NRC Scenario 1

Facility: **Browns Ferry NPP** Scenario No.: **NRC - 1** Op-Test No.: **1306**

Examiners:_____ Operators: **SRO:**_____

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: Reactor Power is 70%. HPCI is tagged out. Condensate Booster Pump 3A has been returned to service.

Turnover: Place 3A RFPT in service from 600 RPM in accordance with 3-OI-3. Commence a power increase in accordance with Reactivity Control Plan to 90%.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Place 3A RFPT in service from 600 RPM IAW 3-OI-3
2		R-ATC R-SRO	Power increase with Control Rods
3	RD01A	C-ATC C-SRO	CRD Pump Trip
4	sev file	C-ATC TS-SRO	Control Rod 30-23 High CRD Temperature
5	ed07b	C-BOP C-SRO	Loss of 480V Unit Board 3B
6	og05a/og01	I-BOP TS-SRO	Off Gas Recombiner Catalyst failure, with Hydrogen explosion
7	Batch	M-ALL	Loss of Feedwater / Fuel Failure / RCIC Steam Leak / ED on High Radiation
8	RH01A/C	C	3A and 3C RHR Pumps trip
9	IOR	I	ADS SRV 1-34, Acoustic Monitor indication failure

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

reid 5/22/13

Critical Tasks - Three

With a primary system discharging into the secondary containment, when two or more areas are greater than their maximum safe operating values for the same parameter, RO initiates Emergency Depressurization as directed by US without delay.

1. Safety Significance:
   Places the primary system in the lowest possible energy state, rejects heat to the suppression pool in preference to outside the containment. and reduces driving head and flow of system discharging into the secondary containment.

2. Cues:
   Procedural compliance.
   Secondary containment area temperatures, level, and radiation indication.
   Field reports.

3. Measured by:
   Observation - US transitions to C-2 and RO opens at least 6 SRV's when two or more areas are greater than their maximum safe operating values for the same parameter.

4. Feedback:
   RPV pressure trend.
   SRV status indications.

When Suppression Chamber Pressure exceeds 12 psig, initiate Drywell Sprays while in the safe region of the Drywell Spray Initiation Limit (DSIL) curve and prior to exceeding the PSP limit.

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

Critical Tasks - Three

When MAIN STEAM LINE RADIATION HIGH-HIGH is received and SLC injection is NOT required in accordance with RC/Q of EOI-1, MSIVs are closed. SRO will direct MSIV closure without delay and the RO will close MSIVs.

1. Safety Significance:
   Isolate potential discharge path to environment.

2. Cues:
   Procedural compliance.
   Reactor Pressure trend.
   Pressure Control on SRVs

3. Measured by:
   When ARP-9-3A window 27 annunciator is received MSIVs are closed if alarm is verified valid and SLC injection IAW EOI-1 RC/Q is NOT required.

4. Feedback:
   Reactor Pressure trend.
   MSIVs indicate closed.

NRC Scenario 1

Events

1. BOP places RFPT 3A in service from 600 rpm IAW 3-OI-3, Reactor Feedwater System section 5.7

2. ATC will commence to raise power with control rods to a load line of 105 to 106, by withdrawing four control rods from 00 to 24.

3. CRDH pump 3A trips while the ATC is withdrawing the fourth control rod. ATC will perform 3-AOI-85-3 actions to start the Standby CRD Pump and restore CRD parameters.

4. Once Control Rod 30-23 is withdrawn to position 24, this control rod will experience a high CRD mechanism temperature. The ATC will respond IAW ARPs and 3-OI-85, the operator will perform CRD flushing for a control rod at a position other than 48. The SRO will declare control rod 30-23 slow IAW Technical Specification 3.1.4-1 Note 1. Enter Tech Spec 3.1.4 or 3.1.3.

5. Crew will respond to a loss of 480V Unit Board 3B, the BOP will restore from a trip of Bus Duct Cooling 3A Fan and take action IAW with ARPs, start standby Bus Duct Cooling Fan 3B.

6. The Hydrogen Water Injection system will malfunction resulting in high hydrogen concentration in Off Gas. The BOP Operator will respond IAW with ARPs and 3-AOI-66-1 an Off Gas System explosion will occur once off gas hydrogen concentration exceeds 5%. The SRO will evaluate TRM 3.7.2 and enter Condition A.

7. On the SCRAM a loss of Unit Board 3C will occur with a trip of Condensate Booster Pump 3A and 3B, resulting in a loss of feedwater. RCIC will auto start and slowly start to restore Reactor Level. Shortly after the scram a LOCA will occur requiring Suppression Chamber and Drywell Sprays. Reactor Level will begin to lower. An unisolable RCIC steam leak will develop and Emergency Depressurization will be required due to High Secondary Containment Radiation Levels

8. RHR Pumps on Division 1 will trip and be unavailable for Containment Cooling. The crew will use Division 2 RHR Pumps for Containment Cooling functions.

9. When the Emergency Depressurization is required the Acoustic Monitor on ADS SRV 1-34 will fail, requiring the crew to open an additional SRV.

10. Once Emergency Depressurization is complete the crew will restore Reactor Level with Core Spray Loops 1 or 2, and the Condensate Pumps.

Terminate the scenario when the following conditions are satisfied or upon request of Lead Examiner:

Drywell Sprays initiated and secured

Emergency Depressurization complete

Reactor Level is restored and maintained

NRC Scenario 1

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER:1

8	Total Malfunctions Inserted: List (4-8)
3	Malfunctions that occur after EOI entry: List (1-4)
4	Abnormal Events: List (1-3)
1	Major Transients: List (1-2)
3	EOI's used: List (1-3)
1	EOI Contingencies used: List (0-3)
65	Validation Time (minutes)
3	Crew Critical Tasks: (2-5)
YES	Technical Specifications Exercised (Yes/No)

NRC Scenario 1

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Place a RFPT in Service			
RO U-003-NO-04	259001A4.01	3.6	3.5
Raise Power with Control Rods			
RO U-085-NO-07 SRO S-000-NO-31	2.2.2	4.6	4.1
CRD Pump Trip			
RO U-085-AL-07 SRO S-085-AB-03	201001A2.01	3.2	3.3
CRD Mechanism Temperature High			
RO U-085-AL-08 SRO S-085-AB-03	201003A2.10	3.0	3.4
Loss of 480V Unit Board 3B			
RO U-57A-AL-15 SRO S-57B-NO-07	262001A2.04	3.8	4.2
Off Gas Explosion			
RO U-066-AB-01 SRO S-066-AB-01	271000 A2.06	3.5	3.9
Fuel Failure			
RO U-090-AL-07 SRO S-000-EM-02	272000A2.01	3.7	4.1
RCIC Steam Leak			
RO U-000-EM-10 SRO S-000-EM-10	295033EA2.01	3.8	3.9
LOCA			
RO U-000-EM-01 SRO S-000-EM-01	295009AA2.01	4.2	4.2
Secondary Containment High Radiation			
RO U-090-AL-04 SRO S-000-EM-15	295033EA2.01	3.8	3.9

Procedures Used/Referenced:

Procedure Number	Procedure Title
3-OI-3	Reactor Feedwater System
3-GOI-100-12	Power Maneuvering
3-OI-85	Control Rod Drive System
3-AOI-85-3	CRD System Failure
3-TI-393	Evaluation of CRD Temperature Alarms
	Technical Specifications
3-ARP-9-7A	Panel 9-7 3-XA-55-7A
3-ARP-9-8A	Panel 9-8 3-XA-55-8A
3-ARP-9-8B	Panel 9-8 3-XA-55-8B
3-ARP-9-8C	Panel 9-8 3-XA-55-8C
3-ARP-9-53	Panel 9-53 3-XA-55-53
3-AOI-66-1	Off Gas H2 High
3-AOI-100-1	Reactor Scram
3-EOI-1	RPV Control
3-EOI-2	Primary Containment Control
3-EOI-3	Secondary Containment Control
3-EOI Appendix-5C	Injection System Lineup RCIC
3-EOI Appendix-8F	Restoring Refuel Zone and Reactor Zone Ventilation Fans Following Group 6 Isolation
3-EOI Appendix-17C	RHR System Operation Suppression Chamber Sprays
3-EOI Appendix-17B	RHR System Operation Drywell Sprays
3-ARP-9-3A	Panel 9-3 3-XA-55-3A
3-EOI Appendix-11A	Alternate RPV Pressure Control Systems MSRVs
3-EOI Appendix-6A	Injection Subsystems Lineup Condensate
3-EOI Appendix-6D	Injection Subystems Lineup Core Spray System I
3-EOI Appendix-6E	Injection Subystems Lineup Core Spray System II
3-EOI-2-C-2	Emergency RPV Depressurization
EPIP-1	Emergency Classification Procedure
EPIP-4	Site Area Emergency

Console Operator Instructions

A. Scenario File Summary

Batch File

```
#HPCI tagout
bat nrchpcito

#bus duct cooling fan trip
imf ed07b (e1 0)

#Rod 30-23 high temperature
sev rdkxleak(63) -1.01
sev yua85795 240
trg 9 = sev yua85795 345
trg 10 = sev rdkxleak(63) -.9          Do NOT use this trigger
trg 11 = sev rdkxleak(63) -.96         Do NOT use this trigger
trg 12 = sev rdkxleak(63) .768

#hwc malfunction
imf og05a (e3 0) 85 1200 100
imf og01 (e5 0)
mrf og06 byp

#CRD A Pumptrip
imf rd01a (e7 0)

#Major
ior zaoxi0134 0                Acoustic monitor failure ADS SRV 1-34
imf ed08c (e20 0)              Loss of Unit Board 3C
imf fw02a (e20 0)              Condensate Booster Pump 2A Trip
imf fw02b (e20 0)              Condensate Booster Pump 2B Trip
trg e20 MODESW
imf rc09 (e20 12:20) 25 120    RCIC Steam Leak
imf th21 (e20 5:00) .2         LOCA
imf pc16a (e20 5:10)           Vacuum Breaker failure
imf pc16b (e20 5:10)
imf th23 (e20 0) 10 1000       Fuel Failure
imf rc10                       RCIC Steam Valves fail to Auto Close
ior zdihs712a open             RCIC Steam Valve fails to close
ior zdihs713a open             RCIC Steam Valve fails to close
trg e30 nrcRHR3C
imf rh01c (e30 :30)            RHR 3C Trip
imf rh01a                      RHR 3A Trip
```

Trigger Files

MODESW
ZDIHS465(4) .NE. 1

nrcRHR3C – 3C RHR Pump to start
zdihs7416a[3] .eq. 1

Scenario 1

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 201
Simulator Setup	**manual**	close HPCI Valves and open drain valves so steam line pressure decays to zero
Simulator Setup	**Load Batch**	bat nrc1306-1
Simulator Setup	manual	Tag HPCI, Shift Bus Duct Fans to B on and A in Standby, swap lens covers on Bus duct, Adjust CRD flow to 60
Simulator Setup		Verify file loaded, leave simulator in freeze until crew is walking down. Monitor control rod 30-23 temperature and adjust file sev rdkxleak(63) as necessary to ensure CRD temp alarm does not come in until 30-23 is being withdrawn. Less than 1.0 temp down, greater than 1.0 temp up.

RCP required (70% - 90% with control rods and flow) and RCP for Urgent Load Reduction
Provide marked up copy of 3-GOI-100-12

Simulator Event Guide:

Event 1 Normal: Place 3A RFPT in service from 600 RPM in accordance with 3-OI-3

		5.7 Placing the Second and Third RFP/RFPT In Service
		[2] **IF** RFP/RFPT is **NOT** warmed, reset and rolling, **THEN PERFORM** the following: (Otherwise N/A)
		[3] **VERIFY** RFP 3A MIN FLOW VALVE, 3-HS-3-20, in OPEN position. • **CHECK OPEN** MIN FLOW VALVE, 3-FCV-3-20. [4] **SLOWLY RAISE** speed of RFPT using RFPT 3A SPEED CONT RAISE/LOWER, 3-HS-46-8A, to establish flow and maintain level in vessel. [5] **WHEN** RFPT discharge pressure is within 250 psig of reactor pressure, **THEN VERIFY OPEN** RFP 3A DISCHARGE VALVE, 3-FCV-3-19. [6] **SLOWLY RAISE** RFPT speed using RFPT 3A SPEED CONT RAISE/LOWER switch, 3-HS-46-8A, to slowly raise RFP discharge pressure and flow on the following indications (Panel 3-9-6): • RFP Discharge Pressure - RFP 3A, 3-PI-3-16A • RFP Discharge Flow - RFP 3A, 3-FI-3-20 [7] **WHEN** sufficient flow is established to maintain RFP 3A MIN FLOW VALVE, 3-FCV-3-20, in CLOSED position (approximately 2 x 106 lbm/hr), **THEN PLACE** RFP 3A MIN FLOW VALVE, 3-HS-3-20, in AUTO. [8] **OBSERVE** lowering in speed and discharge flows of other operating RFPs.

Simulator Event Guide:

Event 1 Normal: Place 3A RFPT in service from 600 RPM in accordance with 3-OI-3

		[9] **IF** transferring RFPT from MANUAL GOVERNOR to individual RFPT Speed Control PDS, **THEN PERFORM** the following: (Otherwise N/A) [9.1] **PULL** RFPT 3A SPEED CONT RAISE/LOWER switch, 3-HS-46-8A, to FEEDWATER CONTROL position. [9.2] **VERIFY** amber light at switch extinguished above RFPT 3A SPEED CONT RAISE/LOWER switch, 3-HS-46-8A. [9.3] **PERFORM** the following on RFPT 3A SPEED CONTROL(PDS), 3-SIC-46-8 (Panel 3-9-5): [9.3.1] **SELECT** Column 3. [9.3.2] **VERIFY** PDS in MANUAL.
		[10] **IF** transferring control of RFPT from individual RFPT Speed Control PDS to "AUTO" control using REACTOR WATER LEVEL CONTROL PDS, 3-LIC-46-5, **THEN PERFORM** the following: (Otherwise N/A) [10.1] **VERIFY** REACTOR WATER LEVEL CONTROL (PDS), 3-LIC-46-5 is functioning properly and ready to control second or third RFP. [10.2] **SLOWLY RAISE** RFP discharge flow and pressure by raising RFP speed. [10.3] **WHEN** RFP speed is approximately equal to operating RFP(s) speed, **THEN PERFORM** the following on RFPT 3A SPEED CONTROL (PDS), 3-SIC-46-8: [10.3.1] **PLACE** PDS in AUTO. [10.3.2] **VERIFY** Column 3 selected.

Simulator Event Guide:

Event 1 Normal: Place 3A RFPT in service from 600 RPM in accordance with 3-OI-3

		[11]	**WHEN** RFP in automatic mode on REACTOR WATER LEVEL CONTROL, (PDS) 3-LIC-46-5, **THEN CLOSE** the following valves: • RFPT 3A LP STOP VLV ABOVE SEAT DR, 3-FCV-6-120 • RFPT 3A LP STOP VLV BELOW SEAT DR, 3-FCV-6-121 • RFPT 3A HP STOP VLV ABOVE SEAT DR, 3-FCV-6-122 • RFPT 3A HP STOP VLV BELOW SEAT DR, 3-FCV-6-123 • RFPT 3A FIRST STAGE DRAIN VLV, 3-FCV-6-124 • RFPT A HP STEAM SHUTOFF ABOVE SEAT DRAIN, 3-FCV-006-0153 (local control) • RFPT A LP STEAM SHUTOFF ABOVE SEAT DRAIN, 3-FCV-006-0154 (local control)
		[12]	**VERIFY CLOSED** the following valves on first RFP started in Section 5.5: • RFPT 3B(3C) LP STOP VLV ABOVE SEAT DR, 3-FCV-6-125(130) • RFPT 3B(3C) LP STOP VLV BELOW SEAT DR, 3-FCV-6-126(131) • RFPT B(C) LP STEAM SHUTOFF ABOVE SEAT DR, 3-FCV-006-0156(0158) (local control) [13] **VERIFY** both RFPT Main Oil Pumps running.
		[14]	**IF** desired to stop Turning Gear for in service RFPT, **THEN PLACE** appropriate handswitch in STOP and RETURN to AUTO: • RFPT 3A TURNING GEAR MOTOR, 3-HS-3-101A [15] **REFER TO** Section 6.0. • **CONTROL** and **MONITOR** RFW system operation.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	SRO	Notify ODS of power increase.
		Direct Power increase using control rods IAW 3-GOI-100-12. [21] **WHEN** desired to restore Reactor power to 100%, **THEN PERFORM** the following as directed by Unit Supervisor and recommended by the Reactor Engineer: • **RAISE** power using control rods or core flow changes. **REFER TO** 3-SR-3.3.5(A) and 3-OI-68. • **MONITOR** Core thermal limits using ICS, and/or 0-TI-248
	ATC	Raise Power with Control Rods IAW 3-OI-85, section 6.6. Control Rods: 22-31 from 0 to 24, 30-39 from 0 to 24, 38-31 from 0 to 24 and 30-23 from 0 to 24 .
		NOTES Continuous control rod withdrawal may be used when a control rod is to be withdrawn greater than three notches. When continuously withdrawing a control rod to a position other than position 48, the CRD Notch Override Switch is held in the Override position and then the CRD Control Switch is held in the Rod Out Notch position. • Both switches should be released when the control rod reaches two notches prior to its intended position.
		6.6.1 Initial Conditions Prior to Withdrawing Control Rods [2] **VERIFY** the following prior to control rod movement: • CRD POWER, 3-HS-85-46 in ON. • Rod Worth Minimizer is operable and LATCHED into the correct ROD GROUP when Rod Worth Minimizer is enforcing. **6.6.2 Actions Required During and Following Control Rod Withdrawal** [4] **OBSERVE** the following during control rod repositioning: • Control rod reed switch position indicators (four rod display) agree with the indication on the Full Core Display. • Nuclear Instrumentation responds as control rods move through the core. (This ensures control rod is following drive during Control Rod movement.) [5] **ATTEMPT** to minimize automatic RBM Rod Block as follows: • **STOP** Control Rod withdrawal (if possible) prior to reaching any RBM Rod Block using the RBM displays on Panel 3-9-5 and **PERFORM** Step 6.6.2[6].

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

		[6] **IF** Control Rod movement was stopped to keep from exceeding a RBM setpoint or was caused by a RBM Rod Block, **THEN PERFORM** the following at the Unit Supervisor's discretion to "REINITIALIZE" the RBM: [6.1] **PLACE** CRD POWER, 3-HS-85-46 in the OFF position to deselect the Control Rod. [6.2] **PLACE** CRD POWER, 3-HS-85-46, in the ON position.
	ATC	**6.6.3 Control Rod Notch Withdrawal** [1] **SELECT** the desired control rod by depressing the appropriate CRD ROD SELECT pushbutton, 3-XS-85-40. [2] **OBSERVE** the following for the 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 is operable and LATCHED into the correct ROD GROUP when the Rod Worth Minimizer is enforcing. [4] **PLACE** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH, and **RELEASE**. [5] **OBSERVE** the control rod settles into the desired position and the ROD SETTLE light extinguishes.
	Driver	At NRC direction, trip CRD Pump 3A trigger 7

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	ATC	**6.6.4 Continuous Rod Withdrawal** [1] **SELECT** desired Control Rod by depressing appropriate CRD ROD SELECT, 3-XS-85-40. [2] **OBSERVE** the following for the 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 the Rod Worth Minimizer is enforcing. [4] **VERIFY** Control Rod is being withdrawn to a position greater than three notches. [5] **IF** withdrawing the control rod to a position other than "48", **THEN PERFORM** the following: [5.1] **PLACE AND HOLD** CRD NOTCH OVERRIDE, 3-HS-85-47, in NOTCH OVERRRIDE. [5.2] **PLACE AND HOLD** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH. [5.3] **WHEN** control rod reaches two notches prior to the intended notch, **THEN RELEASE** CRD NOTCH OVERRIDE, 3-HS-85-47 and CRD CONTROL SWITCH, 3-HS-85-48. [5.4] **IF** control rod settles at notch before intended notch, **THEN PLACE** CRD CONTROL SWITCH, 3-HS-85-48, in ROD OUT NOTCH and **RELEASE**.
	Driver	At NRC direction, trip CRD Pump 3A trigger 7

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	ATC	**6.6.4 Continuous Rod Withdrawal (Continued)** [5.5] **WHEN** control rod settles into the intended notch, **THEN CHECK** the following. • Four rod display digital readout and the full core display digital readout and background light remain illuminated. • CONTROL ROD OVERTRAVEL annunciator, 3-XA-55-5A, Window 14, does **NOT** alarm. [5.6] **CHECK** the control rod settles at intended position and ROD SETTLE light extinguishes. [6] **IF** continuously withdrawing the control rod to position 48 and performing the control rod coupling integrity check in conjunction with withdrawal, **THEN PERFORM** the following: (Otherwise N/A)
	ATC	**6.6.5 Return to Normal After Completion of Control Rod Withdrawal** [1] **WHEN** control rod movement is no longer desired **AND** deselecting control rods is desired, **THEN**: [1.1] **PLACE** CRD POWER, 3-HS-85-46, in OFF. [1.2] **PLACE** CRD POWER, 3-HS-85-46, in ON.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	ATC	Responds to annunciator 9-5A window 24: RBM HIGH/INOP
	ATC	A. **IF** moving control rods for start-up or power maneuvering **THEN PERFORM** the following: 1. **VERIFY** correct control rod selected. 2. **VERIFY** Rod Out Permit light is **NOT** illuminated to ensure selected rod withdrawal is inhibited. 3. **CHECK** annunciator LPRM HIGH (3-XA-55-5A, Window 12) and matrix light, Panel 3-9-5 to determine if the alarm is due to high flux. 4. **DESELECT** then **RESELECT** the desired Control Rod to reset the alarm and Reinitialize the RBM back to Normalized 100%. B. **IF NOT** moving control rods but a rod is selected **THEN VERIFY** Rod Out Permit light is **NOT** illuminated to ensure selected rod withdrawal is inhibited. (Receiving a rod block when **NOT** moving a rod, may be an indication of a failure of the RBM or an indication of a Reactor power reduction with a rod selected.)

