Reactivity Maneuver Instructions

STEP 4A of 6A **Reactivity Maneuver Plan # U3 NRC Exam**

Description of Step: Urgent Load Reduction:

Insert control rods per Emergency Shove Sheet until Load Line is between 55% and 66%. (Case shows total of 4 groups inserted)

Conditions : To be recorded at the Completion of Step Recorded: _____/_____
(by RO) (Date)

QRE presence required in the Control Room? Yes ____ No _X_ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
MW Electric	N/A		MFLCPR	0.70 - 0.75	
MW Thermal	1150 - 1315		MAPRAT	0.25 - 0.35	
Core Flow	46.0%		MFDLRX	0.35 - 0.45	
Loadline	57 - 64%				
Core Power	35 - 40%		Other		

Critical Parameters: To be recorded DURING Step. **IF** parameters are outside of the predictions, **THEN** discuss with the RE **AND** record conclusions in the Comments / Notes section.

Description including frequency, method of monitoring, **AND** contingency actions	High	Low
Load Line: Displayed on Heat Balance or Power/Flow Map If LOW, then stop inserting control rods.	N/A	**55%**

Comments / Notes:

If desired, stop power reduction after any control rod (not group) is fully inserted. Note that Load Line may increase ~1.5% as flow is reduced in the next Step.

Step Complete **AND** Reviewed by:_____/_____
Unit Supervisor / Date

Attachment 8

Reactivity Maneuver Instructions

STEP 5A of 6A **Reactivity Maneuver Plan # U3 NRC Exam**

Description of Step: Urgent Load Reduction:

Lower recirculation pump speed to ~28% (~480 rpm or ~38% core flow).

Conditions : To be recorded at the Completion of Step Recorded: _____/_____
(by RO) (Date)

QRE presence required in the Control Room? Yes ____ No X (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
MW Electric	N/A		MFLCPR	0.70 - 0.75	
MW Thermal	1045 - 1280		MAPRAT	0.25 - 0.30	
Core Flow	38%		MFDLRX	0.35 - 0.45	
Loadline	55 - 66%				
Core Power	33 - 37%		Other		

Critical Parameters: To be recorded DURING Step. **IF** parameters are outside of the predictions, **THEN** discuss with the RE **AND** record conclusions in the Comments / Notes section.

Description including frequency, method of monitoring, **AND** contingency actions	High	Low
Load Line: Displayed on Heat Balance or Power/Flow Map If HIGH, then insert control rods.	**66%**	N/A

Comments / Notes:

Step Complete **AND** Reviewed by:_____/_____
Unit Supervisor / Date

Attachment 8

Reactivity Maneuver Instructions

STEP 6A of 6A **Reactivity Maneuver Plan # U3 NRC Exam**

Description of Step: Urgent Load Reduction:

Insert control rods per Emergency Shove Sheet until desired power level is reached or SCRAM the reactor.

Conditions : To be recorded at the Completion of Step Recorded: _____/_____
(by RO) (Date)

QRE presence required in the Control Room? Yes ____ No _X_ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
MW Electric	N/A		MFLCPR	0.60 - 0.70	
MW Thermal	700 - 875		MAPRAT	0.20 - 0.30	
Core Flow	38%		MFDLRX	0.35 - 0.50	
Loadline	40 - 45%				
Core Power	21 - 30%		Other		

Critical Parameters: To be recorded DURING Step. **IF** parameters are outside of the predictions, **THEN** discuss with the RE **AND** record conclusions in the Comments / Notes section.