Simulator Event Guide:

Event 3 Component: CRD Pump 3A trip

	ATC	Reports Trip of CRD Pump 3A.
	SRO	Announces entry into 3-AOI-85-3, "CRD System Failure".
		4.1 Immediate Actions [1] **IF** operating CRD PUMP has failed **AND** the standby CRD Pump is available, **THEN PERFORM** the following at Panel 3-9-5: [1.1] **PLACE** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, in MAN at minimum setting. [1.2] **START** associated standby CRD Pump using one of the following: • CRD PUMP 3B, using 3-HS-85-2A [1.3] **ADJUST** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, to establish the following conditions: • CRD CLG WTR HDR DP, 3-PDI-85-18A, approximately 20 psid • CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, between 40 and 65 gpm. [1.4] **BALANCE** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, and **PLACE** in AUTO or BALANCE.
	Driver	If Dispatched to CRD Pump 3A, pump is extremely hot to touch. CRD Pump 3B - oil levels in band, pump ready for start, conditions normal after the start. CRD 3A - report breaker tripped on over current, Electrical Maint called.
	Driver	While control rod 30-23 is being withdrawn initiate severity files for High CRD Temperature on Control Rod 30-23. Initiate trigger 9 CRD Temp for 30-23 will rise to 345 and climb to 350 from there and continue to climb. Once the crew is no longer monitoring CRD Temps insert trigger 12 to return simulator to normal otherwise the last sev entered will stay in, resetting does not clear.

Simulator Event Guide:

Event 4 Component: Control Rod 30-23 High Temperature

	ATC	Responds to annunciator 9-5A window 17: CONTROL ROD DRIVE UNIT TEMP HIGH
		A. **CHECK** high temp of CRD on recorder 3-TR-85-7A, & 3-TR-85-7B (Panel 3-9-47) or on ICS. B. **IF** alarm is VALID, **THEN PERFORM** the following, as directed by the Unit Supervisor. • **CHECK** cooling water pressure and flow normal on Panel 3-9-5. • **DISPATCH** personnel to check for HCU scram discharge valve leaking as indicated by elevated discharge piping temperatures for associated CRD. • **PERFORM** 3-TI-393 for control rods with high temperatures or failed thermocouples. • **REFER TO** OPDP-4, 3-OI-85, 3-AOI-85-3. • **FLUSH** CRD to unblock restricted cooling water flow. **REFER TO** 3-OI-85. • **DECLARE** the control rod, which is in alarm, "SLOW" as directed by 3-TI-393 per Tech Spec Table 3.1.4-1 Note 1. • **RAISE** CRD Flow, as directed by Unit Supervisor, if required to keep the drives cool per "CRD Pump Operation At Elevated Flow" section of 3-OI-85.
	Driver	When called report CRD Temperature from ICS, report no elevated piping temperature

Simulator Event Guide:

Event 4 Component: Control Rod 30-23 High Temperature

	ATC	Flush of Control Rod 30-23 IAW 3-OI-85 Section 8.29
		CAUTION This section may only be used at the direction of the CRD System engineer to flush a CRD that has the characteristics of the cooling water flow being restricted by debris within the CRD. This flushing section should not be performed repeatedly (Greater than one time per week)on the same CRD to prevent thermal cycling on the CRD. GESIL 173. [1] **IF** flushing rods at Position 48, **THEN**: **NOTE** The following steps (performed only on rods at positions other than 48) perform an insert flush at reduced drive water DP to prevent the CRD from being inserted. [2] **IF** flushing rods at positions other than 48, **THEN**: [2.1] **LOWER** the CRD DRIVE WTR HDR DP, 3-PDI-85-17A, to < 75 psid, using CRD DRIVE WATER PRESS CONTROL VLV, 3-HS-85-23A. [2.2] **VERIFY** CRD POWER, 3-HS-85-46, in ON. [2.3] **SELECT** the control rod to be flushed by depressing the appropriate CRD ROD SELECT pushbutton, 3-XS-85-40. [2.4] **IF** while performing this section Rod Motion is observed, **THEN** [2.4.1] **IMMEDIATELY RELEASE** CRD CONTROL SWITCH 3-HS-85-48 and **NOTIFY** System Engineer. [2.4.2] **RAISE** the CRD DRIVE WTR HDR DP, 3-PDI-85-17A to between 250 psid and 270 psid, using CRD DRIVE WATER PRESS CONTROL VLV, 3-HS-85-23A. [2.4.3] **STOP** further flushing until authorized by the Unit Supervisor. **NOTE** It could take up to two minutes for CRD DRIVE WTR HDR DP to stabilize. [2.5] **CHECK** CRD DRIVE WTR HDR DP, 3-PDI-85-17A, is stable and < 75 psid. [2.6] **PLACE AND HOLD** CRD CONTROL SWITCH 3-HS-85-48, in ROD IN for 30 seconds.
	Driver	When called CRD System Engineer recommends flushing

Simulator Event Guide:

Event 4 Component: Control Rod 30-23 High Temperature

	ATC	[2.7] **ADJUST** the CRD DRIVE WTR HDR DP, 3-PDI-85-17A to between 250 psid and 270 psid, using CRD DRIVE WATER PRESS CONTROL VLV, 3-HS-85-23A. [2.8] **DESELECT** the control rod after flushing by PLACING CRD POWER, 3-HS-85-46, in OFF, **THEN PLACE** CRD POWER, 3-HS-85-46, in ON.
	SRO	Evaluate 3-TI-393 and Tech Spec 3.1.4 EVALUATION OF CRD TEMPERATURE ALARMS **SCOPE** This procedure is utilized by Operations personnel to evaluate CRD high temperature alarms as directed by 3-ARP-9-5A. **FREQUENCY** This instruction will be performed for the following conditions: • As required to evaluate new CRD high temperature alarms, **4.0 PRECAUTIONS AND LIMITATIONS** 4.1 GE SIL 173 discusses the potential effects on scram times for CRDs whose operating temperature is above 350 °F. Scram times can be increased by 0.150 to 0.500 seconds for a CRD operating between 350 °F and 525 °F. CRDs with temperatures above 350 °F are declared slow in accordance with Technical Specification Section 3.1.4 and are added to the population of rods scram time tested per 3-SR-3.1.4.1. **7.1 Evaluation of New Alarms** 7.1.1 Record the CRD number on Appendix B, Evaluation of New CRD Temperature Alarms. Record the CRD temperature or indicate that the alarm is due to an open thermocouple input (upscale trip of 3-TA-85-7 and unknown temperature data displayed on ICS). 7.1.2 Determine if the scram outlet valve is leaking by comparing the scram outlet piping temperature for the affected CRD to the scram outlet piping temperatures of adjacent HCUs. 7.1.4 If the CRD temperature is greater than 350 °F and it has been determined that the scram outlet valve is not leaking, perform Section 8.28 of 3-OI-85 to flush the CRD as directed by the System Engineer. If the CRD temperature returns to normal after flushing, document in the Comments field of Appendix B. 7.1.5 If the CRD temperature remains greater than 350 °F, 7.1.5.1 Declare the affected rod SLOW per Note 1 of Tech Spec Table 3.1.4-1, and contact Reactor Engineering to update the scram time data base.
	Driver	At direction of NRC initiate trigger 1 for loss of 480V Unit BD 3B

Simulator Event Guide:

Event 4 Component: Control Rod 30-23 High Temperature

<table>
<tr><td></td><td>SRO</td><td>Evaluate 3-TI-393 and Tech Spec 3.1.4</td></tr>
<tr><td></td><td></td><td>
3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Control Rod Scram Times

LCO 3.1.4 a. No more than 13 OPERABLE control rods shall be "slow," in accordance with Table 3.1.4-1; and

b. No more than 2 OPERABLE control rods that are "slow" shall occupy adjacent locations.

APPLICABILITY: MODES 1 and 2.

ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. Requirements of the LCO not met.</td><td>A.1 Be in MODE 3.</td><td>12 hours</td></tr>
</table>
Table 3.1.4-1 (page 1 of 1)
Control Rod Scram Times

----------NOTES----------
1. OPERABLE control rods with scram times not within the limits of this Table are considered "slow."

2. Enter applicable Conditions and Required Actions of LCO 3.1.3, "Control Rod OPERABILITY," for control rods with scram times > 7 seconds to notch position 06. These control rods are inoperable, in accordance with SR 3.1.3.4, and are not considered "slow."

</td></tr>
<tr><td></td><td>SRO</td><td>Contacts Reactor Engineering and Operations Management</td></tr>
<tr><td></td><td>SRO</td><td>Entries Tech Spec 3.1.4 Condition A, once flushing is started and control rod temperature lowers below 350° F can exit TS 3.1.4 condition A</td></tr>
<tr><td></td><td>Driver</td><td>When Reactor Engineer called "report that will evaluate"</td></tr>
<tr><td></td><td>Driver</td><td>At direction of NRC initiate trigger 1 for loss of 480V Unit BD 3B</td></tr>
</table>

Simulator Event Guide:

Event 4 Component: Control Rod 30-23 High Temperature

	SRO	May enter Tech Spec 3.1.3 and declare control rod inoperable and fully insert to exit TS 3.1.4 Condition A action statement.
		3.1.3 Control Rod OPERABILITY LCO 3.1.3 Each control rod shall be OPERABLE. APPLICABILITY: MODES 1 and 2. Condition C. One or more control rods inoperable for reasons other than Condition A or B Required Action C.1 Fully insert inoperable control rod Required Action C.2 Disarm the associated CRD Completion Time C.1 3 hours Completion Time C.2 4 hours
	SRO	Contacts Reactor Engineering and Operations Management
	SRO	Entries Tech Spec 3.1.4 Condition A, once flushing is started and control rod temperature lowers below 350° F can exit TS 3.1.4 condition A
	Driver	At direction of NRC initiate trigger 1 for loss of 480V Unit BD 3B

Simulator Event Guide:

Event 5 Component: Loss of 480V Unit Board 3B

	Crew	Respond the following Annunciators: 9-8A Window 4 and 35, 9-8B Window 17, 9-8C Window 22, 23, and 30 and 9-7A Window 31
		Announce loss of 480V Unit Board 3B
	SRO	Prioritize annunciators 9-7A Window 31, Highest Priority
	BOP	9-7A Window 31 GEN BUS DUCT FAN FAILURE
		A. **VERIFY** Main Bus Cooling Fans, 3-HS-262-1A or 1-HS-262-2A, indicates running on Panel 3-9-8 **AND START** GEN BUS DUCT HX FAN A using 3-HS-262-1A, on panel 3-9-8 to start the standby fan. B. **IF** no Fans are operating and the Generator is tied to the grid and loaded to greater than the self cooled bus rating of 16,500 amps **THEN, IMMEDIATELY INSERT** a manual reactor scram, **AND TRIP** the Main Generator. C. **IF** while executing this procedure, the Bus Duct Temperature is at or above the Temperature Excursion limit of 120°C, **THEN IMMEDIATELY INSERT** a manual reactor and **TRIP** the Main Generator.
		D. **DISPATCH** personnel as necessary to check the following: 1. Main Bus Cooling Fan on elevation 586' to check fan condition. 2. Monitor Bus Duct temperature by available means including using a portable temperature monitor device locally at the 14 in-service thermostats. **REFER** to Window 32, Figure 1. 3. 480V Unit Board 3A on elevation 586' to check breaker 5C closed. 4. 480V Unit Board 3B on elevation 604' to check breaker 5C closed. E. **VERIFY** the system is operating in accordance with 3-OI-47.
	Driver	When sent to investigate inform crew that an ACTUATION OF NORMAL SUPPLY BREAKER OVERCURRENT RELAY (51U)

Simulator Event Guide:

Event 5 Component: Loss of 480V Unit Board 3B

	Crew	Respond the following Annunciators: 9-8A Window 4 and 35, 9-8B Window 17, 9-8C Window 22, 23, and 30 and 9-7A Window 31
	BOP	Responds to remaining annunciators
		9-8A Window 4 and 35
		Window 4 EXCITATION SYSTEM ABNORMAL A. **CHECK** the following displays on ICS to identify the cause: • AVR ALARM CODES (AVRALM) • AVR FAULT CODES (AVRFLT) B. **ADJUST,** as required, VOLTAGE REGULATOR LOWER/RAISE ADJUST, 3-HS-57-26, to maintain the following: • GENERATOR VOLTS, 3-EI-57-39, between 20,900V and 23,100V. • GENERATOR MVARS, 3-EI-57-51
		Window 35 COMMUNICATIONS ROOM COMMON ALARM A. Unit 3 ICS display: 1. SYSTEM MIMICS 2. ANNUNCIATOR MIMICS 3. ANNUNCIATOR 8A 4. COMM ROOM COMMON ALARM 5. Determine alarm point in alarm by EOR point number with RED "ALM" for point QUAL.
	Driver	When sent to investigate inform crew that an ACTUATION OF NORMAL SUPPLY BREAKER OVERCURRENT RELAY (51U)

Simulator Event Guide:

Event 5 Component: Loss of 480V Unit Board 3B

	Crew	Respond the following Annunciators: 9-8A Window 4 and 35, 9-8B Window 17, 9-8C Window 22, 23, and 30 and 9-7A Window 31
	BOP	Responds to remaining annunciators
		9-8B Window 17
		Window 17 480V UNITBD 3B UV OR XFR Automatic action A. Undervoltage Trip (loss of following): • EHC hyd fluid system Pump 3B • Stator cooling water Pump 3B • Motor suction Pump • RFPT 3B 3B1 Main Oil Pump • Cond vac pump 3B • Lose one of two 480V AC power supplies to Generator Voltage Regulator. Voltage Regulator remains in service. • **COMPLETE** listing on reference drawings. B. Auto Transfer: • Alternate breaker closes • No loss of equipment
		A. **VERIFY** automatic action has occurred. B. **INSPECT** 480V Unit Bd 3B for abnormal conditions: relay targets, smoke, burned paint, breaker position, etc. C. **REFER TO** 0-OI-57B to re-energize board. D. **REFER TO** appropriate OI for recovery or realignment of equipment.
	Driver	When sent to investigate inform crew that an ACTUATION OF NORMAL SUPPLY BREAKER OVERCURRENT RELAY (51U). Unit Board 3B failed to transfer

Simulator Event Guide:

Event 5 Component: Loss of 480V Unit Board 3B

	Crew	Respond the following Annunciators: 9-8A Window 4 and 35, 9-8B Window 17, 9-8C Window 22, 23, and 30 and 9-7A Window 31
	BOP	Responds to remaining annunciators
		9-8C Window 22, 23, and 30
		Window 22 480V TB VENT BD 3B UV OR XFR A. **VERIFY** alarm by checking associated annunciator, TURBINE BLDG VENTILATION ABNORMAL, (3-XA-55-3D, Window 4) in alarm. □ B. **DISPATCH** personnel to TB VENT Bd 3B to check equipment, board status, and abnormal conditions. • Turbine spaces supply fans 3A and 3B • Turbine room supply fans 3C, 3D, 3E • Turbine room exhaust fans 3E, 3F, 3G, 3H, 3J • Electrical space supply fan 3A, 3B, and exhaust fan C. **REFER TO** 0-OI-57B to re-energize or transfer the board. D. **REFER TO** appropriate OI for recovery or realignment of equipment.
		Window 23 480V TURB MOV BD 3B UV OR XFR A. **VERIFY** alarm by checking light indication in Control Room for the following equipment: • Steam packing exhauster blower 3B • RFPT injection water pump 3B • RFPT oil tanks vapor extractor • RFPT 3A 3A2 Main Oil Pump • RFPT 3C 3C2 Main Oil Pump B. **NOTIFY** Radwaste of loss of the following: • Station sump pump 3A • Turb Bldg equipment and floor drain sump pump 3B • Turb Bldg cnds pump pit equipment and floor drain sump pump 3B C. **CHECK** board for abnormal conditions: relay targets, smoke, burned paint, breaker position, etc. D. **REFER TO** 0-OI-57B to re-energize or transfer the board. E. **REFER TO** appropriate OI for recovery or realignment of equipment.
	Driver	When sent to investigate inform crew that 480V TB Vent BD 3B transferred and 480V TURB MOV BD 3B transferred. DO NOT re-energize 480V Unit BD 3B, electrical Maintenance will have to investigate actuation of overcurrent relay

Simulator Event Guide:

Event 5 Component: Loss of 480V Unit Board 3B

	Crew	Respond the following Annunciators: 9-8A Window 4 and 35, 9-8B Window 17, 9-8C Window 22, 23, and 30 and 9-7A Window 31
	BOP	Responds to remaining annunciators
		9-8C Window 22, 23, and 30
		Window 30 480V TURB MOV BD 3C UV OR XFR A. **VERIFY** alarm by checking light indication in Control Room for the following equipment: • H2 main seal oil pump • H2 seal oil vacuum pump • H2 recirculating seal oil pump • Steam packing exhauster blower 3A B. **CHECK** MOV board for abnormal conditions: relay targets, smoke, burned paint, breaker position, etc. C. **REFER TO** 0-OI-57B to re-energize or transfer the board. D. **REFER TO** appropriate OI for recovery or realignment of equipment.
	SRO	Will call outside US and determine if board can be re-energized
	Driver	When sent to investigate inform crew that 480V TURB MOV BD 3C transferred. DO NOT re-energize 480V Unit BD
	Driver	At NRC direction insert trigger 3 for Off Gas Malfunction when hydrogen is above 5% and at NRC direction initiate trigger 5 for Hydrogen Explosion

Simulator Event Guide:

Event 6 Component: OFF-GAS H2 RECOMBINER CATALYST FAILURE

	BOP	Responds to alarm the following alarms: HIGH OFFGAS % H2 TRAIN A (9-53, Window 3) HIGH OFFGAS % H2 TRAIN B (9-53, Window 13) H2 WATER CHEMISTRY ABNORMAL, (9-53, window 10)
	BOP	Reports a rise in hydrogen concentration on OFF GAS HYDROGEN ANALYZERs (CH 1-Analyzer 3A, CH 2-Analyzer 3B) recorder, 3-XR-66-103/1 and 2, Panel 9-53.
	SRO	Enters 3-AOI-66-1, Off-Gas H2 High.
		4.1 Immediate Actions None
		4.2 Subsequent Actions [1] **PLACE** both OFFGAS TRAIN A(B) AUTO CHANNEL CHECK / BYPASS control switches, 3-HS-066-1007 and 1008, on OFFGAS SAMPLE PANEL, 3-LPNL-925-0588, in BYPASS to assure continuous availability of hydrogen monitoring. [2] **IF** HWC System injection is in service, **THEN PERFORM** the following: [2.1] At HYDROGEN WATER CHEMISTRY CONTROL PANEL, 3-LPNL-925-0589, **VERIFY** that H2 and O2 injection rates are normal at Operator Interface Unit (OIU). (H2 injection rate should match the setpoint on the OIU and the O2 injection rate should match the setpoint on the OIU which should be half of the H2 injection rate during normal steady state conditions.) [2.2] **IF** H2 and O2 injection rates do **NOT** meet the above conditions, **THEN** [2.3] **IF** oxygen concentration as indicated on OFFGAS TRAIN A or TRAIN B SAMPLE O2 INDICATOR, 3-O2I-066-1051 or 1052, on 3-LPNL-925-0588 indicates less than 5% oxygen **AND** an automatic HWC shutdown has **NOT** occurred, **THEN INITIATE** a HWC System shut down using either, 3-HS-4-40A H2 WATER CHEMISTRY CONTROL [Panel 3-9-53], 3-HS-4-40B H2 WATER CHEMISTRY CONTROL [Panel 3-9-5] or 3-HS-4-39 HWC SHUTDOWN SWITCH [3-LPNL-925-0588].
	Driver	When directed wait 2 minutes and report that both OFFGAS TRAIN A(B) AUTO CHANNEL CHECK / BYPASS control switches, 3-HS-066-1007 and 1008 are in bypass. Report that H2 and O2 injection rates are normal. When called to report O2 concentration for step 2.3 above report a concentration of 4.5%.

Simulator Event Guide:

Event 6 Component: OFF-GAS H2 RECOMBINER CATALYST FAILURE

		[3] **VERIFY** proper operation of in service SJAE. (Steam jet may have failed to isolate on low supply steam pressure.) [3.1] **IF** a failure of the in service SJAE is indicated **AND** hydrogen concentration is less than 4%, **THEN PLACE** standby SJAE in service. **REFER TO** 3-OI-66 (otherwise N/A)
		[4] **IF** hydrogen concentration is ≥ 4%, **THEN REFER TO** TRM 3.7.2
	SRO	TR 3.7.2 Airborne Effluents LCO 3.7.2 Whenever the SJAE is in service, the concentration of hydrogen in the offgas downstream of the recombiners shall be limited to ≤ 4% by volume. APPLICABILITY: During main condenser offgas treatment system operation Condition A: With the concentration of hydrogen >4% by volume. Required Action A.1: Restore the concentration to within the limit. Completion Time: 48 hours
	Driver	When directed wait 2 minutes and report that both OFFGAS TRAIN A(B) AUTO CHANNEL CHECK / BYPASS control switches, 3-HS-066-1007 and 1008 are in bypass. Report that H2 and O2 injection rates are normal.

Simulator Event Guide:

Event 6 Component: OFF-GAS H2 RECOMBINER CATALYST FAILURE

		NOTE Fuel failure is indicated by, but **NOT** limited to, rising activity on the following: • OFF-GAS PRETREATMENT RADIATION recorder, 3-RR-90-157 (Panel 3-9-2) • MAIN STEAM LINE RADIATION recorder, 3-RR-90-135 (Panel 3-9-2) • OFFGAS POST-TREATMENT RADIATION recorder, 3-RR-90-265 • On MAIN CONDENSERS (MN COND) ICS display: Offgas pretreatment, post treatment, and stack radiation [5] **IF** high hydrogen concentration is a result of possible fuel failure, **THEN REDUCE** core flow to 50 - 60 % (otherwise N/A).
		[6] **WHEN** any of the following conditions exist **OBTAIN** US approval, **THEN SCRAM** the Reactor (**REFER TO** 3-AOI-100-1): • Hydrogen ignition/explosion as indicated by rising temperature, and/or pressure, and/or flow in the Off-Gas System which may cause some or all of the following annunciators to alarm: • OFF-GAS HOLDUP VOLUME PRESS HIGH, (3-XA-55-7A, Window 1) • OFF-GAS HOLDUP VOLUME TEMP HIGH, (3-XA-55-7A, Window 2) • OG CHARCOAL BED VESSEL TEMP HIGH, (3-XA-55-53, Window 9) • HOLDUP LINE INLET FLOW HIGH, (3-XA-55-53, Window 14) • CHARCOAL BED VAULT TEMP HIGH, (3-XA-55-53, Window 19) • CHARCOAL BED GAS REHTR OUTL DEW PT TEMP HIGH, (3-XA-55-53, Window 27) • CHARCOAL TRAIN INLET/OUTLET PRESS HIGH, (3-XA-55-53, Window 28) • Charcoal combustion in Adsorber beds as indicated by rising temperature and/or radiation in the Off-Gas System which may cause some or all of the following windows to alarm: • CHARCOAL BED VESSEL TEMP HIGH, (3-XA-55-53, Window 9) • CHARCOAL BED VAULT TEMP HIGH, (3-XA-55-53, Window 19) • OG POST TRTMT RADIATION HIGH, (3-XA-55-4C, Window 33) • Unit Supervisor direction
	NRC	The Following alarms will come in when Off Gas Explosion occurs: Panel 7A window 1,4,9; Panel 4C window 33,34,35; Panel 3A window 6,13; Panel 53 window 4,14,8,9,18,27,28
	SRO	May Direct Core Flow runback prior to Reactor Scram
	SRO	Directs Reactor SCRAM and enters 3-AOI-100-1
	Driver	Just before scram or as scram is directed insert trigger 15 for loss of feedwater

Simulator Event Guide:

Event 6 Component: OFF-GAS H2 RECOMBINER CATALYST FAILURE

	BOP	Respond to Annunciator 4C window 35: OG POST TRTMT RAD MONITOR HI HI HI/INOP
		A. **VERIFY** alarm condition on the following: • OFFGAS POST-TREATMENT RADIATION recorder, 3-RR-90-265 on Panel 3-9-2 • OG POST-TREATMENT CHAN A RAD MON RTMR radiation monitor, 3-RM-90-266A on Panel 3-9-10 • OG POST-TREATMENT CHAN B RAD MON RTMR radiation monitor, 3-RM-90-265A on Panel 3-9-10 B. **CHECK** the following is in alarm: • OFF-GAS ISOLATION VALVE CLOSED, 3-XA-55-7A Window 4. C. **VERIFY** OFF-GAS SYSTEM ISOLATION VALVE, 3-FCV-66-28 has the mechanical restraint **DISENGAGED** and 3-FCV-66-28 is CLOSED.
	BOP	Closes OFF-GAS SYSTEM ISOLATION VALVE, 3-FCV-66-28
	SRO	May Direct Core Flow runback prior to Reactor Scram
	SRO	Directs Reactor SCRAM and enters 3-AOI-100-1
	Driver	Just before scram or as scram is directed insert trigger 15 for loss of feedwater

Simulator Event Guide:

Event 6 Component: OFF-GAS H2 RECOMBINER CATALYST FAILURE

	BOP	Responds to annunciator 9-7A window 1, OFF-GAS HOLDUP VOLUME PRESS HIGH
		A. **CHECK** off-gas flow recorder, 3-FR-66-20 on Panel 3-9-8 and pressure to off-gas preheater 3-PI-66-71 on Panel 3-9-53. B. **CHECK** for indications of H2 ignition: 1. OFF GAS HOLDUP VOLUME TEMP HIGH alarm, 3-XA-55-7A, Window 2. 2. OFF GAS SAMPLE FLOW ABNORMAL alarm, 3-XA-55-3A, Window 33. 3. Various abnormal indications or alarms **NOT** limited to, but may include one or more of the following on Panel 3-9-53: a. GAS RHTR OUTLET DEW POINT HIGH TEMP alarm, 3-XA-55-53, Window 27. b. Upscale reading on Recorder 3-TRS-66-108. c. Adsorber Vault (3-TRS-66-120) or Adsorber Vessel (3-TRS-66-115) high temperature. d. Lowering inlet recombiner temperature 3-TI-66-75A(B).
		C. **IF** indication of H2 ignition is present, **THEN VERIFY** the following valves are closed: • 3-FCV-66-14, 18 - SJAE discharge valves. • 3-FCV-66-11, 15 - SJAE Air inlet valves. • 3-PCV-1-151,153,166,167 - SJAE steam pressure control valves. • 3-FCV-1-155,156,172,173 - SJAE steam isolation valves. • 3-FSV-1-150,152 SJAE inter-condenser drain valves, **AND REFER TO** 3-AOI-66-1.
	BOP	Verify the following Valves Closed • 3-FCV-66-14, 18 - SJAE discharge valves. • 3-FCV-66-11, 15 - SJAE Air inlet valves. • 3-PCV-1-151,153,166,167 - SJAE steam pressure control valves. • 3-FCV-1-155,156,172,173 - SJAE steam isolation valves. • 3-FSV-1-150,152 SJAE inter-condenser drain valves
	SRO	May Direct Core Flow runback prior to Reactor Scram
	SRO	Directs Reactor SCRAM and enters 3-AOI-100-1
	Driver	Just before scram or as scram is directed insert trigger 15 for loss of feedwater

Simulator Event Guide:

Event 7 Major: SCRAM and Loss of Feedwater

	SRO	Directs Reactor SCRAM and enters 3-AOI-100-1
		4.1 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) [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
		4.2 Subsequent Actions [3] **DRIVE** in all IRMs and SRMs from Panel 3-9-5 as time and conditions permit. [3.1] **DOWNRANGE** IRMs as necessary to follow power as it lowers. [4] **VERIFY** SCRAM DISCH VOL VENT & DR VLVS closed by green indicating lights at SDV Display on Panel 3-9-5. [5] **MONITOR** and **CONTROL** Reactor Water Level between +2" and +51", or as directed by US, as follows:
	Crew	Reports loss of Unit Board 3C
	ATC	Report Loss of all Condensate Booster Pumps

NRC Scenario 1

Simulator Event Guide:

Event 7 Major: SCRAM and Loss of Feedwater

	SRO	Enters EOI-1 on Reactor Level
	SRO	EOI-1 (Reactor Pressure)
		Monitor and Control Reactor Pressure
		IF Drywell Pressure Above 2.4 psig? – NO
		IF Emergency Depressurization is Anticipated and the Reactor will remain subcritical without boron under all conditions, **THEN** Rapidly depressurize the RPV with the Main Turbine Bypass Valves irrespective of cooldown rate? - NO
		IF Emergency Depressurization is or has been required THEN exit RC/P and enter C2 Emergency Depressurization? - NO
		IF RPV water level cannot be determined? - NO
		Is any MSRV Cycling? – No
		IF Steam cooling is required? - NO
		IF Suppression Pool level and temperature cannot be maintained in the safe area of Curve 3?- NO
		IF Suppression Pool level cannot be maintained in the safe area of Curve 4? - NO
		IF Drywell Control air becomes unavailable? - NO
		IF Boron injection is required? - NO
	SRO	Directs a Pressure Band with MSIVs
	SRO	EOI-1 (Reactor Level)
		Monitor and Control Reactor Water Level. Directs Verification of PCIS isolations.
	ATC/BOP	Verifies PCIS isolations.
	SRO	Directs ATC to Restores and Maintains RPV Water Level between (+) 2 to (+) 51 inches with the following injection source. **(RCIC, App 5C)**
	ATC	Initiates RCIC IAW **App 5C**

Simulator Event Guide:

Event 7 Major: SCRAM and Loss of Feedwater

	ATC/BOP	Maintain Directed Level Band with RCIC, **Appendix 5C.**
		1. **VERIFY RESET** and **OPEN** 3-FCV-71-9, RCIC TURB TRIP/THROT VALVE RESET.
		2. **VERIFY** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller in AUTO with setpoint at 600 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.
		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 600 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.
		9. IF BOTH of the following exist? - NO
		10. **ADJUST** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller as necessary to control injection.

NRC Scenario 1

Simulator Event Guide:

Event 7 Major: SCRAM and Loss of Feedwater

	Crew	Respond to Turbine Building Radiation High
		A. **DETERMINE** area with high radiation level on Panel 3-9-11. Report Numerous Turbine Building areas B. **IF** the TSC is **NOT** manned, **THEN USE** public address system to evacuate area where high airborne conditions exist.
		Respond to MAIN STEAM LINE RADIATION HIGH
		A. **CHECK** following radiation recorders: 1. MAIN STEAM LINE RADIATION, 3-RR-90-135 on Panel 3-9-2.
		Respond to RX BLDG AREA RADIATION HIGH
		A. **DETERMINE** area with high radiation level on Panel 3-9-11. RX BLDG 565 Area 3-RI-90-21A
		D. **IF** the TSC is **NOT** manned and a "VALID" radiological condition exists., **THEN USE** public address system to evacuate area where high radiological conditions exist
		I. **ENTER** 3-EOI-3 Flowchart.
	SRO	Enters **EOI-3** on **Secondary Containment Radiation**
	SRO	If Reactor Zone or Refuel Zone Exhaust Radiation Level is above 72 mr/hr. NO
	SRO	If Reactor Zone or Refuel Zone Exhaust Ventilation isolated and ventilation radiation levels are below 72 mr/hr Then Restart Reactor Zone and Refuel Zone Ventilation.
	SRO	Directs Restart of Reactor Zone and Refuel Zone Exhaust Ventilation **(App 8F)** Directs Defeat of isolation interlocks **(App 8E)**
	BOP/ATC	Calls for Appendix 8E and when complete Restarts Reactor Zone and Refuel Zone Exhaust Ventilation
		Is Any Area Radiation Level Above Max Normal? - **YES**
		Isolate all systems that are discharging into the area except systems required to: • Be operated by EOIs **OR** • Suppress a Fire
		Will Emergency Depressurization Reduce Discharge Into Secondary Containment? – NO, NO System Discharging
		Before any area radiation rises to Max Safe (table 4) Continue and enter EOI-1 (EOI-1 has already been entered after Reactor Scram)
	Crew	Monitors for Max Safe Radiation and reports
	DRIVER	If Called for Appendix 8E, Wait 4 minutes, enter bat app08e and report complete

Simulator Event Guide:

Event 7 Major: SCRAM and Loss of Feedwater

	ATC/BOP	**Appendix 8F** - RESTORING REFUEL ZONE AND REACTOR ZONE VENTILATION FANS FOLLOWING GROUP 6 ISOLATION
		1. **VERIFY** PCIS Reset. 2. **PLACE** Refuel Zone Ventilation in service as follows (Panel 3-9-25): a. **VERIFY** 3-HS-64-3A, REFUEL ZONE FANS AND DAMPERS, control switch is in OFF. b. **PLACE** 3-HS-64-3A, REFUEL ZONE FANS AND DAMPERS, control switch to SLOW A (SLOW B). c. **CHECK** two SPLY/EXH A(B) green lights above 3-HS-64-3A, REFUEL ZONE FANS AND DAMPERS, control switch extinguish and two SPLY/EXH A(B) red lights illuminate. d. **VERIFY OPEN** the following dampers: • 3-FCO-64-5, REFUEL ZONE SPLY OUTBD ISOL DMPR • 3-FCO-64-6, REFUEL ZONE SPLY INBD ISOL DMPR • 3-FCO-64-9, REFUEL ZONE EXH OUTBD ISOL DMPR • 3-FCO-64-10, REFUEL ZONE EXH INBD ISOL DMPR.
		3. **PLACE** Reactor Zone Ventilation in service as follows (Panel 3-9-25): a. **VERIFY** 3-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch is in OFF. b. **PLACE** 3-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch in SLOW A (SLOW B). c. **CHECK** two SPLY/EXH A(B) green lights above 3-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch extinguish and two SPLY/EXH A(B) red lights illuminate. d. **VERIFY OPEN** the following dampers: • 3-FCO-64-13, REACTOR ZONE SPLY OUTBD ISOL DMPR • 3-FCO-64-14, REACTOR ZONE SPLY INBD ISOL DMPR • 3-FCO-64-42, REACTOR ZONE EXH INBD ISOL DMPR • 3-FCO-64-43, REACTOR ZONE EXH OUTBD ISOL DMPR.

Simulator Event Guide:

Event 7 Major: SCRAM and Loss of Feedwater

	Crew	Report rising Drywell Pressure
	SRO	**Enters EOI-2 on High Drywell Pressure** **DW/T** Monitor and control Drywell temperature below 160F using available Drywell cooling Can Drywell Temperature be maintained below 160F, NO Operate all available drywell cooling Before Drywell Temperature rises to 200F enter EOI-1 and Scram Reactor, Completed Before Drywell Temperature rises to 280F continue Is Suppression Pool Level below 19 Feet, YES Is Drywell Temperatures and Pressures within the safe area of curve 5, YES Directs Shutdown of Recirc Pumps and Drywell Blowers Initiate DW Sprays using only those pumps NOT required to assure adequate core cooling by continuous injection **(App 17B)**

Simulator Event Guide:

Event 7 Major: SCRAM and Loss of Feedwater

	Crew	Report rising Drywell Pressure
	SRO	**Enters EOI-2 on High Drywell Pressure** **PC/P** Monitor and control PC pressure below 2.4 psig using the Vent System (AOI-64-1), PC pressure above 2.4 psig unable to vent When PC pressure CANNOT be maintained below 2.4 psig, Continues Before suppression chamber pressure rises to 12 psig continue, Continues Initiate suppression chamber sprays using only those pumps NOT required to assure adequate core cooling by continuous injection (**App 17C**), Direct Appendix 17C When suppression chamber pressure exceeds 12 psig, Continues Is Suppression Pool Level below 19 Feet, YES Is Drywell Temperatures and Pressures within the safe area of curve 5, YES Directs Shutdown of Recirc Pumps and Drywell Blowers Initiate DW Sprays using only those pumps NOT required to assure adequate core cooling by continuous injection **(App 17B)** When Suppression chamber pressure CANNOT be maintained in the safe area of Curve 5 Continue, Does not continue

Simulator Event Guide:

Event 7 Major: SCRAM and Loss of Feedwater

	Crew	Report rising Drywell Pressure
	SRO	**Enters EOI-2 on High Drywell Pressure** **PC/P** Monitor and control PC pressure below 2.4 psig using the Vent System (AOI-64-1), PC pressure above 2.4 psig unable to vent When PC pressure CANNOT be maintained below 2.4 psig, Continues Before suppression chamber pressure rises to 12 psig continue, Continues Initiate suppression chamber sprays using only those pumps NOT required to assure adequate core cooling by continuous injection **(App 17C),** Direct Appendix 17C When suppression chamber pressure exceeds 12 psig, Continues Is Suppression Pool Level below 19 Feet, YES Is Drywell Temperatures and Pressures within the safe area of curve 5, YES Directs Shutdown of Recirc Pumps and Drywell Blowers Initiate DW Sprays using only those pumps NOT required to assure adequate core cooling by continuous injection **(App 17B)** When Suppression chamber pressure CANNOT be maintained in the safe area of Curve 5 Continue, Does not continue

Simulator Event Guide:

Event 7 Major: SCRAM and Loss of Feedwater

	Crew	Report rising Drywell Pressure
	SRO	**Enters EOI-2 on High Drywell Pressure** **PC/H** Verify H2O2 analyzer in service (**APP 19)** When H2 is detected in PC (2.4% on control room indicators continue, does not continue
		Enters EOI-2 on High Drywell Pressure **SP/T** **MONITOR** and **CONTROL** suppr pl temp below 95°F using available suppr pl cooling (**APPX 17A),** Pool Temp below 95° WHEN suppr pl temp CANNOT be maintained below 95°F, does not continue **Enters EOI-2 on High Drywell Pressure** **SP/L** **MONITOR** and **CONTROL** suppr pl lvl between -1 in. and -6 in. (**APPX 18)** Can suppr pl lvl be maintained above -6 in., YES Can suppr pl lvl be maintained below -1 in., YES

Simulator Event Guide:

Event 8 Component: RHR Pumps 3A and 3C Trip

	ATC/BOP	**3-EOI APPENDIX-17C**, RHR System Operation Suppression Chamber Sprays
		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 auto open signal as necessary by **PLACING** 3-HS-74-155A(B), LPCI SYS I(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. 4. IF Directed by SRO to spray the Suppression Chamber using Fire Protection, THEN **CONTINUE** in this procedure at Step 8.
		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. 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.
	ATC/BOP	When RHR Pumps 3A and 3C are started they will trip, operator will report and align Loop 2 of RHR

Simulator Event Guide:

Event 8 Component: RHR Pumps 3A and 3C Trip

	ATC/BOP	**3-EOI APPENDIX-17C**, RHR System Operation Suppression Chamber Sprays
		h. IF RHR System I(II) is operating ONLY in Suppression Chamber Spray mode, THEN **CONTINUE** in this procedure at Step 5.k. i. **VERIFY CLOSED** 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE. j. **RAISE** system flow by placing the second RHR System I(II) pump in service as necessary. 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 3A 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 3D RHRSW OUTLET VLV. n. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers. 6. WHEN EITHER of the following exists: • Before Suppression Pool pressure drops below 0 psig, **OR** • Directed by SRO to stop Suppression Chamber Sprays, THEN **STOP** Suppression Chamber Sprays as follows: a. **CLOSE** 3-FCV-74-58(72), RHR SYS I(II) SUPPR CHBR SPRAY VALVE. b. **VERIFY CLOSED** 3-FCV-74-100, RHR SYS I U-2 DISCH XTIE c. IF RHR operation is desired in ANY other mode, THEN **EXIT** this EOI Appendix. d. **STOP** RHR Pumps 3A and 3C (3B and 3D). e. **CLOSE** 3-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV.

Simulator Event Guide:

Event 8 Component: RHR Pumps 3A and 3C Trip

	ATC/BOP	**3-EOI APPENDIX-17B**, RHR System Operation Drywell Sprays
		1. BEFORE Drywell pressure drops below 0 psig, **CONTINUE** in this procedure at Step 7. 2. IF Adequate core cooling is assured, **OR** Directed to spray the Drywell irrespective of adequate core cooling, THEN **BYPASS** LPCI injection valve auto open signal as necessary by **PLACING** 3-HS-74-155A(B), LPCI SYS I(II) OUTBD INJ VLV BYPASS SEL in **BYPASS**. 3. **VERIFY** Recirc Pumps and Drywell Blowers shutdown. 4. IF Directed by SRO to spray the Drywell using Standby Coolant supply, THEN **CONTINUE** in this procedure at Step 8. 5. IF Directed by SRO to spray the Drywell using Fire Protection, THEN **CONTINUE** in this procedure at Step 9.
		6. **INITIATE** Drywell 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) LPCI INBD INJECT VALVE, is OPEN, THEN **VERIFY CLOSED** 3-FCV-74-52(66), RHR SYS I(II) LPCI OUTBD INJECT VALVE. 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.
	ATC/BOP	When RHR Pumps 3A and 3C are started they will trip, operator will report and align Loop 2 of RHR

Simulator Event Guide:

Event 8 Component: RHR Pumps 3A and 3C Trip

	ATC/BOP	**3-EOI APPENDIX-17B,** RHR System Operation Drywell Sprays
		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. i. **MONITOR** RHR Pump NPSH using Attachment 2. j. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger(s). k. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1350 and 4500 gpm RHRSW flow: • 3-FCV-23-34, RHR HX 3A 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 3D RHRSW OUTLET VLV. l. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers. 7. WHEN EITHER of the following exists: • Before drywell pressure drops below 0 psig, **OR** • Directed by SRO to stop Drywell Sprays, THEN **STOP** Drywell Sprays as follows: a. **VERIFY CLOSED** the following valves: • 3-FCV-74-100, RHR SYS I U-2 DISCH XTIE • 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. b. **VERIFY OPEN** 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE. c. IF RHR operation is desired in ANY other mode, THEN **EXIT** this EOI Appendix. d. **STOP** RHR Pumps 3A and 3C (3B and 3D).

Simulator Event Guide:

Event 9 Major: Fuel Failure

	ATC/BOP	Report MAIN STEAM LINE RADIATION HIGH-HIGH
		A. **VERIFY** alarm on 3-RM-90-136 thru 137 on Panel 3-9-10. B. **CONFIRM** main steam line radiation level on recorder 3-RR-90-135, Panel 3-9-2. C. **IF** alarm is **VALID** and scram has **NOT** occurred, **THEN PERFORM** the following: **IF** core flow is above 60%, **THEN** 1. **LOWER** core flow to between 50-60%. 2. **MANUALLY SCRAM** the Reactor. 3. **REFER TO 3**-AOI-100-1. D. **IF** SLC injection per RC/Q of EOI-1 is NOT required, **THEN VERIFY** the MSIVs closed.
	SRO	Directs MSIVs Closed and transitions pressure control to **Appendix 11A**
	ATC/BOP	Close MSIVs and commences pressure control with **Appendix 11A**

Simulator Event Guide:

Event 9 Major: Fuel Failure

	ATC/BOP	Commence pressure control with **Appendix 11A**, Alternate RPV Pressure Control Systems MSRVs
		1. IF Drywell Control Air is NOT available, THEN **EXECUTE** EOI Appendix 8G, CROSSTIE CAD TO DRYWELL CONTROL AIR, **CONCURRENTLY** with this procedure. 2. IF Suppression Pool level is at or below 5.5 ft, THEN **CLOSE** MSRVs and **CONTROL** RPV pressure using other options. 3. **OPEN** MSRVs using the following sequence to control RPV pressure as directed by SRO: a. 1 3-PCV-1-179 MN STM LINE A RELIEF VALVE. b. 2 3-PCV-1-180 MN STM LINE D RELIEF VALVE. c. 3 3-PCV-1-4 MN STM LINE A RELIEF VALVE. d. 4 3-PCV-1-31 MN STM LINE C RELIEF VALVE. e. 5 3-PCV-1-23 MN STM LINE B RELIEF VALVE. f. 6 3-PCV-1-42 MN STM LINE D RELIEF VALVE. g. 7 3-PCV-1-30 MN STM LINE C RELIEF VALVE. h. 8 3-PCV-1-19 MN STM LINE B RELIEF VALVE. i. 9 3-PCV-1-5 MN STM LINE A RELIEF VALVE. j. 10 3-PCV-1-41 MN STM LINE D RELIEF VALVE. k. 11 3-PCV-1-22 MN STM LINE B RELIEF VALVE. l. 12 3-PCV-1-18 MN STM LINE B RELIEF VALVE. m. 13 3-PCV-1-34 MN STM LINE C RELIEF VALVE.