Description including frequency, method of monitoring, **AND** contingency actions	High	Low
Load Line: Displayed on Heat Balance or Power/Flow Map If HIGH, then insert control rods.	**66%**	N/A

Comments / Notes:

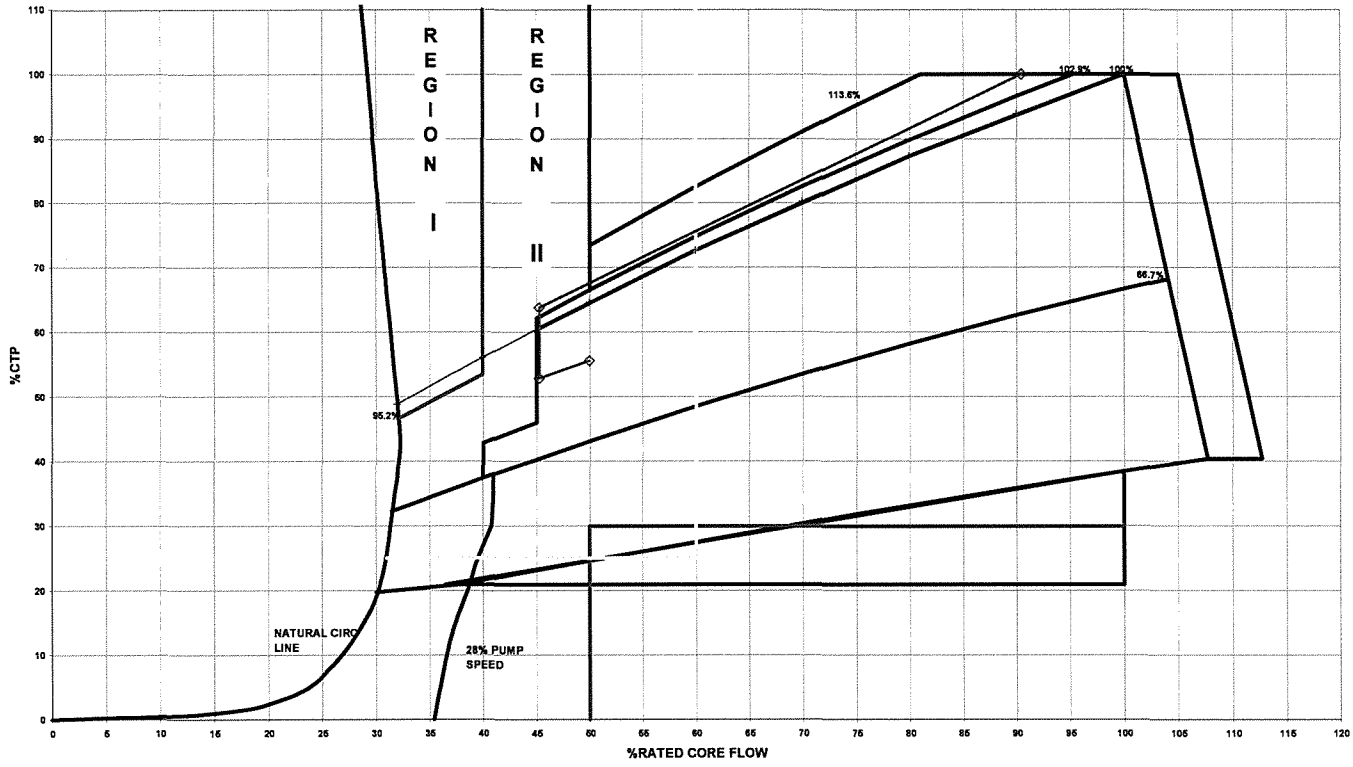
Loadline/Power should continue to drop because of the xenon transient.

Bypass the RWM if power drop is to continue below 30%.

The unit should be scrammed or lined up to the A2 RWM sequence before reaching 10% RTP.

Step Complete **AND** Reviewed by:_____/_____
Unit Supervisor / Date

Attachment 9
(Page 1 of 1)
Power to Flow Map
Recirculation Pump Trip (Steps 1 - 2)
Reactivity Control Plan # U3 NRC Exam