Simulator Event Guide:

Event 9 Major: Fuel Failure

	ATC/BOP	Report RX BLDG, TURB BLDG, RF ZONE EXH RADIATION HIGH AND RCIC STEAM LINE LEAK DETECTION TEMP HIGH
		RCIC STEAM LINE LEAK DETECTION TEMP HIGH A. **CHECK** following instrumentation: 1. RCIC temperature elements on LEAK DETECTION SYSTEM TEMPERATURE Recorder, 1-TR-69-29 (Points 9-12) on 1-9-21. 2. CS / RCIC ROOM EL. 519 RX BLDG, 1-RI-90-26A, on Panel 1-9-11. 3. RX REFUEL ZONE EXHAUST RADIATION, 1-RR-90-144, on Panel 1-9-2 B. **IF** RCIC is **NOT** in service **AND** 1-FI-71-1A(B), RCIC STEAM FLOW indicates flow, **THEN ISOLATE** RCIC AND verify temperatures lowering. C. **IF** high temperature is confirmed, **THEN ENTER** 1-EOI-3 Flowchart.
	ATC/BOP	Reports rising temperature in RCIC Area, If temperature continues to rise it will cause a RCIC Isolation @ 165°F in Torus area or RCIC Pump Room temp.
	SRO	Re-Enters EOI-3

Simulator Event Guide:

Event 9 Major: Fuel Failure

	SRO	RE Enters **EOI-3** on **Secondary Containment Temperature**
	SRO	If Reactor Zone or Refuel Zone Exhaust Radiation Level is above 72 mr/hr. NO
	SRO	If Reactor Zone or Refuel Zone Exhaust Ventilation isolated and ventilation radiation levels are below 72 mr/hr Then Restart Reactor Zone and Refuel Zone Ventilation.
	SRO	Directs Restart of Reactor Zone and Refuel Zone Exhaust Ventilation (App 8F) Directs Defeat of isolation interlocks (App 8E)
	BOP/ATC	Calls for Appendix 8E and when complete Restarts Reactor Zone and Refuel Zone Exhaust Ventilation
	SRO	Monitors and Controls Secondary Containment Temps
		Operate Available ventilation (APPX 8F) Defeat Isolation interlocks if necessary (APPX 8E)
		Is any Area Temp Above MAX Normal, Yes RCIC Room
		Isolate all systems that are discharging into the area except systems required to: • Be operated by EOIs **OR** • Suppress a Fire
	ATC/BOP	Attempt to Isolate RCIC, RCIC fails to isolate
	SRO	Will Emergency Depressurization Reduce Discharge Into Secondary Containment? – YES
		Before ANY Area Temp Rises to MAX Safe Continue, Completed
		When Temps in 2 or more areas are above MAX Safe Then Continue, Does Not Continue in the Temperature leg, NO area at or above MAX Safe Temperature
	SRO	Enters **EOI-3** on **Secondary Containment Radiation**
		Will Emergency Depressurization Reduce Discharge Into Secondary Containment? – YES
		Before any area radiation rises to Max Safe (table 4) Continue When Radiation Levels in 2 or more Areas are Above MAX Safe Then Continue,
	ATC/BOP	Report Two areas are above MAX SAFE Radiation Levels 3-RI-90-26A CS/RCIC Room and 3-RI-90-29A Supp Pool Area 519 Elev.
	SRO	Continues to Emergency RPV Depressurization 3-C-2

Simulator Event Guide:

Event 10 Instrument: ADS SRV 1-34, Acoustic Monitor indication failure

	SRO	Emergency RPV Depressurization 3-C-2
		RPV Water Level CANNOT be determined, NO
		Containment Water Level CANNOT be Maintained Below 44 Feet, NO
		DW Control Air Becomes Unavailable, NO
		Will the Reactor remain subcritical without boron under all conditions, YES
		Is DW pressure above 2.4 psig, YES
		Prevent Injection from ONLY those CS and LPCI Pumps NOT required to assure adequate core cooling (APPX 4), NOT required currently no injection systems aligned for injection
		Is Suppression Pool Level above 5.5 feet, YES
		Directs all ADS Valves Open
	ATC/BOP	Opens six ADS Valves, reports indication on that ADS Valve 1-34 failed to open
	SRO	Can 6 ADS Valves be Opened, NO
		Open Additional MSRVs as necessary to establish 6 MSRVs open
	ATC/BOP	Open an additional MSRV, reports 6 MSRVs are open

Simulator Event Guide:

Event 10 Instrument: ADS SRV 1-34, Acoustic Monitor indication failure

	SRO	EOI-1 RPV Control
	SRO	Directs ATC to Restores and Maintains RPV Water Level between (+) 2 to (+) 51 inches with the following injection source. **Condensate APPX 6A, Core Spray APPX 6D, 6E**
	SRO	Can RPV Water Level be maintained above 2 inches, Yes
	ATC/BOP	Align injection sources directed by the SRO and Restores Level to 2 to 51 inches
		Injection Subsystems Lineup **Condensate**
		1. **VERIFY CLOSED** the following Feedwater heater return valves: 3-FCV-3-71, HP HTR 3A1 LONG CYCLE TO CNDR 3-FCV-3-72, HP HTR 3B1 LONG CYCLE TO CNDR 3-FCV-3-73, HP HTR 3C1 LONG CYCLE TO CNDR. 2. **VERIFY CLOSED** the following RFP discharge valves: 3-FCV-3-19, RFP 3A DISCHARGE VALVE 3-FCV-3-12, RFP 3B DISCHARGE VALVE 3-FCV-3-5, RFP 3C DISCHARGE VALVE. 3. **VERIFY OPEN** the following drain cooler inlet valves: 3-FCV-2-72, DRAIN COOLER 3A5 CNDS INLET ISOL VLV 3-FCV-2-84, DRAIN COOLER 3B5 CNDS INLET ISOL VLV 3-FCV-2-96, DRAIN COOLER 3C5 CNDS INLET ISOL VLV. 4. **VERIFY OPEN** the following heater outlet valves: 3-FCV-2-124, LP HEATER 3A3 CNDS OUTL ISOL VLV 3-FCV-2-125, LP HEATER 3B3 CNDS OUTL ISOL VLV 3-FCV-2-126, LP HEATER 3C3 CNDS OUTL ISOL VLV.
		5. **VERIFY OPEN** the following heater isolation valves: 3-FCV-3-38, HP HTR 3A2 FW INLET ISOL VLV 3-FCV-3-31, HP HTR 3B2 FW INLET ISOL VLV 3-FCV-3-24, HP HTR 3C2 FW INLET ISOL VLV 3-FCV-3-75, HP HTR 3A1 FW OUTLET ISOL VLV 3-FCV-3-76, HP HTR 3B1 FW OUTLET ISOL VLV 3-FCV-3-77, HP HTR 3C1 FW OUTLET ISOL VLV. 6. **VERIFY OPEN** the following RFP suction valves: 3-FCV-2-83, RFP 3A SUCTION VALVE 3-FCV-2-95, RFP 3B SUCTION VALVE 3-FCV-2-108, RFP 3C SUCTION VALVE.

Simulator Event Guide:

Event 10 Instrument: ADS SRV 1-34, Acoustic Monitor indication failure

	ATC/BOP	Injection Subsystems Lineup Condensate
		7. **VERIFY** at least one condensate pump running. 8. **VERIFY** at least one condensate booster pump running. 9. **ADJUST** 3-LIC-3-53, RFW START-UP LEVEL CONTROL, to control injection (Panel 3-9-5). 11. **VERIFY** RFW flow to RPV.
	ATC/BOP	Injection Subsystems Lineup **Core Spray System I**
		1. **VERIFY OPEN** the following valves: 3-FCV-75-2, CORE SPRAY PUMP 3A SUPPR POOL SUCT VLV 3-FCV-75-11, CORE SPRAY PUMP 3C SUPPR POOL SUCT VLV 3-FCV-75-23, CORE SPRAY SYS I OUTBD INJECT VALVE. 2. **VERIFY CLOSED** 3-FCV-75-22, CORE SPRAY SYS I TEST VALVE. 3. **VERIFY** CS Pump 3A and/or 3C **RUNNING**. 4. WHEN RPV pressure is below 450 psig, THEN **THROTTLE** 3-FCV-75-25, CORE SPRAY SYS I INBD INJECT VALVE, as necessary to control injection at or below 4000 gpm per pump. 5. **MONITOR** Core Spray Pump NPSH using Attachment 1.

Simulator Event Guide:

Event 10 Instrument: ADS SRV 1-34, Acoustic Monitor indication failure

<table>
<tr><td></td><td>ATC/BOP</td><td>Injection Subsystems Lineup Core Spray System II
1. VERIFY OPEN the following valves:
3-FCV-75-30, CORE SPRAY PUMP 3B SUPPR POOL SUCT VLV
3-FCV-75-39, CORE SPRAY PUMP 3D SUPPR POOL SUCT VLV
3-FCV-75-51, CORE SPRAY SYS II OUTBD INJECT VALVE.

2. VERIFY CLOSED 3-FCV-75-50, CORE SPRAY SYS II TEST VALVE.

3. VERIFY CS Pump 3B and/or 3D RUNNING.

4. WHEN RPV pressure is below 450 psig, THEN THROTTLE 3-FCV-75-53, CORE SPRAY SYS II INBD INJECT VALVE, as necessary to control injection at or below 4000 gpm per pump.

5. MONITOR Core Spray Pump NPSH using Attachment 1.</td></tr>
<tr><td></td><td>SRO</td><td>Emergency Classification
EPIP-1

3.2-S
An unisolable Primary System leak is discharging into Secondary Containment
AND
Any area radiation level at or above the Maximum Safe Operating Area radiation limit listed in Table 3.2.

<table>
<tr><th colspan="5">TABLE 3.2
MAXIMUM SAFE OPERATING AREA RADIATION LIMITS</th></tr>
<tr><th rowspan="2">AREA</th><th rowspan="2">RAD MONITOR</th><th colspan="3">MAX SAFE VALUE MR/HR</th></tr>
<tr><th>UNIT 1</th><th>UNIT 2</th><th>UNIT 3</th></tr>
<tr><td>RHR West Room</td><td>90-25A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>RHR East Room</td><td>90-28A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>HPCI Room</td><td>90-24A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>CS/RCIC Room</td><td>90-26A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>Core Spray Room</td><td>90-27A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>Suppr Pool Area</td><td>90-29A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>CRD-HCU West Area</td><td>90-20A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>CRD-HCU East Area</td><td>90-21A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>TIP Drive Area</td><td>90-23A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>North RWCU System Area</td><td>90-13A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>South RWCU System Area</td><td>90-14A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>RWCU System Area</td><td>90-9A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>MG Set Area</td><td>90-4A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>Fuel Pool Area</td><td>90-1A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>Service Flr Area</td><td>90-2A</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>New Fuel Storage</td><td>90-3A</td><td>1000</td><td>NA</td><td>NA</td></tr>
</table>
</td></tr>
</table>

NRC Scenario 1

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

HPCI is Tagged Out

Operations/Maintenance for the Shift:

Unit 3 is at 70% Power. Condensate Booster Pump 3A has been placed back in service. RFPT 3A is warmed and operating at 600 rpm, place RFPT 3A in service in accordance with 3-OI-3 Reactor Feedwater System section 5.7. An RPHP is effect for placing the RFPT in service, all data and signatures are recorded on Appendix A.

Then commence power ascension with Control Rods in accordance with the reactivity control plan.

Units 1 and 2 are at 100% power

Unusual Conditions/Problem Areas:

The following Control Rods are identified as SLOW: 30-19, 34-23, 14-51, 02-19, 46-51, and 06-43.

NRC Scenario 2

Facility: **Browns Ferry NPP** Scenario No.: **NRC - 2** Op-Test No.: **1306**

Examiners:_____ Operators: **SRO:**_____

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 4.5% power. 2-GOI-100-1A Section 5.4 Step 64 and 66

Turnover: Continue to pull rods to 8% power, verify IRM/APRM overlap at 5% and continue to 8% power and hold for Mode Change.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP TS-SRO	Start SBGT Fan C and align to Reactor Zone Ventilation IAW 0-OI-65 section 5.2
2		R-ATC R-SRO	Raise power with Control Rods; IRM B fails as is
3	imf rd06	C-ATC C-SRO	Control Rod 50-11 and 58-19 difficult to withdraw
4	imf fw20a	I-BOP I-SRO	Condenser Hotwell Level Automatic Makeup controller failure
5	imf ed07a	C-BOP C-SRO	Loss of 480V Unit Board 2A, failure of EHC Pump 2B to auto start
6	imf th31b	TS-SRO	Pressure Transmitter PT-3-22BB, fails high
7	ior	C-ATC C-SRO	RFPT C Trip
8	th23	M-ALL	ATWS and Fuel Failure
9	cu06a/b	C	RWCU Leak, failure of auto isolation only, high Secondary Containment Radiation, ED not required
10	imf rd01	C	CRD Pump Trip

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

ncd 5/22/13

Critical Tasks – Three

With a reactor scram required and the reactor not shutdown, initiate action to reduce power by inserting control rods.

1. Safety Significance:
   Shutting down reactor can preclude failure of containment or equipment necessary for the safe shutdown of the plant.

2. Cues:
   Procedural compliance
   CRD Pump B operating

3. Measured by:
   Observation - Control Rod insertion commenced in accordance EOI Appendixes.

4. Feedback:
   Reactor Power trend.
   Control Rod indications.

With a primary system discharging into the secondary containment, take action to manually isolate the break.

1. Safety Significance:
   Isolating high energy sources can preclude failure of secondary containment and subsequent radiation release to the public.

2. Cues:
   Procedural compliance.
   Area temperature indication.

3. Measured by:
   With the reactor at pressure and a primary system discharging into the secondary containment, operator takes action to manually isolate the break before two areas reach the MAX Safe radiation levels.

4. Feedback:
   Valve position indication

Critical Tasks – Three

When MAIN STEAM LINE RADIATION HIGH-HIGH is received and SLC injection is NOT required in accordance with RC/Q of EOI-1, MSIVs are closed.

1. Safety Significance:
   Isolate potential discharge path to environment through Off-Gas System which is currently bypassed and will not isolate or go to treat.

2. Cues:
   Procedural compliance.
   Reactor Pressure trend.

3. Measured by:
   When ARP-9-3A window 27 annunciator is received MSIVs are closed if alarm is verified valid and SLC injection IAW EOI-1 RC/Q is NOT required. MSIV are closed without delay when the SRO has been notified of the annunciator and has evaluated that SLC Injection is not required IAW EOI-1 RC/Q.

4. Feedback:
   Reactor Pressure trend.
   MSIVs indicate closed.

EVENTS

1. BOP starts SBGT Fan C and aligns to Reactor Bldg IAW 0-OI-65 section 5.2. The relative humidity heater will fail to start and the SRO will evaluate Technical Specification 3.6.4.3 and determine Condition A is entered.

2. ATC Continues Power ascension with control rods to 8%. IRM/APRM overlap required to be verified at 5% power, prior to continued ascension to 8%. IRM B fails as is and during power ascension the ATC will identify that IRM B is not responding to increasing power.

3. Control Rod 50-11 will not withdraw with normal methods from position 00, the ATC will take action IAW 2-OI-85 for control difficult to withdraw. The ATC will double clutch control rod 50-11, the control rod will withdraw. Control Rod 58-19 will not withdraw with normal methods from position 12, the ATC will take action IAW 2-OI-85 for control difficult to withdraw. The ATC will raise drive water pressure and the control rod will withdraw.

4. Condenser Hotwell Level Automatic Makeup controller will fail closed. The BOP operator will responds to alarms on Panel 9-6A-5, 6, 7 OR notice Hotwell Level on 2-LR-2-9 trending down or CST FLOW to Hotwell at 0 on 2-FT-2-48. The operator will take manual control and begin to restore hotwell level.

5. A loss of 480V Unit Board 2A will occur. EHC Pump 2A will trip with failure of standby pump to auto start, BOP operator will start EHC Pump 2B to prevent a loss of EHC pressure and closure of Turbine Bypass Valves.

6. Pressure Transmitter PT-3-22BB, fails high. This will cause a Half Scram and a high Reactor Pressure annunciator. The SRO will evaluate Tech Specs 3.3.1.1 and determine condition A is entered.

7. RFPT 2C Trips, ATC increases the speed of RFPT 2B to maintain level in the normal level band. SRO will enter 2-AOI-3-1. While restoring Reactor Level if the restoration is too rapid, power oscillations will occur and the SRO may direct a Reactor Scram at this point.

8. After Reactor Level is restored a fuel failure will occur. Rising radiation levels will occur throughout the Unit, the SRO will determine when to scram. Eventually the Main Steam Line High-High will alarm requiring a Reactor Scram and MSIVs to be isolated if SLC is not required IAW the RC/Q leg of EOI-1. An ATWS will result on the scram and the SRO will evaluate conditions.

9. Shortly after the scram RWCU will develop a small leak, with the fuel failure two areas in Secondary Containment will be at or above max safe radiation levels. The SRO will enter EOI-3 and evaluate the need to Emergency Depressurize. The crew will isolate RWCU and with no primary system discharging to Secondary Containment ED will not be required.

10. The operating CRD Pump will trip while rods are being driven requiring the RO to start the standby CRD Pump in order to continue rod movement.

Terminate the scenario when the following conditions are satisfied or upon request of Lead Examiner.

Control Rods are being inserted

Reactor Level is maintained

RWCU has been isolated

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 2

10 Total Malfunctions Inserted: List (4-8)

3 Malfunctions that occur after EOI entry: List (1-4)

4 Abnormal Events: List (1-3)

1 Major Transients: List (1-2)

1 EOI's used: List (1-3)

0 EOI Contingencies used: List (0-3)

80 Validation Time (minutes)

3 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

NRC Scenario 2

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Manual Initiation of SBGT Fan C			
RO U-065-NO-02 SRO S-000-AD-27	261000A4.07	3.1	3.2
Raise Power with Control Rods			
RO U-085-NO-07 SRO S-000-AD-31	2.2.2	4.6	4.1
Control Rod difficult to Withdraw			
RO U-085-AB-07 SRO S-085-AB-07	201002A2.02	3.2	3.3
Hotwell Level Automatic Makeup controller failure			
RO U-002-AL-01 SRO S-002-AL-01	201002A2.02	3.2	3.3
EHC Pump Trip			
RO U-47A-AL-07 SRO S-57B-NO-07	256000A2.06	3.2	3.2
RFPT C Trip			
RO U-003-AB-01 SRO S-003-AB-01	259001A2.01	3.7	3.7
RWCU Leak			
RO U-069-AL-09 SRO S-000-EM-10	295033EA1.05	3.9	4.0

NRC Scenario 2

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Fuel Failure			
RO U-099-AL-05 SRO S-066-AB-02	272000A2.01	3.7	4.1
ATWS			
RO U-000-EM-03 RO U-000-EM-22 RO U-000-EM-28 SRO S-000-EM-03 SRO S-000-EM-18	295015AA2.01	4.1	4.3

NRC Scenario 2

Procedures Used/Referenced:

Procedure Number	Procedure Title
0-OI-65	Standby Gas Treatment System
2-GOI-100-1A	Power Maneuvering
2-OI-85	Control Rod Drive System
2-ARP-9-6A	Panel 9-6 2-XA-55-6A
2-OI-2	Condensate System
2-ARP-9-7A	Panel 9-7 2-XA-55-7A
2-ARP-9-7B	Panel 9-7 2-XA-55-7B
2-ARP-9-8B	Panel 9-7 2-XA-55-8B
2-ARP-9-8C	Panel 9-7 2-XA-55-8C
2-ARP-9-5B	Panel 9-5 2-XA-55-5B
2-ARP-9-4A	Panel 9-4 2-XA-55-4A
	Technical Specifications
2-OI-71	Reactor Core Isolation Cooling
2-OI-73	High Pressure Coolant Injection System
2-OI-74	Residual Heat Removal System
2-AOI-84-3	CRD System Failure
2-ARP-9-6C	Panel 9-6 2-XA-55-6C
2-AOI-3-1	Loss of Reactor Feedwater or Reactor Water Level
2-ARP-9-5A	Panel 9-5 2-XA-55-5A
2-ARP-9-3A	Panel 9-3 2-XA-55-3A
2-EOI-3	Secondary Containment Control
2-AOI-100-1	Reactor Scram
EPIP-1	Emergency Classification Procedure

Simulator Instructor – IC 104

Batch File NRC/1306nrc-2

imf cu06a
imf cu06b
trg e5 NRC/ehc
trg e5= bat NRC/ehcpumptrip-1
trg el0 NRC/modesw
imf cu04 (el0 2:00) 70 180 0 RWCU Leak
ior zdihs74155a normal
imf rd06r5011
bat atws80
ior ypomtrsbgthtrrh fail_control_power
ior ypobkrrhfpmb fail_ccoil
imf nm05b 21
imf rd06r5819
imf fw08c 15

Batch File NRC/1306nrc-2a

dmf fw08c
ior zdihs03176 trip

Preference File NRC/1306nrc-2

pfk 01 tog
pfk 02 ann silence
pfk 03 bat NRC/1306nrc-2
pfk 04 imf fw20 0 Condenser hotwell level auto makeup failure
pfk 05 imf ed07a 480V unit bd 2A loss
pfk 06 imf th31b Pressure Transmitter PT-3-22BB fails high
pfk 07
pfk 08 bat NRC/1306nrc-2a RFPT 2C Trip
pfk 09 imf th23 15 180 0 Fuel Failure
pfk 10 bat sdv
pfk 11 bat app0lf
pfk 12 bat app02
pfk s1
pfk s2
pfk s3 bat app08ae
pfk s4 mrf rd06 close
pfk s5 mrf rd06 open
pfk s6 imf rd01a CRD Pump 2A trip

Scenario 2

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC104
	restorepref	NRC/1306nrc-2
Simulator Setup	**Load Batch F3**	NRC/1306nrc-2
Simulator Setup		Verify file loaded
		Verify Rod Worth Minimizer Working
	Manual	Verify IRM B on range 8, when the batch file is loaded range all IRMs upscale and then back to mask IRM B Failure, Dial 2-LC-2-3 Hotwell High Level Dumpback to an indication on 2-FT-2-47 of about 151. Set 2-LC-2-3 at 30 in manual and 2-LC-2-6 at 30.5 in auto Swap lens covers on Bus Duct Cooling Fans Advance chart recorders in fast
	Manual	Insert pref key f4 as soon as the crew assumes the shift. imf fw20 0

RCP required (4% - 8%), Marked up copy of 2-GOI-100-1A Unit Startup

NRC Scenario 2

Simulator Event Guide:

Event 1 Normal: Start SBGT Fan C and align to Reactor Bldg IAW 0-OI-65 section 5.2

	SRO	Directs Start SBGT Fan C and align to Reactor Bldg IAW 0-OI-65 section 5.2
	BOP	Start SBGT Fan C and align to Reactor Bldg IAW 0-OI-65 section 5.2
		5.2 Standby Gas Treatment System Manual Initiation [1] **VERIFY** the following requirements are satisfied: • SGT Train A(B)(C) in standby readiness. • Main Stack Radiation Monitoring in Service. [2] **REVIEW** the Precautions and Limitations in Section 3.0. [3] **VERIFY** suction path is aligned to SGT System as follows: [3.2] **IF** alignment to Reactor Zone Ventilation suction path is desired, **THEN VERIFY OPEN** the following dampers for the desired unit(s) to be aligned. • REACTOR ZONE EXH TO SGTS dampers, 2-HS-64-40 and 2-HS-64-41 on Panel 2-9-25 [4] **START** SGT FAN C as follows: [4.2] **IF** starting SGT FAN C from Panel 2-9-25, **THEN PLACE** SGTS FAN C, 0-HS-65-69A/2 in START. [5] **CHECK** SGT TRAIN C INLET DAMPER as follows: [5.3] **IF** SGT FAN C was started, **THEN CHECK OPEN** SGTS TRAIN C INLET DAMPER, 0-HS-65-51A indicates OPEN on Panel 2-9-25. [6] **CHECK** SGT TRAIN C RH CONTROL HTR as follows: [6.2] **IF** SGT FAN C was started, **THEN CHECK** ENERGIZED SGTS TRAIN C RH CONTROL HTR, 0-HS-65-60 on Panel 2-9-25. [7] **RECORD** start time and filter bank differential pressure for SGT Train as follows: [7.2] **IF** SGT FAN C was started, **THEN RECORD** start time and FILTER BANK DIFFERENTIAL PRESSURE, 0-PDI-65-53 on Panel 2-9-25, in the Narrative Log. [8] **DISPATCH** Operator to the Standby Gas Treatment building as soon as time allows to check for abnormal conditions (i.e. belt tightness, rubbing or vibration noises). [9] **MONITOR** Standby Gas Treatment Train operation. **REFER TO** Section 6.0.
	BOP	Reports failure of RH Heater

Simulator Event Guide:

Event 1 Normal: Start SBGT Fan C and align to Reactor Bldg IAW 0-OI-65 section 5.2

		BOP should identify failure of the RH during procedure execution, step 6.2 on previous page. If BOP turns the RH control switch out of the AUTO position, 2-9-3B, window 5 (SGT TRAIN C SWITCHES MISALIGNED), will alarm, however, the RH will not work with switch in either position (AUTO or ON)
NRC	NRC /Driver	**IF** the BOP fails to inform the SRO that the relative humidity heater failed to energize, **THEN** the Chief examiner will notify the booth driver to call the SRO (as UO) and inform him of the problem.
		2-ARP-9-3B, Window 5 – SGT TRAIN C SWITCHES MISALIGNED
		A. **CHECK** each hand switch in normal operating position in accordance with 0-OI-65, Attachment 2. B. If possible, **CLEAR** initiating signal. Otherwise **REFER TO** Tech Spec 3.6.4.3. C. **NOTIFY** UNIT SUPERVISOR/SRO and Unit 1 and Unit 3.
	SRO	SRO Evaluate Technical Specification 3.6.4.3
		3.6.4.3 Standby Gas Treatment (SGT) System LCO 3.6.4.3 Three SGT subsystems shall be OPERABLE. APPLICABILITY: MODES 1, 2, and 3, During operations with a potential for draining the reactor vessel (OPDRVs).
		Condition A One SGT subsystem inoperable Required Action A.1 Restore SGT subsystem to OPERABLE status Completion Time 7 Days NOTE: This LCO applies to ALL 3 UNITs
	SRO	Determines that cannot change MODE with SBGT Train C inoperable

NRC Scenario 2

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 40, 41 and 42

	SRO	Direct Power increase using Control Rods per 2-GOI-100-1A , Section 5.4 **5.4 Withdrawal of Control Rods while in Mode 2** [64] **VERIFY** IRM/APRM overlap by operator visual observation before exceeding 5% power. [66] **CONTINUE** to withdraw control rods to raise Reactor power to approximately 8% per 2-OI-85 and 2-SR-3.1.3.5(A).
	ATC	Raise Power with Control Rods IAW 2-OI-85, Section 6.6 Group 40 = 18-03 and 02-19 from 00 to 12 Group 41 = 10-51, 50-51, 50-11, and 10-11 from 00 to 12 Group 42 = 02-43, 18-59, 42-59, 58-43, 58-19, 42-03, 18-03, 02-19 from 12 to 48
		6.6.1 Initial Conditions Prior to Withdrawing Control Rods [2] **VERIFY** the following prior to control rod movement: • CRD POWER, 3-HS-85-46 in ON. • Rod Worth Minimizer is operable and LATCHED into the correct ROD GROUP when Rod Worth Minimizer is enforcing (not required with no fuel in RPV). **6.6.2 Actions Required During and Following Control Rod Withdrawal** [1] **IF** control rod fails to withdraw, **THEN** Refer to Section 8.15 for additional methods to reposition control rod. [2] **IF** control rod double notches, or withdraws past its correct/desired position, **THEN** Refer to Section 6.7 for inserting control rod to its correct/desired position. [3] **IF** at any time while driving a selected rod during the performance of this section, the Control Rod moves more than one notch from its intended position, **THEN** Refer to 2-AOI-85-7, MISPOSITIONED CONTROL ROD. [4] **OBSERVE** the following during control rod repositioning: • Control rod reed switch position indicators (four rod display) agree with indication on Full Core Display. • Nuclear Instrumentation responds as control rods move through the core (This ensures control rod is following drive during Control Rod movement.) [5] **ATTEMPT** to minimize Automatic RBM Rod block as follows: • **STOP** Control Rod Withdrawal (if possible) prior to reaching any RBM Rod Block using the RBM Displays on Panel 9-5 and perform step 6.6.2[6].

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 40, 41 and 42

	ATC	[6] **IF** Control Rod movement was stopped to keep from exceeding a RBM Setpoint or was caused by a RBM Rod Block, **THEN PERFORM** the following at the Unit Supervisors discretion to "REINITIALIZE" the RBM: [6.1] **PLACE** the CRD Power, 2-HS-85-46 to the OFF position to deselect the control Rod. [6.2] **PLACE** the CRD Power, 2-HS-85-46 to the ON position. [6.3] **IF** desired, **THEN CONTINUE** to withdraw Control Rods and PERFORM applicable section for Control Rod withdraw. **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 in to 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.

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 40, 41 and 42

	ATC	[6] **IF** control rod is notch withdrawn to rod notch Position 48, **THEN 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.
		6.6.4 Continuous Rod Withdrawal **NOTES** 1) Continuous control rod withdrawal may be used when a control rod is to be withdrawn greater than three notches. 2) When in areas of high notch worth, single notch withdrawal should be used instead of continuous rod withdrawal. Information concerning high notch worth is identified by Reactor Engineering in Control Rod Coupling Integrity Check, 2-SR-3.1.3.5A. 3) When continuously withdrawing a control rod to a position other than position 48, the CRD Notch Override Switch is held in the Override position and then the CRD Control Switch is held in the Rod Out Notch position. • Both switches should be released when the control rod reaches two notches prior to its intended position. (Example: If a control rod is to be withdrawn from position 00 to position 12, the CRD Notch Override Switch and the CRD Control Switch would be used to move the control rod until reaching position 08, then both switches would be released.) • If the rod settles in a notch prior to the intended position, the CRD Control Switch should be used to withdraw the rod to the intended position. (using the above example; If the control rod settles at a notch prior to the intended position of 12, the CRD Control Switch would be used to withdraw the control rod to position 12.)

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 40, 41 and 42

	ATC	[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 in to correct ROD GROUP when Rod Worth Minimizer is enforcing. [4] **VERIFY** Control Rod is being withdrawn to a position greater than three notches.
		[5] **IF** withdrawing the control rod to a position other than "48", **THEN PERFORM** the following: (Otherwise N/A) [5.1] **PLACE** and **HOLD** CRD NOTCH OVERRIDE, 2-HS-85-47, in OVERRIDE. [5.2] **PLACE** and **HOLD** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH. [5.3] **WHEN** control rod reaches two notches prior to the intended notch, **THEN RELEASE** both CRD NOTCH OVERRIDE, 2-HS-85-47, and CRD CONTROL SWITCH, 2-HS-85-48. [5.4] **IF** control rod settles at notch before intended notch, **THEN PLACE** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH and **RELEASE**. [5.5] **WHEN** control rod settles into the intended notch, **THEN CHECK** the following: • Four rod display digital readout and full core display digital readout and background light will remain illuminated. • CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) does not alarm. [5.6] **CHECK** control rod settles at intended position and ROD SETTLE light extinguishes.
	ATC	During power ascension IRM B fails to respond to continuous steady counts, ATC reports to Unit Supervisor
	SRO	Directs Startup to continue, have all needed IRM instruments. Need 6 of 8 IRMs. Direct IRM B bypassed IAW OI-92A, IRMs

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 40, 41 and 42

	ATC	**NOTE** When continuously withdrawing a control rod to position 48, the control rod coupling integrity check can be performed by one of the two following methods: 1) Coupling integrity check while maintaining the CRD Notch Override Switch in the Override position and the CRD Control Switch in the Rod Out Notch position. If this method is selected, perform Step 6.6.4[6] and N/A Step 6.6.4[7]. 2) Coupling integrity check after releasing the CRD Notch Override Switch and the CRD Control Switch. If this method is selected, perform Step 6.6.4[7] and N/A Step 6.6.4[6]. [6] **IF** continuously withdrawing the control rod to position 48 and performing the control rod coupling integrity check in conjunction with withdrawal, **THEN PERFORM** the following: (Otherwise N/A) [6.1] **PLACE** and **HOLD** CRD NOTCH OVERRIDE, 2-HS-85-47, in OVERRIDE. [6.2] **PLACE** and **HOLD** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH. [6.3] **MAINTAIN** the CRD Notch Override Switch in the Override position and the CRD Control Switch in the Rod Out Notch position with the control rod at position 48. [6.4] **CHECK** control rod coupled by observing the following: • Four rod display digital readout and full core display digital readout and background light will remain illuminated. • CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) does not alarm. [6.5] **RELEASE** both CRD NOTCH OVERRIDE, 2-HS-85-47, and CRD CONTROL SWITCH, 2-HS-85-48. [6.6] **CHECK** control rod settles into position 48 and ROD SETTLE light extinguishes. [6.7] **IF** control rod coupling integrity check fails, **THEN** Refer to 2-AOI-85-2.

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 40, 41 and 42

	ATC	[7] **IF** continuously withdrawing the control rod to position 48 control rod coupling integrity check is to be performed after the CRD NOTCH OVERRIDE, 2-HS-85-47, and CRD CONTROL SWITCH, 2-HS-85-48 are to be released, **THEN PERFORM** control rod coupling integrity check as follows (otherwise N/A): [7.1] **PLACE** and **HOLD** CRD NOTCH OVERRIDE, 2-HS-85-47, in OVERRIDE. [7.2] **PLACE** and **HOLD** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH. [7.3] **WHEN** position 48 is reached, **THEN RELEASE** CRD NOTCH OVERRIDE, 2-HS-85-47, and CRD CONTROL SWITCH, 2-HS-85-48. [7.4] **VERIFY** control rod settles into position 48. [7.5] **PLACE** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH and **RELEASE**. [7.6] **CHECK** control rod coupled by observing the following: • Four rod display digital readout and full core display digital readout and background light will remain illuminated. • CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) does not alarm. [7.7] **CHECK** control rod settles into position 48 and ROD SETTLE light extinguishes. [7.8] **IF** control rod coupling integrity check fails, **THEN** Refer to 2-AOI-85-2.
		6.6.5 Return to Normal after Completion of Control Rod Withdrawal [1] **WHEN** control rod movement is no longer desired **AND** deselecting control rods is desired, **THEN**: [1.1] **PLACE** CRD POWER, 2-HS-85-46, in OFF. [1.2] **PLACE** CRD POWER, 2-HS-85-46, in ON.

NRC Scenario 2

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 40, 41 and 42

	SRO	Directs Startup to continue, have all needed IRM instruments. Need 6 of 8 IRMs. Direct IRM B bypassed IAW OI-92A, IRMs
	ATC	**6.1 Bypassing an IRM Channel** **CAUTION** NPG-SPP 10.4 requires approval of the Plant Manager or his designee prior to any planned operation with IRMs bypassed unless bypassing is specifically allowed within approved procedures. **NOTES** 1) It is not necessary for a bypassed IRM channel to have its detector inserted into the core. 2) Only one IRM in each trip system can be bypassed at a time. 3) All operations are performed on Panel 2-9-5 unless specifically stated otherwise. [1] **REVIEW** all precautions and limitations in Section 3.0. [2] **PLACE** the appropriate IRM Bypass selector switch to the BYPASS position: • IRM BYPASS, 2-HS-92-7A/S4A • IRM BYPASS, 2-HS-92-7A/S4B [3] **CHECK** that the Bypassed light is illuminated.
	NRC	If Reactor Power is approximately 8%, SRO will continue in 2-GOI-100-1A
	SRO	When Reactor power is approximately 8%, continues in 2-GOI-100-1A Directs [70] **IF** primary containment purge and/or Primary Containment Ventilation is in service, **THEN PLACE** the following switches in the BYPASS 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.
	BOP	Bypasses PC PURGE DIV I RUN MODE BYPASS, 2-HS-64-24 and PC PURGE DIV II RUN MODE BYPASS, 2-HS-64-25.

NRC Scenario 2

Simulator Event Guide:

Event 3 Component: Control Rod 50-11and 58-19 difficult to withdraw

	ATC	**8.15 Control Rod Difficult to Withdraw** [1] **VERIFY** the control rod will not notch out. Refer to Section 6.6. [2] **REVIEW** all Precautions and Limitations in Section 3.0
		[3] **IF** RWM is enforcing, **THEN VERIFY** RWM is operable and LATCHED in to the correct ROD GROUP. **NOTES** 1) Steps 8.15[4] through 8.15[6] should be used when the control rod is at Position 00 while Step 8.15[7] should be used when the control rod is at OR between Positions 02 and 46. 2) Double clutching of a control rod at Position 00 will place the rod at the "overtravel in" stop, independent of the RMCS timer, allowing maximum available time to establish over-piston pressure required to maintain the collet open and prevent the collet fingers from engaging the 00 notch. 3) Step 8.15[4] may be repeated as necessary until it is determined that this method will not free the control rod.
		[4] **IF** the control rod problem is not believed to be air in the hydraulic system, **THEN PERFORM** the following to double clutch the control rod at Position 00: [4.1] **PLACE** AND **HOLD** CRD NOTCH OVERRIDE, 2-HS-85-47, in EMERG ROD IN, for several seconds. [4.2] **CHECK** the control rod full in indication (double green dashes) on the Full Core Display for the associated control rod. [4.3] **SIMULTANEOUSLY PLACE** CRD NOTCH OVERRIDE, 2-HS-85-47, in NOTCH OVERRIDE **AND** CRD CONTROL SWITCH, 2-HS-85-48, in ROD OUT NOTCH. [4.4] **WHEN** EITHER of the following occur: • Control rod begins to move, **OR** • It is determined the rod will not move, **THEN RELEASE** 2-HS-85-47 AND 2-HS-85-48. [4.5] **IF** the control rod successfully notches out, **THEN PROCEED TO** Section 6.6 and **WITHDRAW** the control rod to the appropriate position.
	ATC	Will Double clutch Control Rod 50-11 from position 00
	Driver	when ATC goes to double clutch 50-11, delete stuck rod 50-11

Simulator Event Guide:

Event 3 Component: Control Rod 50-11and 58-19 difficult to withdraw

	ATC	[7] **IF** the control rod is at or between Positions 02 and 46, **THEN PERFORM** the following to withdraw the control rod using elevated drive water pressure: [7.1] **RAISE** the CRD DRIVE WTR HDR DP, 2-PDI-85-17A, to 300 psid, using CRD DRIVE WATER PRESS CONTROL VLV, 2-HS-85-23A. [7.2] **ATTEMPT** to withdraw the Control Rod using CRD CONTROL SWITCH, 2-HS-85-48. [7.3] **IF** the control rod successfully notches out, **THEN LOWER** CRD DRIVE WTR HDR DP, 2-PDI-85-17A, to between 250 psid and 270 psid, using CRD DRIVE WATER PRESS CONTROL
		[7.4] **IF** the control rod still fails to NOTCH OUT, **THEN RAISE** CRD DRIVE WTR HDR DP, 2-PDI-85-17A, to 350 psid, using CRD DRIVE WATER PRESS CONTROL VLV, 2-HS-85-23A.
		[7.5] **ATTEMPT** to withdraw the Control Rod using CRD CONTROL SWITCH, 2-HS-85-48. [7.6] **LOWER** CRD DRIVE WTR HDR DP, 2-PDI-85-17A, to between 250 psid and 270 psid, using CRD DRIVE WATER PRESS CONTROL VLV, 2-HS-85-23A. [7.7] **IF** the control rod still fails to NOTCH OUT using elevated CRD DRIVE WTR HDR DP, **THEN CONTACT** Reactor Engineer and **NOTIFY** Unit Supervisor for further instructions.
	ATC	Will raise drive water pressure to 350 psid to successfully move Control Rod 58-19 from position 12
	Driver	when ATC raises drive water pressure to 350 psid, delete stuck rod 58-19

NRC Scenario 2

Simulator Event Guide:

Event 4 Instrument: Condenser Hotwell Level Automatic Makeup controller failure

	NRC	This malfunction will be in from the beginning of the scenario, hotwell level starts at 30 inches and this alarm is at 24 inches. May notice before alarm and take action at that time
	BOP	Responds to Alarms on Panel 9-6A-5, 6, 7 OR notices Hotwell Level on 2-LR-2-9 trending down or CST FLOW to Hotwell at 0 on 2-FT-2-48
		6A-5, HOTWELL A LEVEL ABNORMAL 6A-6, HOTWELL B LEVEL ABNORMAL 6A-7, HOTWELL C LEVEL ABNORMAL A. **VERIFY** abnormal level on 2-LIC-2-3, Panel 2-9-6. 1. **IF** level is high, **THEN RAISE** hotwell reject. 2. **IF** level is low, **THEN RAISE** makeup. B. **CHECK** condenser vacuum normal. C. **CHECK**: 1. Hotwell level recorder 2-LR-2-9C and 2-LIC-2-6. 2. Hotwell makeup flow 2-FR-2-48, Panel 2-9-6. 3. Hotwell dump flow 2-FR-2-47, Panel 2-9-6. 4. Conductivity rising - recorder 2-CR-43-1A, Panel 2-9-6; recorder 2-CR-43-11A/12A, Panel 2-9-4. a. **IF** conductivity is rising, **THEN REFER TO** 2-AOI-2-1. 5. Bypass valves 2-LCV-2-4 and -7 closed. 6. Locally verify level in Hotwell level sightglass 2-LG-2-261. D. **IF** cause is malfunction of automatic level control, **THEN REFER TO** 2-OI-2, Section 8.3, Manual HW Level Control.
	BOP	**OPENS** CONDENSATE MAKEUP BYPASS VLV, 2-LCV-2-7, using 2-HS-2-7A

Simulator Event Guide:

Event 4 Instrument: Condenser Hotwell Level Automatic Makeup controller failure

	BOP	Refers to 2-OI-2 Section 8.3 **8.3 Manual Hotwell Level Control** [3] **IF** desired to raise Hotwell Level, **THEN PERFORM** the following, as required: [3.1] **THROTTLE OPEN** HOTWELL LOW LEVEL MAKEUP CONTROL, 2-LCV-2-6, using 2-LC-2-6 in MAN to maintain desired level. [3.2] **OPEN** CONDENSATE MAKEUP BYPASS VLV, 2-LCV-2-7, using 2-HS-2-7A, if necessary. [3.3] **VERIFY CLOSED** CONDENSATE DUMPBACK BYPASS VLV, 2-LCV-2-4, using 2-HS-2-4A. [3.4] **THROTTLE CLOSED** HOTWELL HIGH LEVEL DUMPBACK CONTROL, 2-LC-2-3, as necessary to raise Hotwell level. [5] **IF** desired to maintain Hotwell Level, **THEN**: [5.1] **PLACE** HOTWELL HIGH LEVEL DUMPBACK CONTROL, 2-LC-2-3, in MAN and **ESTABLISH** approximately equal to or greater than 60 x 103 lbm/hr flow from the Hotwell to the CST as indicated on 2-FR-2-47. [5.2] **PLACE** HOTWELL LOW LEVEL MAKEUP CONTROL, 2-LC-2-6, in MAN and **ESTABLISH** the required amount of flow from the CST to the Hotwell as necessary to stabilize desired HOTWELL LEVEL. [5.3] **IF** auto control of HOTWELL LOW LEVEL MAKEUP CONTROL, 2-LC-2-6, is desired, **THEN PLACE** HOTWELL LOW LEVEL MAKEUP CONTROL, 2-LC-2-6, in AUTO with controller set at desired HOTWELL LEVEL.
	BOP	When hotwell level is restored **CLOSES** CONDENSATE MAKEUP BYPASS VLV, 2-LCV-2-7, using 2-HS-2-7A

NRC Scenario 2

Simulator Event Guide:

Event 5 Component: Loss of 480V Unit Board 2A

	Driver	When requested by the NRC insert preference key F5 for imf ed07a, when sent to investigate wait 3 minutes and inform the Normal Supply Breaker for Unit Board 2A has an actuation of the overcurrent relay.
	BOP	Responds to the following alarms; 7A-22, 8C-3, 8C-10, 8C-15, 8C-16, 8C-25, 8B-16, 7B-1 and 7B-15.
		7A-22 GEN STATOR COOLANT SYS ABNORMAL A. **IF** while performing the action of this ARP 2-XA-55-9-8A Window 1 alarms **THEN,** 1. **VERIFY** all available Stator Cooling Water Pumps running. 2. Attempt to **RESET** alarm 3. **IF** alarm fails to reset, AND reactor power is above turbine bypass valve capability **THEN SCRAM** the Reactor B. **VERIFY** a stator cooling water pump is running and **CHECK** stator temperature recorder, 2-TR-57-59, Panel 2-9-8. Generator NOT on line, verifies Stator water cooling pump running
		8B-16 480V UNIT BD 2A UV OR XFR A. **VERIFY** automatic action has occurred. B. **INSPECT** 480V Unit Bd A for abnormal conditions: relay targets, smoke, burned paint, breaker position, etc. C. **REFER TO** 0-OI-57B to re-energize board. D. **REFER TO** appropriate OI for recovery or realignment of equipment. Reports trip of 480V Unit Bd 2A, dispatches operators
		8C-3 480V RX BLDG VENT BD 2A UV OR XFR A. **VERIFY** automatic action has occurred. B. **CHECK** or **START** refuel floor and reactor zone exhaust fans 2A or 2B. C. **CHECK** board for abnormal condition: relay targets, smoke, burned paint, breaker position, etc. D. **REFER TO** 0-OI-57B to re-energize or transfer board. E. **REFER TO** appropriate OI for recovery or realignment of equipment.