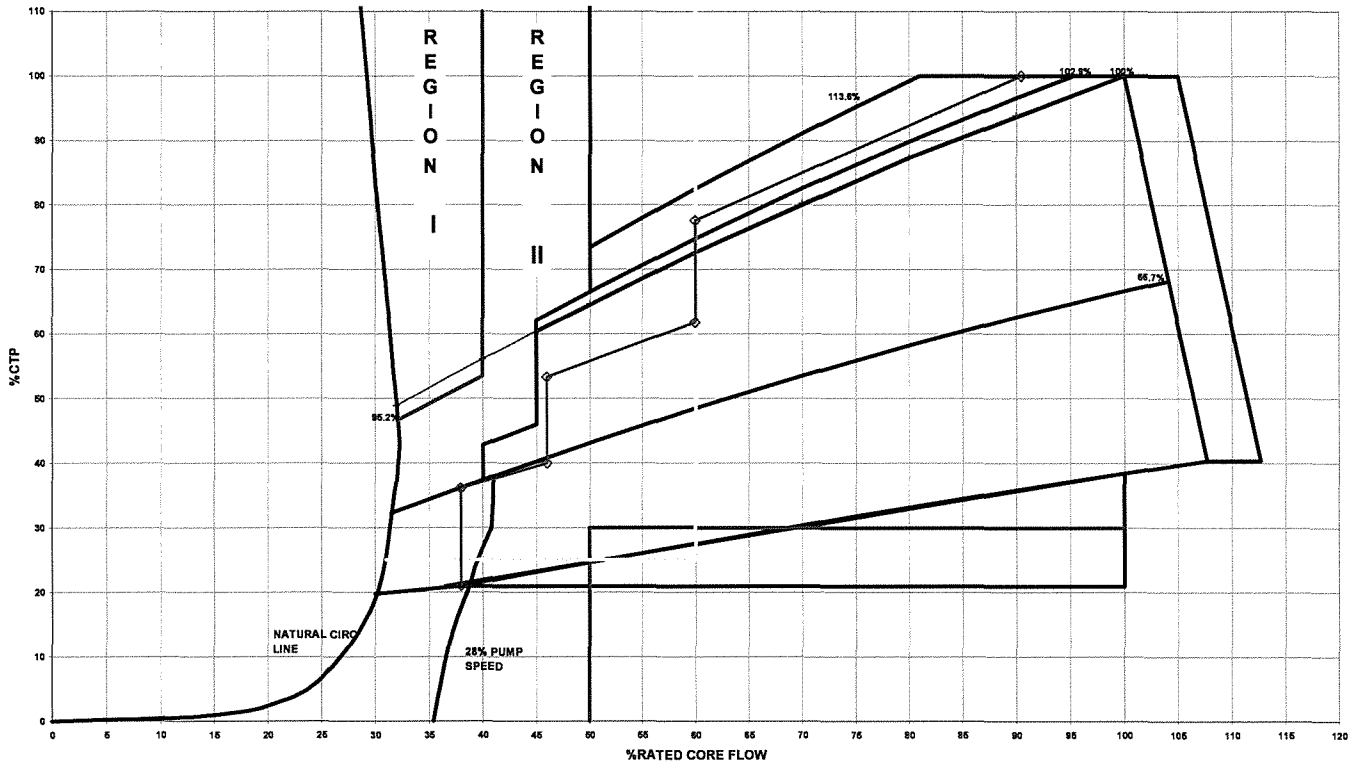


Attachment 9
(Page 1 of 1)

Power to Flow Map

Urgent Load Reduction (Steps 1A - 6A)

Reactivity Control Plan # U3 NRC Exam



Attachment 10
(Page 1 of 1)

Recirc Flow Maneuver Instructions

Reactivity Control Plan # U3 NRC Exam

RCP Step #	Flow Step #	Time	**Target Power (%RTP or MWe)**	Delta ±(MWe)	**Target Flow (MLb/Hr)**	Completed (RO)

Comments / Notes:

Reviewed by: _____/_____
Unit Supervisor / Date

SHIFT MANAGER TURNOVER

EQUIPMENT OOS/LCOS

- A3 EECW Pump is out of service for maintenance.

ANTICIPATED OPERATIONS/MAINTENANCE FOR ONCOMING SHIFT

- Continue the in progress Turbine Control Valve Fast Closure, or Turbine Trip and RPT Initiate Logic testing IAW 3-SR-3.3.1.1.8(9), starting at step 7.3. See copy attached.
- Following the Surveillance on the TCVs, return the plant to 100% power.