NRC Scenario 2

Simulator Event Guide:

Event 5 Component: Loss of 480V Unit Board 2A

	Driver	When requested by the NRC insert preference key F5 for imf ed07a, when sent to investigate wait 3 minutes and inform the Normal Supply Breaker for Unit Board 2A has an actuation of the overcurrent relay.
	BOP	Responds to the following alarms; 7A-22, 8C-3, 8C-10, 8C-15, 8C-16, 8C-25, 8B-16, 7B-1 and 7B-15.
		8C-10 480V RX BLDG VENT BD 2B UV OR XFR A. **VERIFY** automatic action has occurred. B. **CHECK** or **START** refuel floor and reactor zone fans 2A or 2B. C. **CHECK** 480V Reactor Bldg Vent Bd 2B for abnormal conditions: relay targets, smoke, burned paint, breaker position, etc. D. **REFER TO** 0-OI-57B to re-energize board. E. **REFER TO** appropriate OI for recovery or realignment of equipment.
		8C-15 480V TB VENT BD 2A UV OR XFR A. **VERIFY** alarm by checking the following: • Associated annunciator, TURBINE BLDG VENTILATION ABNORMAL, (2-XA-55-3D, Window 4) in alarm. • Power light on MTOT vapor extractor and EHC fluid heaters, Panel 2-9-7. B. **DISPATCH** Personnel to 480V Turb Bldg Vent Bd 2A to CHECK equipment and board status for abnormal conditions. • Mechanical spaces supply fan 2A, 2B and exhaust fan. • Turb room supply fan 2A, 2B and exhaust fans 2A, 2B, 2C, 2D. • EHC fluid transfer and filtering pump. C. **REFER TO** 0-OI-57B to re-energize or transfer the board. D. **REFER TO** appropriate OI for recovery or realignment of equipment.
	Driver	If called to verify if the following boards transferred report that these boards have auto transferred to their alternate supply. 480V RX BLDG VENT BD 2A, 480V RX BLDG VENT BD 2B, 480V TB VENT BD 2A, 480V TURB MOV BD 2A, and 480V CNDS DEMIN BD 2

NRC Scenario 2

Simulator Event Guide:

Event 5 Component: Loss of 480V Unit Board 2A

	Driver	When requested by the NRC insert preference key F5 for imf ed07a, when sent to investigate wait 3 minutes and inform the Normal Supply Breaker for Unit Board 2A has an actuation of the overcurrent relay.
	BOP	Responds to the following alarms; 7A-22, 8C-3, 8C-10, 8C-15, 8C-16, 8C-25, 8B-16, 7B-1 and 7B-15.
		8C-16 480V TURB MOV BD 2A UV OR XFR A. **VERIFY** alarm by checking light indication to the following equipment: • RFW heaters (2B1,2B2,2C1,2C2) extraction isolation valves. • RFPT 2B 2B2 Main Oil Pump. • RFPT 2C 2C1 Main Oil Pump. B. **CHECK** board inspected for abnormal conditions: relay targets, smoke, burned paint, breaker position, etc. C. **REFER TO** ICS screen "VFDAAL" or "VFDBAL" and verify PROCESS ALARM Internal HX Fan Power status is "OK". D. **REFER TO** 0-OI-57B to re-energize or transfer the board. E. **REFER TO** appropriate OI for recovery or realignment of equipment.
		8C-25 480V CNDS DEMIN BD 2 UV OR XFR A. **VERIFY** automatic transfer by dispatching personnel to 480V Cnds Demin Bd 2 to check for the following: • Power available lights illuminated. • Normal disconnect switch 1A open and alternate disconnect 2A closed. • Any abnormal conditions such as breaker trips. B. **NOTIFY** Radwaste Operator. C. **IF** power **NOT** available, **THEN OBTAIN** status of the following from Radwaste: • Condensate demins precoat operation. • Condensate backwash transfer operation. • Backwash receiver pit floor drains. D. **REFER TO** 0-OI-57B for power restoration or transfer instructions.
	Driver	If called to verify if the following boards transferred report that these boards have auto transferred to their alternate supply. 480V RX BLDG VENT BD 2A, 480V RX BLDG VENT BD 2B, 480V TB VENT BD 2A, 480V TURB MOV BD 2A, and 480V CNDS DEMIN BD 2

NRC Scenario 2

Simulator Event Guide:

Event 5 Component: Loss of 480V Unit Board 2A

	Driver	When requested by the NRC insert preference key F5 for imf ed07a, when sent to investigate wait 3 minutes and inform the Normal Supply Breaker for Unit Board 2A has an actuation of the overcurrent relay.
	BOP	Responds to the following alarms; 7A-22, 8C-3, 8C-10, 8C-15, 8C-16, 8C-25, 8B-16, 7B-1 and 7B-15.
		7B-1 EHC HYD FLUID HDR PRESS LOW A. **VERIFY** Standby EHC PUMP 2B(2A), 2-HS-47-2A(1A) running. B. **CHECK** EHC HEADER PRESSURE indicator, 2-PI-47-7 between 1550 and 1650 psig. C. **DISPATCH** personnel to inspect EHC pump unit. D. **IF** EHC Hydraulic system fails, **THEN VERIFY** turbine trips at or below 1100 psig.
		7B-15 STANDBY EHC PUMP FAILED A. On Panel 2-9-7: 1. **VERIFY** alarm by checking EHC HEADER PRESSURE indicator, 2-PI-47-7. 2. **VERIFY** EHC PUMP 2B, 2-HS-47-2A and/or EHC PUMP 2A, 2-HS-47-1A running. 3. **CHECK** EHC PUMP 2B PUMP MTR CURRENT 2-EI-47-2 and/or EHC PUMP 2A PUMP MTR CURRENT 2-EI-47-1. **NOTE** Lights extinguish at 1300 psig lowering and illuminate at 1500 psig rising. 4. **CHECK** lights above EHC PUMP 2A TEST pushbutton 2-HS-47-4A and EHC PUMP 2B TEST pushbutton 2-HS-47-5A. B. **DISPATCH** personnel to pumping unit to check for abnormal conditions. C. **IF** EHC Hydraulic System fails, **THEN VERIFY** turbine trips at or below 1100 psig.
	BOP	Starts Standby EHC Pump 2B and verifies EHC pressure returns to normal
	Driver	When directed by NRC insert preference key F6, and when asked to investigate in aux instrument room report 2-PIS-3-22BB is failed high

NRC Scenario 2

Simulator Event Guide:

Event 6 Instrument: Pressure Transmitter PT-3-22BB, fails high

	ATC	Responds to alarms 5B-2 and 4A-9, reports half scram, power, pressure and level stable
		5B-2 REACTOR CHANNEL B AUTO SCRAM A. **VERIFY** channel B relays dropped out by checking scram solenoid and backup scram valve lights extinguished. B. **IF** any EOI entry condition is met, **THEN ENTER** the appropriate EOI(s). C. **IF** alarm due to inadvertent criticality during incore fuel movements, **THEN REFER TO** 2-AOI-79-2. D. **IF** alarm is from a control rod drop, **THEN REFER TO** 2-AOI-85-1. E. With SRO permission, **RESET** half-scram. **REFER TO** 2-OI-99.
		4A-9 RX VESSEL PRESSURE HIGH HALF SCRAM A. **VERIFY** alarm by multiple indications. B. **IF** the alarm is valid AND reactor has **NOT** scrammed, **THEN MANUALLY SCRAM** the reactor. **ENTER** 2-EOI-1. C. **DISPATCH** personnel to the sensors to check for abnormal conditions. D. **IF** alarm is invalid, **THEN** with SRO permission, **RESET** Half Scram.

NRC Scenario 2

Simulator Event Guide:

Event 6 Instrument: Pressure Transmitter PT-3-22BB, fails high

<table>
<tr><td></td><td>SRO</td><td>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.

APPLICABILITY: According to Table 3.3.1.1-1.

Table 3.3.1.1-1 (page 2 of 3)
Reactor Protection System Instrumentation

<table><tr><th>FUNCTION</th><th>APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS</th><th>REQUIRED CHANNELS PER TRIP SYSTEM</th><th>CONDITIONS REFERENCED FROM REQUIRED ACTION D.1</th><th>SURVEILLANCE REQUIREMENTS</th><th>ALLOWABLE VALUE</th></tr><tr><td>3. Reactor Vessel Steam Dome Pressure - High[d]</td><td>1,2</td><td>2</td><td>G</td><td>SR 3.3.1.1.1
SR 3.3.1.1.8
SR 3.3.1.1.10
SR 3.3.1.1.14</td><td>≤ 1090 psig</td></tr></table></td></tr>
<tr><td></td><td>SRO</td><td>Condition A: One or more required channels inoperable
Required Action A.1: Place channel in trip.
Completion Time: 12 hours

OR
Required Action A.2: NOTE Not applicable for Functions 2.a, 2.b, 2.c, 2.d or 2.f.
Place associated trip system in trip.
Completion Time: 12 hours</td></tr>
<tr><td></td><td>SRO</td><td>May direct the following fuse pulled IAW 2-OI-99, 2-FU1-3-22BA, (5AF5B)
2-RLY-099-05AK05B at Panel 9-17, ALARMS AND 1/2 SCRAM IN B CHANNEL</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>Driver</td><td>When directed by NRC insert preference key F8 for a trip of RFPT 2C. After RFPT 2C is tripped wait 3 minutes after dispatched and report a scaffold crew removing scaffold from the area believes they may have tripped RFPT.

When RFPT 3C is tripped verify imf fw08c is deleted</td></tr>
</table>

NRC Scenario 2

Simulator Event Guide:

Event 7 Component: RFPT 2C Trip

	ATC	Responds to a trip of RFPT 2C, reports Reactor level lowering, Reactor power lowering and reactor pressure stable.
		Responds to the following alarms 6C-15, 6C-23, 6C-29, 6C-32 and 5A-8
		6C-15 RFPT C ABNORMAL A. **CHECK** other RFP alarms on Panel 2-9-6 to determine problem area. B. **REFER TO** appropriate alarm response procedure.
		6C-23 RFPT TRIP CIRCUIT ABNORMAL A. **VERIFY** alarm and RFPT trip by checking Panel 2-9-6, RFPT speed, governor valve position and discharge flow. B. **VERIFY** reactor power is within the capacity of operating RFPs. C. **IF** BKR TRIPOUT PNL 2-9-9 DC DIST (2-XA-55-8C, alarm window 20) is illuminated, **THEN Step is NA** D. **IF** RFP is tripped, **THEN REFER TO** 2-OI-3, Section 8.1 or 2-AOI-3-1.
		6C-29 RFPT TRIPPED A. **VERIFY** reactor power is within the capacity of operating RFPs. B. **CHECK** core limits. C. **WHEN** RFPT coasts down to zero speed, unless RFPT is rolling on minimum flow, **THEN VERIFY** turning gear motor starts and engages. D. **REFER TO** 2-AOI-3-1 or 2-OI-3, Section 8.1.
		6C-32 RFP DISCH FLOW LOW A. **VERIFY** reactor Feedpump flow on Panel 2-9-6. B. **REFER TO** 2-OI-3, Section 8.7.

NRC Scenario 2

Simulator Event Guide:

Event 7 Component: RFPT 2C Trip

	ATC	Responds to a trip of RFPT 2C, reports Reactor level lowering, Reactor power lowering and reactor pressure stable.
		Responds to the following alarms 6C-15, 6C-23, 6C-29, 6C-32 and 5A-8
		5A-8 REACTOR WATER LEVEL ABNORMAL A. **VALIDATE** Reactor water level hi/low using multiple indications including Average Narrow Range Level on 2-XR-3-53 recorder, 2-LI-3-53, 2-LI-3-60, 2-3-206 and 2-LI-3-253 on Panel 2-9-5. B. **IF** alarm is valid, **THEN REFER TO** 2-AOI-3-1 or 2-OI-3.
	SRO	Directs entry to 2-AOI-3-1, Loss of Reactor Feedwater or Reactor Water Level
	ATC	2-AOI-3-1 **5.0 LOW REACTOR WATER LEVEL OR LOSS OF FEEDWATER** [7] **IF** RFPs in manual control, **THEN RAISE** speed of operating RFPs. [9] **IF** RFPT has tripped and will not be required to maintain level, **THEN REFER TO** 2-OI-3 and **SHUT DOWN** tripped RFPT. [11] **IF** unit remains on-line, **THEN RETURN** Reactor water level to 33" (normal range).
	ATC	Takes control of RFPT 2B and raises RFPT speed and discharge pressure until RFPT 2B injects and raises and maintains RPV Level.
	NRC	Power will drop to about 3% as level lowers, depending on how aggressive level is restored power may peak and cause and auto scram at 14% reactor power, or the SRO may direct a scram when he sees power oscillating depending on the actions of the ATC operator on level control.
	Driver	When directed by NRC or if the crew scrams the reactor insert preference key F9 for fuel failure When Reactor SCRAM insert preference key F10 for BAT SDV

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	BOP	Respond to the following radiation alarms 3A-29, 3A-5, 3A-22 and 3A-7
		Alarm 3A-29, TURBINE BLDG AREA RADIATION HIGH A. **DETERMINE** area with high radiation level on Panel 2-9-11. (Alarm on Panel 2-9-11 will automatically reset if radiation level lowers below setpoint.) B. **IF** the TSC is **NOT** manned, **THEN USE** public address system to evacuate area where high airborne conditions exist. D. **NOTIFY** RAD PRO.
		Alarm 3A-5, OG PRETREATMENT RADIATION HIGH A. **VERIFY** high radiation on following: 1. OFFGAS RADIATION recorder, 2-RR-90-266 on Panel 2-9-2. 2. OG PRETREATMENT RAD MON RTMR, 2-RM-90-157 on Panel 2-9-10. 3. OFFGAS RAD MON RTMR, 2-RM-90-160 on Panel 2-9-10. B. **CHECK** off-gas flow normal. C. **CHECK** following radiation recorders and associated radiation monitors: 1. MAIN STEAM LINE RADIATION, 2-RR-90-135 on Panel 2-9-2. 2. OFFGAS POST-TREATMENT RADIATION, 2-RR-90-265 on Panel 2-9-2. 3. STACK GAS/CONT RM RADIATION, 0-RR-90-147 on Panel 1-9-2. D. **NOTIFY** RAD PRO. E. **NOTIFY** Chemistry to perform radiochemical analysis to determine source

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	BOP	Respond to the following radiation alarms 3A-29, 3A-5, 3A-22 and 3A-7
		Alarm 3A-22, RX BLDG AREA RADIATION HIGH A. **DETERMINE** area with high radiation level on Panel 2-9-11. (Alarm on Panel 2-9-11 will automatically reset if radiation level lowers below setpoint.) B. **IF** Dry Cask storage activities are in progress, **THEN NOTIFY** CASK Supervisor. C. **IF** alarm is from the HPCI Room while Flow testing is performed, **NOTIFY** personnel at the HPCI Quad to validate conditions. D. **NOTIFY** RAD PRO. E. **IF** the TSC is **NOT** manned and a "VALID" radiological condition exists, **THEN USE** public address system to evacuate area where high radiological conditions exist. J. For all radiation indicators except FUEL STORAGE POOL radiation indicator, 2-RI-90-30, **ENTER** 2-EOI-3 Flowchart.
	BOP	Reports RWCU South Area 90-14a and RWCU 621 Elev 90-9a in alarm and each are EOI-3 entry conditions
	SRO	Announce Entry to EOI-3
	BOP	Alarm 3A-7, MAIN STEAM LINE RADIATION HIGH A. **CHECK** following radiation recorders: 1. MAIN STEAM LINE RADIATION, 2-RR-90-135 on Panel 2-9-2. 2. OFFGAS RADIATION, 2-RR-90-266 on Panel 2-9-2. 3. STACK GAS/CONT RM RADIATION, 0-RR-90-147 on Panel 1-9-2. B. **NOTIFY** RAD PRO. C. **NOTIFY** Chemistry to perform radiochemical analysis of primary coolant.

NRC Scenario 2

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	SRO	Enters **EOI-3** on **Secondary Containment Radiation**
	SRO	If Reactor Zone or Refuel Zone Exhaust Radiation Level is above 72 mr/hr. NO
	SRO	If Reactor Zone or Refuel Zone Exhaust Ventilation isolated and ventilation radiation levels are below 72 mr/hr Then Restart Reactor Zone and Refuel Zone Ventilation. NO
	SRO	WHEN Any Area Radiation Level Above Max Normal? - **YES, proceeds**
		Isolate all systems that are discharging into the area except systems required to: • Be operated by EOIs **OR** • Suppress a Fire
		Will Emergency Depressurization Reduce Discharge Into Secondary Containment? – NO, NO System Discharging
		Before any area radiation rises to Max Safe (table 4) Continue and enter EOI-1 (EOI-1 has already been entered after Reactor Scram)
	SRO	If Reactor not SCRAMMED, Direct Scram
	Crew	Monitors for Max Safe Radiation and reports
	BOP	Respond to the following radiation alarm 3A-27, MAIN STEAM LINE RADIATION HIGH-HIGH
		A. **VERIFY** the alarm on 2-RM-90-136 and 2-RM-90-137 on Panel 2-9-10. B. **CONFIRM** main steam line radiation level on recorder 2-RR-90-135, Panel 2-9-2. C. **IF** alarm is valid and Reactor Scram has not occurred, **THEN PERFORM** the following: 1. **IF** core flow is above 60% **THEN LOWER** core flow to between 50-60%.. 2. **MANUALLY SCRAM** the Reactor. 3. **REFER** to 2-AOI-100-1. D. **IF** SLC injection per RC/Q of EOI-1 is NOT required, **THEN VERIFY** the MSIVs closed. E. **NOTIFY** RAD PRO.
	SRO	Directs Manual SCRAM, once scrammed evaluates conditions and with NO EOI entry conditions for EOI-1, directs MSIVs Closed
	BOP	Closes MSIVs

NRC Scenario 2

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	SRO	If have NOT directed SCRAM, directs SCRAM and entry to 2-AOI-100-1, Reactor Scram
	ATC	**4.1 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), Step is NA [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) Step is NA [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 Level and trend (recovering or lowering). • Reactor pressure and trend • MSIV position (Open or Closed) • Power level
	Driver	When Reactor SCRAM insert preference key F10 for BAT SDV

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	ATC	**4.2 Subsequent Actions**
	ATC	**NOTES** 1) Steps in this section are written in general order of importance for most anticipated events; however, they are NOT required to be performed in order, but as required to maintain stable conditions. When a step is entered, all associated sub steps are required to be completed in order except those in Step 4.2[33] (Return to Service). Steps which are NOT applicable for this scram should be marked N/A. [1] **ANNOUNCE** Reactor SCRAM over PA system. [2] **IF** all control rods **CAN NOT** be verified fully inserted, **THEN PERFORM** the following: [2.1] **INITIATE** ARI by Arming and Depressing BOTH of the following: • ARI Manual Initiate, 2-HS-68-119A • ARI Manual Initiate, 2-HS-68-119B [2.2] **VERIFY** the Reactor Recirc Pumps (if running) at minimum speed. [2.3] **REPORT** "ATWS Actions Complete" and power level. [3] **DRIVE** in all IRMs and SRMs from Panel 2-9-5 as time and conditions permit. [3.1] **DOWNRANGE** IRMs as necessary to follow power as it lowers. [5] **MONITOR** and **CONTROL** Reactor Water Level between +2" and +51", or as directed by US, as follows: [5.2] **IF** required to maintain reactor water level, **THEN TRIP** reactor feed pumps as necessary to prevent exceeding High Reactor Water Level Trip setpoint. [5.5] **IF** Reactor Water Level exceeds +51 inches, **THEN VERIFY TRIPPED** the following turbines: • HPCI • RCIC [5.6] **IF** Reactor Water Level exceeds +55 inches, **THEN VERIFY TRIPPED** the following turbines: • Main Turbine • Reactor Feed Pump Turbines

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	ATC	[5] **MONITOR** and **CONTROL** Reactor Water Level between +2" and +51", or as directed by US, as follows: [5.1] **CONTROL** RFPT/RFPs with any of the following controls on Panel 2-9-5: • REACTOR WATER LEVEL CONTROL (PDS), 2-LIC-46-5, in MANUAL with Column 3 selected OR with Programmed Scram Response inhibited, either in MANUAL (Column 3 selected) or in AUTO (Column 2 selected). • Individual RFPT SPEED CONTROL (PDS), 2-SIC-46-8(9)(10), in MANUAL with Column 3selected. • Individual RFPT 2A(2B)(2C) SPEED CONT RAISE/LOWER switch, 2-HS-46-8A(9A)(10A), in MANUAL GOVERNOR. [5.2] **IF** required to maintain reactor water level, **THEN TRIP** reactor feed pumps as necessary to prevent exceeding High Reactor Water Level Trip setpoint. [5.3] **IF** required to maintain reactor water level, **THEN START** RCIC and/or HPCI as required. **REFER TO** 2-OI-71 and/or 2-OI-73. [5.4] **IF** HPCI and/or RCIC are in service and injecting to the vessel, **THEN** • **MONITOR** and **CONTROL** Reactor Water Level as necessary. • **TRIP** HPCI and/or RCIC as necessary to prevent exceeding High Reactor Water Level setpoint. [5.5] **IF** Reactor Water Level exceeds +51 inches, **THEN VERIFY TRIPPED** the following turbines: • HPCI • RCIC [5.6] **IF** Reactor Water Level exceeds +55 inches, **THEN VERIFY TRIPPED** the following turbines: • Main Turbine • Reactor Feed Pump Turbines
	SRO	When MSIVs are closed direct level control on RCIC or HPCI
	ATC/BOP	Transition level control as directed by US to either HPCI or RCIC

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	BOP	Control Level as directed with RCIC or HPCI
		Reactor Core Isolation Cooling **5.2 Manual Startup** [1] **VERIFY** the RCIC System is in Standby Readiness. **REFER TO** Section 4.0. □ [2] **NOTIFY** Radiation Protection of the impending action to manually start the RCIC System. [3] **REVIEW** all Precautions and Limitations in Section 3.0. [4] **OBTAIN** 2-SR-3.6.2.1.1 to check Suppression Pool level and temperature every 5 min.
		[5] **ESTABLISH** communication with the AUO locally at the RCIC turbine. [6] **ENSURE** all unnecessary personnel have exited the general area of the RCIC turbine and rupture discs prior to rolling the RCIC turbine. [7] **ANNOUNCE** on the plant PA system, "Unit Two is starting RCIC, all unnecessary personnel stay clear of the NW RX BLDG. QUAD." [8] **OPEN** RCIC LUBE OIL COOLING WTR VLV, 2-FCV-71-25. [9] **START** RCIC VACUUM PUMP, 2-HS-71-31A. [10] **OPEN** RCIC PUMP INJECTION VALVE, 2-FCV-71-39. [11] **OPEN** RCIC PUMP MIN FLOW VALVE, 2-FCV-71-34. [12] **START** RCIC Turbine by opening RCIC TURBINE STEAM SUPPLY VLV, 2-FCV-71-8, **OBSERVE** the following: • RCIC Turbine speed accelerates above 2100 RPM, on RCIC TURBINE SPEED indicator, 2-SI-71-42A. • Flow to the RPV stabilizes and is controlled automatically at 620 gpm. • RCIC TESTABLE CHECK VLV, 2-FCV-71-40, DISC POSITION indicates open. • RCIC PUMP MIN FLOW VLV, 2-FCV-71-34, is closed when flow is above 120 gpm. • RCIC STEAM LINE DR INBD and OUTBD ISOL VLVs, 2-FCV-71-6A and -6B, close. [13] **REFER TO** Section 6.0 to control and monitor RCIC turbine operation.

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	BOP	Control Level as directed with RCIC or HPCI
		High Pressure Coolant Injection System **5.2 Manual Startup** [1] **VERIFY** HPCI is in Standby Readiness. **REFER TO** Section 4.0. [2] **NOTIFY** Radiation Protection of the impending action to manually start the HPCI System. **RECORD** time Radiation Protection notified in the Narrative Log. [3] **REQUEST** Fire Ops to disable the HPCI pump area fire detection system and initiate required impairment. [4] **REVIEW** Precautions and Limitations in Section 3.0. [5] **OBTAIN** 2-SR-3.6.2.1.1 to check Suppression Pool level and temperature every 5 minutes. [6] **VERIFY** HWC has been set to the desired setpoint (if required) to lower radiation levels in the area. [7] **PLACE** SGTS in operation. REFER TO 0-OI-65. [8] **ESTABLISH** communication with the AUO locally in the HPCI room. [9] **DEPRESS** and **HOLD** HPCI AUX OIL PUMP, 2-HS-73-47B, START push-button (local) for approximately 2 minutes to prime the oil system.
		[10] **NOTIFY** Radiation Protection that an RPHP exists for the impending action to manually start the HPCI turbine. **RECORD** time Radiation Protection notified in the NOMS Narrative Log. [11] **ENSURE** all unnecessary personnel have exited the HPCI room prior to rolling the HPCI turbine. [12] **ANNOUNCE** on the plant PA system, "Unit Two is starting HPCI, all unnecessary personnel stay clear of the HPCI Room." [13] **CHECK** HPCI SYSTEM FLOW/CONTROL, 2-FIC-73-33, is in AUTO and SET at 530 (5,300 gpm). **IF** required, **DEPRESS** AUTO operation mode transfer switch and **ADJUST** setpoint using Setpoint up/down keys.

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	BOP	Control Level as directed with RCIC or HPCI
		[14] **PLACE** HPCI AUXILIARY OIL PUMP handswitch, 2-HS-73-47A, in START. [15] **START** HPCI STEAM PACKING EXHAUSTER using 2-HS-73-10A. [16] **OPEN** HPCI PUMP MIN FLOW VALVE, 2-FCV-73-30. [17] **OPEN** HPCI PUMP INJECTION VALVE, 2-FCV-73-44.
		[18] **OPEN** HPCI TURBINE STEAM SUPPLY VLV, 2-FCV-73-16. [19] **VERIFY** the following automatic actions occur: • HPCI TURBINE STOP VALVE, 2-FCV-73-18, opens. • HPCI TURBINE CONTROL VALVE, 2-FCV-73-19, opens. • HPCI TURBINE SPEED, 2-SI-73-51, raises. • HPCI STEAM LINE INBD DRAIN VLV, 2-FCV-73-6A, and HPCI STEAM LINE OUTBOARD DRAIN VLV, 2-FCV-73-6B, close. • HPCI HOTWELL PUMP INBD ISOL VLV, 2-FCV-73-17A, and HPCI HOTWELL PUMP OUTBD ISOL VLV, 2-FCV-73-17B, close. [20] **CHECK** HPCI System Check Vlv DISC POSITION, 2-ZI-73-45A, indicates open. [21] **VERIFY** HPCI PUMP MIN FLOW VALVE, 2-FCV-73-30, closes as flow rises above 1255 gpm. [22] **VERIFY** HPCI Auxiliary Oil pump stops and the Shaft Driven Oil pump is operating properly, **THEN PLACE** HPCI AUXILIARY OIL PUMP handswitch, 2-HS-73-47A, in AUTO. [23] **REFER TO** Section 6.0 to control and monitor HPCI Turbine operation.

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	ATC/BOP	[5.7] **THROTTLE** COND SPE BYPASS FLOW CONTROL VALVE, 2-FCV-2-190A, using 2-HS-2-190A as necessary, to maintain the following indications (Panel 2-9-6): • SJAE/OG CNDR CNDS FLOW, 2-FI-2-42, between 2 x 106 lbm/hr and 3 x 106 lbm/hr • CNDS PRESS AFTER DEMIN, 2-PI-2-46 greater than 5 psig • CNDS to RFP PRESS, 2-PI-2-105 greater than 150 psig
		[6] **IF** Programmed Scram Response has initiated (or was previously inhibited), **THEN RESET** logic by depressing SCRAM RESPONSE INHIBIT/RESET, 2-HS-46-5 on Panel 2-9-5. [7] **CHECK** RFW Control System in SINGLE ELEMENT (Green backlight illuminated for pushbutton 2-HS-46-6/1 on Panel 2-9-5). [8] **PLACE** H2 WATER CHEMISTRY CONTROL switch, 2-HS-4-40/B, in SHUTDOWN (Panel 2-9-5).
	BOP	[9] At ≤ 50 MWe, or as directed by the Unit Supervisor, **VERIFY TRIPPED** the Main Turbine as follows: [9.1] **DEPRESS** the TRIP pushbutton, 2-HS-47-67D on Panel 2-9-7. [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.
	BOP	[9.2.2] **IF** Generator Breaker is CLOSED **OR** to RESET white disagreement light at GENERATOR PCB 224 CNTR W/REV BYPASS, 2-HS-242-224A, **THEN** (Otherwise NA) A. **CONFIRM** ANN 2-XA-55-8A window 7, GEN REVERSE PWR FIRST RELAY OPERATION 2-EA-57-136 is received, B. **PLACE** GENERATOR PCB 224 CNTR W/REV BYPASS, 2-HS-242-224A, in TRIP and release. C. **VERIFY** the following at GENERATOR PCB 224 CNTR W/REV BYPASS, 2-HS-242-224A: • GREEN open target at 2-HS-242-224A • GREEN open light illuminated • RED closed light extinguished

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	BOP	[9.2.3] **IF** Generator Breaker remains CLOSED following step 4.2[9.2.2], **THEN** (Otherwise NA) A. **PLACE** GENERATOR PCB 224 CNTR W/REV BYPASS, 2-HS-242-224A, in BYPASS and release (will feel additional resistance at handswitch as it passes through TRIP to BYPASS position). B. **VERIFY** the following at GENERATOR PCB 224 CNTR W/REV BYPASS, 2-HS-242-224A: • GREEN open target at 2-HS-242-224A • GREEN open light illuminated • RED closed light extinguished [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
	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
	NOTE	Due to low power scenario Reactor pressure should be between 700 psig and 800 psig and not rising no actions required to control pressure rise

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	ATC/BOP	**NOTE** Suppression Pool cooling should be placed in service as soon as practicable following MSRV, HPCI and / or RCIC operation regardless of indicated Suppression Pool temperatures to verify that thermal stratification does not exist. [13] **MONITOR** and **CONTROL** RPV pressure to keep below 1073 psig and stable, or as directed by US. [13.1] **IF** RPV pressure is lowering rapidly, **THEN CLOSE** MSIVs. (Otherwise N/A) [13.2] **IF** MSRVs are cycling and bypass valves are available, **THEN MANUALLY OPEN** MSRVs on Panel 2-9-3 until RPV pressure is below 965 psig. (Otherwise N/A) [13.3] **IF** MSRVs are cycling and bypass valves are **NOT** available, **THEN MANUALLY OPEN** MSRVs on Panel 2-9-3 until RPV pressure is controlled between 800 and 1000 psig. (Otherwise N/A)
	ATC/BOP	[14] **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 2-9-4 • PCIS Mimic and individual control switch indications • ICS • 2-OI-64
	BOP	[15] **VERIFY** all available drywell cooling coils and blowers in service.
	ATC	[16] **CHECK** all control rods fully inserted as indicated on full core display or on ICS NSSS FULL CORE DISPLAY and **REQUEST** PRINT ROD POSITION LOG on ICS NSSS menu.
	ATC	[17] **IF** all rods are **NOT** inserted to Position 02 or beyond, **THEN DIRECT** Reactor Engineer to commence determination that reactor will remain subcritical under all conditions without boron. (Otherwise N/A)
	Driver	When called for Appendix 2 wait 3 minutes and preference key F12, Appendix-1F wait 5 minutes and preference key F11, If requested to close 85-586 wait 3 minutes and preference key shift F4 to close and shift F5 to open. Do NOT delete ATWS change ATWS severity to 90 on both sides

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	ATC	[18] **IF** any control rod fails to fully insert and it is required to Re-scram, **THEN PERFORM** the following, as required: [18.1] **RESET** the scram per Steps 4.2[25] thru 4.2[25.12]. [18.2] **CHECK** WEST and EAST CRD DISCH VOL WTR LVL HIGH HALF SCRAM annunciators (2-XA-55-4A-1and 4A-29) reset. [18.3] **INITIATE** manual scram. [18.4] **REPEAT** Step 4.2[18], as necessary, as long as rod motion is observed. [19] **IF** any control rod fails to fully insert and it is required to Drive Control Rods, **THEN REFER TO** 2-OI-85.
	ATC	[20] **VERIFY** the Reactor Recirc Pumps (if running) at minimum speed at Panel 2-9-4. [21] **IF** Reactor Recirculation pump(s) have tripped, **THEN PERFORM** the following before exceeding differential temperature limits for start. (Otherwise N/A) • **VERIFY** RWCU in service. **REFER TO** 2-OI-69. • **RESTART** affected Reactor Recirculation pumps prior to exceeding differential temperature limits for start. **REFER TO** 2-OI-68.
	Driver	When called for Appendix 2 wait 3 minutes and preference key F12, Appendix-1F wait 5 minutes and preference key F11, If requested to close 85-586 wait 3 minutes and preference key shift F4 to close and shift F5 to open. Do NOT delete ATWS change ATWS severity to 90 on both sides

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	ATC	Insert Control Rods IAW 2-OI-85
		8.19 Control Rods Which Fail to FULLY INSERT After Scram **NOTE** The operator should determine the most effective method to insert rods from the following sections: • Removal and Replacement of RPS Scram Solenoid Fuses (Section 8.19[1]). • Venting and Repressurizing the Scram Pilot Air Header (Section 8.19[2]). • Individually Scram Control Rods (Section 8.19[3]). • Insert Control Rods using Reactor Manual Control System (Section 8.19[4]). • Manual Insertion of Control Rods by Venting the Over Piston Area (Section 8.19[5]). • Control Rod Insertion using Raised Cooling Water Differential Pressure (Section 8.19[6]) [4] **IF** desired to Insert Control Rods Using Reactor Manual Control System, **THEN**: [4.1] **VERIFY** reactor scram is reset. Refer to 2-AOI-100-1. [4.2] **IF** scram **CANNOT** be reset, **THEN CLOSE** CHARGING WATER SHUTOFF, 2-SHV-085-0586 (RB, EL 565, NE Corner). [4.3] **REVIEW** all Precautions and Limitations in Section 3.0. [4.4] **DEMAND**, Print Rod Position Log, to edit control rod positions. [4.5] **BYPASS** Rod Worth Minimizer. Refer to Section 8.17. [4.6] Refer to Illustration 4 and **DEPRESS** the appropriate CRD Rod Select pushbutton on 2-XS-85-40. [4.7] **CHECK** backlit CRD ROD SELECT pushbutton is brightly illuminated and white indicating light on Full Core Display illuminated. [4.8] **CONTINUOUSLY INSERT** control rod to Position 00, by holding CRD CONTROL SWITCH, 2-HS-85-48, in ROD IN **OR** CRD NOTCH OVERRIDE SWITCH, 2-HS-85-47, in EMERG ROD IN. [4.9] **IF** control rod is difficult to insert, **THEN** Refer to Section 8.16. [4.10] **REPEAT** Steps 8.19[4.6] through 8.19[4.8] for each Control Rod to be inserted. [4.11] **PLACE** Rod Worth Minimizer Normal Bypass Switch in NORMAL in accordance with Section 8.18. [4.12] **PLACE** the Reactor Mode Switch in SHUTDOWN.
		[4.13] **VERIFY OPEN** CHARGING WATER SHUTOFF, 2-SHV-085-0586 (RB, EL 565 NE Corner).

NRC Scenario 2

Simulator Event Guide:

Event 10 Component: CRD Pump Trip

	Driver	When ATC has driven 5 or 6 control rods insert Shift F6 for a trip of CRD Pump 2A
	ATC	Report Trip of CRD Pump
	SRO	Direct entry to 2-AOI-85-3, CRD Failure
	ATC	Restore CRD IAW 2-AOI-85-3
		4.1 Immediate Actions [1] **IF** operating CRD pump has failed AND standby CRD pump is available, **THEN PERFORM** the following at Panel 2-9-5: (Otherwise N/A) [1.1] **PLACE** CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, in MAN at minimum setting. [1.2] **START** associated standby CRD Pump using one of the following: • CRD PUMP 1B, using 2-HS-85-2A. • CRD Pump 2A, using 2-HS-85-1A. [1.3] **IF** CRD Pump 1B was started, **THEN OPEN** CRD PUMP 1B DISCH TO U2, using 2-HS-85-8A [1.4] **ADJUST** CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, to establish the following conditions: • CRD CLG WTR HDR DP, 2-PDI-85-18A, approximately 20 psid. • CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, between 40 and 65 gpm. [1.5] **BALANCE** CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, AND **PLACE** in AUTO or BALANCE.
	Driver	If called as Unit 1 CRD Pump 1B is not being used. If dispatched to CRD Pump 2A Pump is extremely hot to touch.

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	ATC	[22] **IF** ΔT between Rx vessel bottom head temperature and moderator temperature precludes restart of Recirc pump **OR** forced Recirculation flow CANNOT be established for any reason, **THEN PERFORM** the following: (Otherwise N/A) [22.1] **INITIATE** plant cooldown to prevent exceeding the pressure limit for Rx vessel bottom head temperature indicated on 2-PNL-9-47, 2-TR-56-4 pt. 10 and based on Tech Specs Figure 3.4.9-1. [22.2] **MONITOR** pressure and temperature to ensure pressure limit vs. Rx vessel bottom head temperature curve from Tech Specs Figure 3.4.9-1 is **NOT** exceeded using ICS RPV PRESS/TEMP COMPARISON graph (type in "RPVCOM" or the graph may be selected from Ops Support touch screen).
	ATC ATC/BOP	[23] **VERIFY** Mode Switch in Shutdown and **PERFORM** the following: [23.1] **REMOVE** Mode Switch key. [23.2] **PLACE** Mode Switch key under Shift Manager control. [23.3] **REQUEST** Caution Order on Mode Switch to verify SRMs and IRMs operable. [24] With Unit Supervisor's permission and conditions allow: [24.1] **VERIFY RESET** PCIS Logic on Panel 2-9-4. [24.2] **DEPRESS** TIP ISOLATION RESET, 2-HS-94-7D/S pushbutton on Panel 2-9-13.
	Driver	When called for Appendix 2 wait 3 minutes and preference key F12, Appendix-1F wait 5 minutes and preference key F11, If requested to close 85-586 wait 3 minutes and preference key shift F4 to close and shift F5 to open. Do NOT delete ATWS change ATWS severity to 90 on both sides

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	ATC	[25] **WHEN** scram signal(s) are reset [25.1] **OBTAIN** Unit Supervisor's permission to reset the scram. [25.2]**DEPRESS** HS-85-36A CRD SCRAM DISCH VOL ISOL TEST VALVE pushbutton on Panel 2-9-5 to isolate the SCRAM DISCH VOL Vent & DR VLVS. [25.3] **IF** either 2-XA-55-4A-10, ATWS AUTO INITIATE, or 2-XA-55-4A-24, ARI MANUAL INITIATE is in alarm, **THEN VERIFY RESET** ATWS/RPT/ARI as follows: (Otherwise N/A) [25.3.1] **VERIFY** 30 seconds have elapsed from ATWS initiation as indicated by READY TO RESET white lights, 2-XI-68-121A and B, illuminated. [25.3.2] **DEPRESS** both RESET pushbuttons 2-HS-68-121A and 2-HS-68-121B. [25.3.3] **VERIFY** ARI MANUAL INITIATE switches, 2-HS-68-119A and 2-HS-68-119B, disarmed. [25.3.4] **CHECK** ARMED white lights, 2-XI-68-119A and B, extinguished. [25.3.5] **CHECK** the following annunciators are reset: • 2-XA-55-4A-10, ATWS AUTO INITIATE • 2-XA-55-4A-24, ARI MANUAL INITIATE
	ATC	[25.4] **PLACE** SCRAM DISCH HI LEVEL BYPASS 2-HS-99-5A/S4 switch in BYPASS. [25.5] **RESET** Scram by placing SCRAM RESET Switch in RESET FIRST and then to RESET SECOND position.
	Driver	When called for Appendix 2 wait 3 minutes and preference key F12, Appendix-1F wait 5 minutes and preference key F11, If requested to close 85-586 preference key shift F4 to close and shift F5 to open. Do NOT delete ATWS change ATWS severity to 90 on both sides

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

	ATC	[25.6] **CHECK** SCRAM SOLENOID GROUP A and B LOGIC RESET, lights illuminate. [25.7] **WHEN** scram is reset, **THEN CHECK** all blue lights on Full Core Display are extinguished and control rods have settled back to position "00" by either observation of Full Core Display, or ICS NSSS FULL CORE DISPLAY. [25.8] **IF** any control rod(s) fail to settle back to "00", **THEN RESET** control rod(s) to "00" by applying rod insert signal. (Otherwise N/A) [25.9] **IF** control rod cannot be seated in notch position "00", **THEN ISOLATE** affected HCU per 2-OI-85, Removing a Hydraulic Control Unit from Service. (Otherwise N/A) [25.10] **RESET** Control Rod Drift Lights. [25.11] **IF** there are any indications that a scram outlet valve has **NOT** isolated, **THEN ISOLATE** the affected HCU per 2-OI-85. (Otherwise N/A) [25.12] **WHEN** there are NO indications of an open scram outlet valve and any HCU identified in step 4.2[25.11] have been isolated, **THEN** [25.12.1] **DEPRESS** HS-85-36A CRD SCRAM DISCH VOL ISOL TEST VALVE pushbutton on Panel 2-9-5 [25.12.2] **CHECK** SCRAM DISCH VOL VENT & DR VLVS open by red indicating lights/illuminating on SDV display.
	Driver	When called for Appendix 2 wait 3 minutes and preference key F12, Appendix-1F wait 5 minutes and preference key F11, If requested to close 85-586 wait 3 minutes and preference key shift F4 to close and shift F5 to open. Do NOT delete ATWS change ATWS severity to 90 on both sides

NRC Scenario 2

Simulator Event Guide:

Event 9 Component: RWCU Leak, failure of Auto Isolation

	ATC/BOP	Reports alarm 3D-17, RWCU LEAK DETECTION TEMP HIGH
	SRO	RE Enters **EOI-3** on **Secondary Containment Temperature**
	SRO	Monitors and Controls Secondary Containment Temps
		Operate Available ventilation (APPX 8F) Defeat Isolation interlocks if necessary (APPX 8E)
		Is any Area Temp Above MAX Normal, Yes RWCU Room
		Isolate all systems that are discharging into the area except systems required to: • Be operated by EOIs **OR** • Suppress a Fire
	BOP	Reports High Temperature RWCU Outboard Isolation Valve Area 2-TS-69-29F Reports RWCU Radiation Monitors 90-14A and 90-13A at MAX Safe
	SRO	Before ANY Area Temp Rises to MAX Safe Continue, Completed
		When Temps in 2 or more areas are above MAX Safe Then Continue, Does Not Continue in the Temperature leg, NO area at or above MAX Safe Temperature
	SRO	Enters **EOI-3** on **Secondary Containment Radiation**
		Will Emergency Depressurization Reduce Discharge Into Secondary Containment? – YES
		Before any area radiation rises to Max Safe (table 4) Continue When Radiation Levels in 2 or more Areas are Above MAX Safe Then Continue,
	ATC	Reports RWCU failed to Auto Isolate, RWCU has been manually isolated with the Hand Switches
	SRO	Will Emergency Depressurization Reduce Discharge Into Secondary Containment? – NO Does NOT direct Emergency Depressurization, NO systems Discharging into Secondary Containment.

	BOP	Places Suppression Pool Cooling in service as directed IAW 2-OI-74
		8.5 Initiation of Loop I(II) Suppression Pool Cooling [1] **VERIFY** RHR Loop I(II) is in Standby Readiness. **REFER TO** Section 4.0 [2] **REVIEW** the precautions and limitations in Section 3.0. [3] **NOTIFY** other units of placing Loop I(II) of RHR in suppression pool cooling, the subsequent start of common equipment (i.e., RHRSW pumps) and associated alarms are to be expected. [4] **NOTIFY** Radiation Protection for impending action to initiate Suppression Pool Cooling. **RECORD** name and time of Radiation Protection representative notified in NOMS narrative log [5] **IF** possible, **THEN BEFORE** placing RHRSW in service, **NOTIFY** Chemistry that RHRSW sampling is to be initiated (RHRSW sampling requirements). [6] **VERIFY** at least one RHRSW Pump is operating on each EECW Header.
		[7] **PLACE** RHR Pump and Heat Exchanger A(C) in service as follows: [7.1] **START** an RHRSW Pump to supply RHR Heat Exchanger A(C). [7.2] **ESTABLISH** RHRSW flow by performing one the following: [7.2.1] **REQUEST** another unit establish minimum flow for Pump which will be utilized for Suppression Pool Cooling, (RHRSW Pump A(C) and establish minimum flow. (between 4000 and 4500 gpm RHRSW flow) REFER TO 0-OI-23. OR [7.2.2] **THROTTLE OPEN** RHR HX 2A(2C) RHRSW OUTLET VLV, 2-FCV-23-34(40), as required for cooling (if another is maintaining minimum flow) and/or to maintain between 4000 and 4500 gpm RHRSW flow as indicated on 2-FI-23-36(42), RHR HTX 2A(2C) RHRSW FLOW. [7.3] **VERIFY CLOSED** RHR SYS I LPCI INBD INJECT VALVE, 2-FCV- 74-53.

Simulator Event Guide:

Event 8 Major: Fuel Failure and ATWS

<table>
<tr><td></td><td>BOP</td><td>Places Suppression Pool Cooling in service as directed IAW 2-OI-74</td></tr>
<tr><td></td><td></td><td>[7.4] IF NO RHR PUMP (1A OR 1C) is operating in Suppression Pool Cooling, THEN VERIFY CLOSED RHR SYS I SUPPR POOL CLG/TEST VALVE, 2-FCV-74-59.

[7.5] VERIFY CLOSED RHR SYS I SUPPR CHBR SPRAY VALVE, 2-FCV-74-58.

[7.6] VERIFY CLOSED RHR SYS I DW SPRAY OUTBD VLV, 2-FCV-74-60.