NO HEATERS ARE TO BE PLUGGED INTO OUTLETS IN THE CONTROL ROOM UNTIL DETERMINED IF WE CAN USE

SPP 7.3 RISK REVIEW DOCUMENTATION ON P DRIVE FOLDER WCC-RISK/BFN

EXPECTATION FOR 1500 MEETING IS FOR THE SM TO COVER CURRENT STATUS ON ALL CONTROL ROOM DEFICIENCIES AND ANNUNCIATOR WOs THAT SHOULD BE WORKING. THIS EXPECTATION STARTED 3/26/09

DO NOT DISABLE ANY ANNUNCIATORS WITHOUT GOING THRU MANAGEMENT REVIEW.

IF ALTERNATE HEAT BALANCES ALARM COMES IN ON ANY UNIT'S ICS, REDUCE POWER BY 10 MWT (3448 IF AT RATED POWER) AND CALL REACTOR ENGINEERING IN TO PLANT TO EVALUATE.

STATUS

WORK WEEK - DIV I ☒, DIV II ☐

OUTSIDE AIR TEMP 45°F

COMMON

UNIT 1

- 100%

UNIT 2

- 100%

UNIT 3

- 90% power.

ATTACHMENT 7
(Page 1 of 2)

Date: Today

CONTROL ROD MOVEMENT DATA SHEET

RWM GP	ROD NUMBER	FROM	TO	Rod Movement Completed INITIALS	
				UO(AC)[1]	2nd(AC) / Peer Check[2]
N/A	14-31	16	00		
N/A	30-47	16	00		
N/A	46-31	16	00		
N/A	30-15	16	00		
N/A	22-31	48	00		
N/A	30-39	48	00		
N/A	38-31	48	00		
N/A	30-23	48	00		
N/A	14-39	48	00		
N/A	46-39	48	00		
N/A	46-23	48	00		
N/A	14-23	48	00		
N/A	22-47	48	00		
N/A	38-47	48	00		
N/A	38-15	48	00		
N/A	22-15	48	00		

REMARKS[4]: SHOVE SHEETS – Continuously Insert

NOTES:

(1) RWM Group may be marked "N/A" if not applicable (i.e., when above the LPSP).

(2) For all rod moves to position "full out" (notch position 48), this signoff verifies coupling integrity was checked in accordance with 3-OI-85.

(3) Documentation of Peer Check by a second qualified member of the plant staff (i.e., RE, STA, OR UO) is required ONLY when the RWM is Inoperable OR bypassed with core thermal power <10%

(4) Record the rod number and any problems encountered on attachment 1, page 2 of 2, as applicable.

(5) Peer check by RE or SRO [SRO to be utilized if a second RE is unavailable]. The SRO should be checking FROM and TO control rod positions as a minimum. The RE OR SRO should be checking the positions identified for agreement with the predictor cases. Anytime the SRO feels the Peer check is beyond his knowledge level, then call in a second RE to perform the required Peer check.

Issued by: Bill Williamson / Today
Reactor Engineer Date

Reviewed by[5]: Michael Keck / Today
RE OR SRO Date

Authorization to perform the control rod manipulations identified on this sheet

David Renn / Today
Unit Supervisor Date

ATTACHMENT 7
(Page 2 of 2)

Date: Today

CONTROL ROD MOVEMENT DATA SHEET

RWM GP	ROD NUMBER	FROM	TO	Rod Movement Completed INITIALS	
				UO(AC)[1]	2nd(AC) / Peer Check[2]
N/A	06-31	48	00		
N/A	30-55	48	00		
N/A	54-31	48	00		
N/A	30-07	48	00		
N/A	06-39	48	00		
N/A	54-39	48	00		
N/A	54-23	48	00		
N/A	06-23	48	00		
N/A	22-55	48	00		
N/A	38-55	48	00		
N/A	38-07	48	00		
N/A	22-07	48	00		
N/A	06-47	48	00		
N/A	54-47	48	00		
N/A	54-15	48	00		
N/A	06-15	48	00		

REMARKS[4]: SHOVE SHEETS – Continuously Insert

NOTES:

(1) RWM Group may be marked "N/A" if not applicable (i.e., when above the LPSP).

(2) For all rod moves to position "full out" (notch position 48), this signoff verifies coupling integrity was checked in accordance with 3-OI-85.

(3) Documentation of Peer Check by a second qualified member of the plant staff (i.e., RE, STA, OR UO) is required ONLY when the RWM is Inoperable OR bypassed with core thermal power <10%

(4) Record the rod number and any problems encountered on attachment 1, page 2 of 2, as applicable.

(5) Peer check by RE or SRO [SRO to be utilized if a second RE is unavailable]. The SRO should be checking FROM and TO control rod positions as a minimum. The RE OR SRO should be checking the positions identified for agreement with the predictor cases. Anytime the SRO feels the Peer check is beyond his knowledge level, then call in a second RE to perform the required Peer check.

Issued by: Bill Williamson / Today
Reactor Engineer Date

Reviewed by[5]: Michael Keck / Today
RE OR SRO Date

Authorization to perform the control rod manipulations identified on this sheet

David Renn / Today
Unit Supervisor Date

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

Reactivity Maneuver Plan U3 NRC 4

Unit 3

Turbine Valve Testing

Attachment 7
(Page 1 of 2)

Reactivity Control Plan Form

BFN Unit: 3 Valid Date(s): 1/11/15 – 2/9/15 Reactivity Control Plan #: **U3 NRC 4**

Are Multiple Activations Allowed: No (If yes, US may make additional copies)

Prepared by: Reactor Engineer / Today
Reactor Engineer Date

Reviewed by: Qualified RE Engineer / Today
Qualified Reactor Engineer Date

Approved by: R.E. Supervisor / Today
RE Supervisor Date

Concurrence: John W. SRO / Today
WCC/Risk/US SRO Date

Approved by: O.P. Manager / Today
Ops Manager or Supt. Date

Authorized by: Mr Shift Manager / Today
Shift Manager Date

RCP Activated: _____ / _____
Unit Supervisor Date

RCP Terminated: _____ / _____
Unit Supervisor Date

Title of Evolution: Unit 3 Turbine Control Valve Testing

Purpose/Overview of Evolution: Reduce Reactor Power to 90% with Reactor Recirc flow, for valve testing and return Rector Recirc flow to raise power back to 100%.

Maneuver Steps

1. ***Reduce Reactor Power using Reactor Recirc flow reduction. Initial power level 100%, final power level 90%.***
2. ***At the completion of Turbine Valve Testing, raise Reactor Power back to 100% using Reactor Recirc flow, with no additional restrictions on rate of return.***

Attachment 7
(Page 2 of 2)

Reactivity Control Plan Form

Operating Experience and General Issues: U3 NRC 4

Previously known control rod issues:

None

Cautions/Error Likely Situations/Special Monitoring Requirements/Contingencies:

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Attachment 8

Reactivity Maneuver Instructions

STEP 1 of 1 **Reactivity Maneuver Plan # U3 NRC 4**

Description of Step:

Conditions : To be recorded at the Completion of Step Recorded: _____/_____
(by RO) (Date)

QRE presence required in the Control Room? Yes ____ No _X_ (check)

	Predicted (may be ranges)	Actual		Predicted (may be ranges)	Actual
MW Electric	1152		MFLCPR	0.830 – 0.840	
MW Thermal	3455		MAPRAT	0.649 – 0.655	
Core Flow	87.1 mlbm/hr		MFDLRX	0.785 – 0.810	
Loadline	110.2				
Core Power	100%		Other		

Critical Parameters: To be recorded DURING Step. **IF** parameters are outside of the predictions, **THEN** discuss with the RE **AND** record conclusions in the Comments / Notes section.

Description including frequency, method of monitoring, **AND** contingency actions	High	Low

Comments / Notes:

Step Complete **AND** Reviewed by:_____/_____
Unit Supervisor / Date

ATTACHMENT 9

POWER TO FLOW MAP

U3 Startup Scenario 8