[7.7] VERIFY OPEN RHR SYS I SUPPR CHBR/POOL ISOL VLV, 2-FCV-74-57.</td></tr>
<tr><td></td><td></td><td>[7.8] IF desired to operate without the Drywell DP Compressor, THEN:

[7.8.1] OBTAIN permission from the Unit Supervisor

[7.8.2] OPERATE without the Drywell DP Compressor. REFER TO 2-OI-64.

[7.9] START RHR PUMP A(C) using 2-HS-74-5A(16A).

[7.10] THROTTLE RHR SYS I SUPPR POOL CLG/TEST VLV, 2-FCV-74-59, to maintain RHR flow within limits, as indicated on RHR SYS I CTMT SPRAY FLOW, 2-FI-74-56:
<table>
<tr><th>RHR Pumps in Operation</th><th>1</th><th>2</th></tr>
<tr><td>Loop Flow</td><td>7,000 to 10,000 gpm & Blue light illuminated</td><td><13,000 gpm & Blue light illuminated</td></tr>
</table>
[7.11] IF desired to raise Suppression Pool Cooling flow and only one Loop I pump is in service, THEN PLACE the second Loop I RHR Pump and Heat Exchanger in service by REPERFORMING Step 8.5[7] for the second pump.

[8] CHECK pump motor breaker charging spring recharged for all 4160 Volt pump motors operated in this section, as follows:
• Amber breaker spring charged light on,
• Closing spring target indicates charged.</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

NRC Scenario 2

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

None

Operations/Maintenance for the Shift:

4.5% power. 2-GOI-100-1A Section 5.4 Step 64 and 66. Perform IRM/APRM overlap before exceeding 5% power.

RFPT 2B is warmed IAW 2-OI-3 Section 5.6.

Engineering is ready in the field need to start SBGT Fan C with alignment to Reactor Zone Ventilation IAW 0-OI-65 section 5.2.

Continue to pull rods to 8% IAW RCP.

Units 1 and 3 are 100% Power

Unusual Conditions/Problem Areas:

Severe Thunderstorm Warnings are in affect for the entire area for the next 2 hours.

NRC Scenario 3

Facility: **Browns Ferry NPP** Scenario No.: **NRC – 3** Op-Test No.: **1306**

Examiners:_____ Operators: **SRO:**_____

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 95% power, CRD Pump 3A, EHC Pump 3A and B3 RHRSW Pump are tagged out.

Turnover: Remove DG 3B from Parallel operation in accordance with 3-OI-82. Raise power to 100% with flow.

Event No.	Malf. No.	Event Type*	Event Description
1		R-ATC R-SRO	Commence power increase with flow to 100%
2	IOR	N-BOP TS-SRO	Remove DG 3B from Parallel operation IAW 3-OI-82
3	sw03m	C-BOP TS-SRO	D3 EECW Pump Trip
4	RD22	I-ATC I-SRO	CRD Flow Transmitter FT-85-11 fails high
5	Batch File	C-ATC C-SRO	RFPT 3C Trips, Reactor Recirc fails to runback
6	Batch File	C-BOP C-SRO	Loss of 4KV Unit BD 3C, Loss of Circ Water Pump 3C and the discharge valve fails to close automatically
7	Batch File	M-ALL	Station Blackout
8	RC04	I	RCIC Controller fails in Auto, Manual available
9	sw03k	C	RHRSW Pump D1 Trips

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

Reid 5/22

Critical Tasks - Two

With a loss of all Off Site Power and NO 480V SD BD energized, energizes 4KV SD BD 3EC from 4KV SD BD 3ED.

1. Safety Significance:
   Provides Power for ECCS Systems

2. Cues:
   Procedural compliance
   480V Shutdown Board 3B Energized, along with 480V RMOV Boards 3B, 3C, 3D, and 3E

3. Measured by:
   Observation – RO crossties to 4 KV SD BD 3ED to 3EC
   AND
   Observation – 4 KV SD BD 3EC indicates energized

4. Feedback:
   Power to 4 KV SD BD 3EC
   Power to 480V SD BD 3B

With a Station Blackout on Unit 3 verify two EECW Pumps not using the same EECW strainer are in service supplying Diesel Generators. Cooling water is required to be established within 8 minutes.

1. Safety Significance:
   Provides Cooling Water for only operating DG on Unit 3

2. Cues:
   Procedural compliance
   RHRSW Pump A1 or C1 in service aligned to EECW

3. Measured by:
   Observation – RO aligns RHRSW Pump C1 and verifies C1 RHRSW Pump starts
   AND
   Observation – RO aligns RHRSW Pump A1 and start A1 RHRSW Pumps

4. Feedback:
   No High Temperature alarms on Panel 9-23D for D Diesel Generator
   A1 or C1 RHRSW Pumps operating

Events

1. ATC commences power increase 100% using recirculation flow.

2. BOP remove DG 3B from Parallel operation IAW 3-OI-82 section 8.1 step 17. A low lube oil pressure condition will occur on DG 3B, requiring an Emergency Shutdown of the DG 3B. SRO will evaluate TS 3.8.1 and Enter Condition B.

3. D3 EECW pump will trip, with B3 EECW pump tagged, the crew will respond IAW the ARP and manually start the D1 EECW pump. The SRO will refer to Tech Specs and initially determine TS 3.7.2 Condition A. Once the D1 EECW pump has been aligned the SRO will determine TS 3.7.1 Condition A now applies.

4. The ATC will respond to the CRD flow element failing high causing 3-FIC-85-11 CRD flow control valve to close. The ATC will take action to take manual control of the CRD flow controller and restore CRD system parameters. Depending on how long the crew takes to restore CRD system parameters Tech Spec actions may be required if CRD temperatures increase high enough.

5. RFPT 3C will trip, with the RFPT trip and when level reaches 27 inches a Reactor Recirc runback should have occurred. The runback will fail to occur, RFPT 3A and 3B speed will increase to maintain level but much higher than the prescribed procedure limit of 5050 rpm. The ATC will have to manually initiate the runback or lower power manually.

6. The crew will respond to a Loss of 4KV Unit Board 3C. The 3C CCW Pump will trip, the Discharge valve will fail to close and the crew will close the discharge valve, to prevent a loss of vacuum. If the crew fails to close the discharge valve vacuum will quickly degrade requiring a SCRAM.

7. On the SCRAM or just before a Loss of Offsite Power will occur, due to equipment failures Unit 3 will enter a Station Blackout. No 4KV Shutdown Boards will be energized. The crew will take action IAW 0-AOI-57-1A and restore 4 KV SD BD B. RCIC and HPCI will be available for Level and Pressure control.

8. The RCIC flow controller will fail in automatic, the crew will take manual control to maintain Reactor level.

9. RHRSW Pump D1 trips, No EECW pumps operating on EECW. Need to align A1 or C1 RHRSW Pumps to EECW within 8 minutes of D1 tripping.

Terminate the scenario when the following conditions are satisfied or upon request of Lead Examiner:

Control Rods are inserted

Reactor Level is maintained

Station Blackout exited when power restored to 4KV SD BD 3EC

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 3

9 Total Malfunctions Inserted: List (4-8)

3 Malfunctions that occur after EOI entry: List (1-4)

4 Abnormal Events: List (1-3)

1 Major Transients: List (1-2)

2 EOI's used: List (1-3)

0 EOI Contingencies used: List (0-3)

75 Validation Time (minutes)

2 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

NRC Scenario 3

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Shutdown DG 3B			
RO U-082-NO-05 SRO S-082-NO-02	264000 A4.04	3.7	3.7
Raise Power with Recirc Flow			
RO U-068-NO-17 SRO S-000-NO-138	2.1.23	4.3	4.4
CRD Controller Failure			
RO U-085-AB-03 SRO S-085-AB-03	201001 A2.07	3.2	3.1
Loss Unit Board 3C/CCW Pump Trip			
RO U-047-AB-03 SRO S-047-AB-03	295002 AA1.07	3.1	2.9
EECW Pump Trip			
RO U-067-NO-12 SRO S-000-AD-27	400000 A2.01	3.3	3.4
RFPT Trip / Failure of Core Flow Runback			
RO U-003-AL-16 RO U-068-AL-20 SRO S-003-AB-01	259001 A2.01	3.7	3.7
Loss of Offsite Power/Station Blackout			
RO U-57A-AB-01 SRO S-57A-AB-01	295003 AA1.03	4.4	4.4

Procedures Used/Referenced:

Procedure Number	Procedure Title
3-OI-82	Standby Diesel Generator System
3-ARP-9-23B	Panel 9-23 3-XA-55-23B
3-GOI-100-12	Power Maneuvering
3-OI-68	Reactor Recirculation System
	Technical Specifications
3-ARP-9-20A	Panel 9-20 3-XA-55-20A
0-OI-67	Emergency Equipment Cooling Water System
3-AOI-85-3	CRD System Failure
3-OI-85	Control Rod Drive System
3-ARP-9-5A	Panel 9-5 3-XA-55-5A
3-ARP-9-6A	Panel 9-6 3-XA-55-6C
3-AOI-3-1	Loss of Reactor Feedwater or Reactor Water Level High/Low
3-OI-3	Reactor Feedwater System
3-ARP-9-8B	Panel 9-8 3-XA-55-8B
3-AOI-47-3	Loss of Condenser Vacuum
3-AOI-100-1	Reactor Scram
0-AOI-57-1A	Loss of Offsite Power (161 and 500 KV)/Station Blackout
3-AOI-30B-1	Reactor Building Ventilation Failure
3-AOI-78-1	Fuel Pool Cleanup System Failure
3-EOI-1	RPV Control
3-EOI Appendix-11A	Alternate Pressure Control Systems MSRVs
3-EOI Appendix-5D	Injection System Lineup HPCI
3-EOI Appendix-5C	Injection System Lineup RCIC
3-EOI Appendix-17C	RHR System Operation Suppression Chamber Sprays
3-EOI Appendix-17B	RHR System Operation Drywell Sprays
3-EOI Appendix-17A	RHR System Operation Suppression Pool Cooling
3-EOI Appendix-11C	Alternate RPV Pressure Control Systems HPCI Test Mode
3-EOI-2	Primary Containment Control
EPIP-3	Alert
EPIP-4	Site Area Emergency
EPIP-1	Emergency Classification

Batch File

```
#tagout CRD 3A, EHC 3A, and B3 EECW
ior ypobkrpumpa fail_ccoil
ior zlohs851a[1] off
ior zlohs471a[1] off
ior zdihs471a[1] ptl
ior ypobkrrhrswpb3 fail_ccoil
ior zdihs2388a[2] stop
ior zlohs2388a[1] off

#DG 3B Loss of Lube Oil
ior zlo3il8213b (e30 0) on
ior 0xa5523b[2] (e30 0) alarm_on
ior 0xa5523b[4] (e30 0) alarm_on

#EECW D3 Trip
imf sw03m (e1 0)
mrf sw05 (e2 0) close

#CRD flow controller fails high
imf rd22 (e4 0) 100

#RFPT 3C Trip/ RR Fails to runback
ior zdihs03176[1] (e8 0) trip
imf fw26e (e8 0) 60

#Circ water 3C pump trip and discharge valve fails to close, Loss of Unit BD 3C
imf ed08c (e12 0)
ior ypovfcv2729 fail_power_now
ior zlohs2729a[2] on
trg e13 nrcccwpumpC
trg e13= bat nrcccwpumpC

#Major
imf ed01 (e18 0)                Loss of Off Site Power
imf ed09a (e18 0)               Loss of 4KV SD BD 3EA
imf dg06c                       DG 3C fails to start
trg e20 MODESW
imf rc04 (e20 0) 10             RCIC Flow controller Failure
imf sw03k (e20 240)
trg e23 = bat eecw
trg e24 = bat eecw-1
trg e25 = bat rpsreset
trg e26 = bat ca
```

Trigger Files

nrcccwpumpC
zdihs2729a[1] .eq. 1

MODESW
ZDIHS465(4) .NE. 1

Scenario 3

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 202
	manual	Verify CRD Pump 3B in service, EHC Pump 3B in service and EHC Pump 3A in Pull-to-Lock
Simulator Setup	**Load Batch**	bat nrc1306-3
Simulator Setup	manual	Tag CRD 3A, EHC 3A and EECW Pump B3
Simulator Setup		Verify file loaded

RCP required (95% - 100% with flow) and RCP for Urgent Load Reduction
Provide marked up copy of 3-GOI-100-12
Provide marked up copy of 3-OI-82, section 8.1 up to step 17
Provide marked up Illustration 2

Simulator Event Guide:

Event 1 Reactivity: Power increase with Recirc Flow

	SRO	Notifies ODS of power increase.
		Directs Power increase using Recirc Flow, per 3-GOI-100-12. [21] **WHEN** desired to restore Reactor power to 100%, **THEN PERFORM** the following as directed by Unit Supervisor and recommended by the Reactor Engineer: • **RAISE** power using control rods or core flow changes. **REFER TO** 3-SR-3.3.5(A) and 3-OI-68.
	ATC	Raise Power w/Recirc, IAW 3-OI-68, Section 6.2
		D. Individual pump speeds should be mismatched by ~60 RPM during dual pump operation between 1200 and 1300 RPM to minimize harmonic vibration (this requirement may be waived for short time periods for testing or maintenance). [1] **IF** desired to control Recirc Pumps 3A and/or 3B speed with Recirc Individual Control, **THEN PERFORM** the following; • Raise Recirc Pump 3A using, RAISE SLOW (MEDIUM), 3-HS-96-15A(15B). **AND/OR** • Raise Recirc Pump 3B using, RAISE SLOW (MEDIUM), 3-HS-96-16A(16B).
		[2] **WHEN** desired to control Recirc Pumps 3A and/or 3B speed with the RECIRC MASTER CONTROL, **THEN ADJUST** Recirc Pump speed 3A & 3B using the following push buttons as required: RAISE SLOW, 3-HS-96-31 RAISE MEDIUM, 3-HS-96-32
	Driver	When directed by NRC, Trigger 1 to trip EECW Pump D3

Simulator Event Guide:

Event 2 Normal/Component: Remove DG 3B from Parallel operation IAW 3-OI-82

<table>
<tr><td></td><td>SRO</td><td>Directs BOP to remove DG 3B from parallel operation IAW 3-OI-82 section 8.1</td></tr>
<tr><td></td><td>BOP</td><td>8.1 Parallel with System Operation at Panel 9-23
[17] WHEN Parallel With System operation is no longer desired, THEN UNLOAD the Diesel Generator as follows:

CAUTION
When unloading the Diesel Generator, failure to slowly approach the 300 kW/250 kVAR limit may result in a reverse power trip of the Diesel Generator output breaker.

[17.1] USE the associated Diesel Generator's governor control switch and voltage regulator control switch to reduce generator load to approximately 300 kW and 250 kVAR.
<table>
<tr><td rowspan="4">3B</td><td>DG 3B GOVERNOR CONTROL</td><td>3-HS-82-3B/3A</td><td rowspan="4">3-9-23</td></tr>
<tr><td>DG 3B VOLT REGULATOR CONT</td><td>3-HS-82-3B/2A</td></tr>
<tr><td>DG 3B KILOWATTS</td><td>3-JI-82-3B/A</td></tr>
<tr><td>DG 3B KILOVARS</td><td>3-VAR-82-3B/A</td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td>[17.2] PLACE the associated Diesel Generator breaker control switch in TRIP.
DG3B BKR 1842 3-HS-211-3EA/9A 3-9-23

[17.3] PULL and PLACE the associated Diesel Generator mode selector switch in SINGLE UNIT.
DG 3B Mode Select 3-HS-82-3B/5A 3-9-23</td></tr>
<tr><td></td><td></td><td>[17.4] RELEASE the Diesel Generator mode selector switch and OBSERVE the SINGLE UNIT light illuminated</td></tr>
<tr><td></td><td></td><td>[17.5] RECORD the time/date unloaded on Illustration 2.

[17.6] DISPATCH personnel to visually inspect the Diesel Generator output breaker to verify the closing springs are fully charged. Both the amber light and mechanical flag should be checked to indicate a charged spring.

[18] IF operation of the Diesel Generator is no longer required, THEN REFER TO Section 7.0 and SHUT DOWN the Diesel Generator.</td></tr>
<tr><td></td><td>DRIVER</td><td>Prior to the operator shutting down the DG insert trigger 30, to cause a low lube oil condition and report significant oil leak from a damaged oil line. Unable to obtain oil pressure reading, cannot access panel. Delete override on amber light after Emergency Shutdown depressed.</td></tr>
</table>

Simulator Event Guide:

Event 2 Normal/Component: Remove DG 3B from Parallel operation IAW 3-OI-82

	BOP	Responds to annunciators DIESEL GEN 3B TROUBLE and DIESEL GEN 3B LUBE OIL ABNORMAL
		DIESEL GEN 3B TROUBLE A. **CHECK** panel 9-23 alarm panel for other alarms. B. **DISPATCH** personnel to diesel generator room to check alarm.
		DIESEL GEN 3B LUBE OIL ABNORMAL
		A. **CHECK** panel 9-23 to see if Low Low Lube Oil pressure light is illuminated. B. **DISPATCH** personnel to diesel generator room to check: 1. Oil pressure on local gauges for lube oil engine, lube oil filter inlet, and turbocharger compressor lube oil. 2. Scavenging, main, and piston cooling pumps running. 3. Oil level visible on dipstick. 4. Oil filters and strainers. 5. Any leakage. C. **SHUT DOWN** the diesel generator by EMERGENCY SHUTDOWN Pushbutton, if necessary.
	BOP	**7.4 Emergency Shutdown at Panel 9-23** [1] **DEPRESS** the associated Diesel Generator Emergency SHUTDOWN (STOP) push-button. DG 3B EMERGENCY SHUTDOWN 3-HS-82-3B/4 3-9-23 [2] **VERIFY OPEN** DG 3B Output Bkr 1842. [3] **DISPATCH** personnel to locally **VERIFY** Diesel Generator stops. [6] **INITIATE** corrective action to return the Diesel Generator to an operable status. [7] **RECORD** time/date stopped on Illustration 2.
	Driver	Report DG is Stopping

Simulator Event Guide:

Event 2 Normal/Component: Remove DG 3B from Parallel operation IAW 3-OI-82

	SRO	Evaluate Tech Spec 3.8.1
		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; b. Unit 3 diesel generators (DGs) with two divisions of 480 V load shed logic and common accident signal logic OPERABLE; and c. Unit 1 and 2 DG(s) capable of supplying the Unit 1 and 2 4.16 kV shutdown board(s) required by LCO 3.8.7, "Distribution Systems - Operating." APPLICABILITY: MODES 1, 2, and 3.
		ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2 Evaluate availability of both temporary diesel generators (TDGs). AND	1 hour AND Once per 12 hours thereafter
	B.3 Declare required feature(s), supported by the inoperable Unit 3 DG, inoperable when the redundant required feature(s) are inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
B. One required Unit 3 DG inoperable.	B.1 Verify power availability from the offsite transmission network. AND	1 hour AND Once per 8 hours thereafter

Simulator Event Guide:

Event 2 Normal/Component: Remove DG 3B from Parallel operation IAW 3-OI-82

	SRO	Evaluate Tech Spec 3.8.1
		3.8 ELECTRICAL POWER SYSTEMS 3.8.1 AC Sources - Operating
		ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
	AND	
	B.4.1 Determine OPERABLE Unit 3 DG(s) are not inoperable due to common cause failure.	24 hours
	OR	
	B.4.2 Perform SR 3.8.1.1 for OPERABLE Unit 3 DG(s).	24 hours
	AND	
B. (continued)	B.5 Restore Unit 3 DG to OPERABLE status.	7 days from discovery of unavailability of TDG(s) AND 24 hours from discovery of Condition B entry $\geq$ 6 days concurrent with unavailability of TDG(s) AND 14 days

Simulator Event Guide:

Event 3 Component: EECW pump D3 trip

	BOP	Respond to Motor Trip Out annunciator.
		Report Trip of D3 EECW Pump, No EECW Pumps on the South Header C. The EECW System is aligned as follows: 1. At least one RHRSW pump, assigned to the EECW System, should be running on each header to maintain the header charged at all times. If no pumps are running on a header and header pressure lowers to ≤ 0 psig, the header shall be declared inoperable and appropriate actions taken, as required by Technical Specifications.
	DRIVER	If contacted as Unit 1 operator, you did not secure the D3 EECW Pump
	SRO	Direct operator to place D1 RHRSW Pump in service to the South Header
	BOP	**8.4 Operation of RHRSW Pump D1 (for EECW in place of D3)** **CAUTION** Only one RHRSW pump in a given RHRSW pump room may be counted toward meeting Technical Specification 3.7.2 requirements for EECW pump operability. **NOTES** 1) RHRSW Pump D1 may be aligned for service by this section when: • It is used to meet the minimum number of Tech. Spec. operable pumps; or • At the discretion of the Unit Supervisor, it is needed to replace another pump's operation; or • At the discretion of the Unit Supervisor, it is needed to assist in supplying header flow/pressure demand. 2) If used to meet EECW requirements, RHRSW pump D1 must be aligned to EECW, the pump started, and should remain running. RHRSW Pump D1 does **NOT** have the same auto start signals as RHRSW Pump D3. 3) Prior to aligning D1 RHRSW Pump to EECW, Technical Requirements Manual 3.5.2 must be reviewed to ensure Standby Coolant requirements are met. 4) When RHRSW Pump D1 is aligned for EECW, its RHRSW function required by the Safe Shutdown Program (Appendix R) is inoperable. Appendix R program equipment operability requirements of FPR-Volume 1 shall be addressed. 5) The RHRSW pump control switches and amp meters are located on Panel 9-3, Unit 1, 2, and 3.

Simulator Event Guide:

Event 3 Component: EECW pump C3 trip

		8.4 Operation of RHRSW Pump D1 (for EECW in place of D3) [1] To line up RHRSW Pump D1 for EECW System operation, **PERFORM** the following: [1.1] **VERIFY** EECW System is in prestartup/standby readiness alignment in accordance with Section 4.0. [1.2] **REVIEW** all precautions and limitations in Section 3.0. [1.3] **VERIFY** RHRSW Pump D1 is in standby readiness in accordance with 0-OI-23. [1.4] **VERIFY** RHRSW Pump D1 upper and lower motor bearing oil level is in the normal operating range. [1.5] **UNLOCK** and **CLOSE** RHRSW PMP D1 & D2 CROSSTIE, 0-23-563 at RHRSW D Room. [1.6] **OPEN** RHRSW PMP D1 CROSSTIE TO EECW, 0-FCV-67-48 using one of the following: • RHRSW PUMP D1 SUPPLY TO EECW, 0-HS-67-48A/3 on Unit 3 [1.7] **REQUEST** a caution order be issued to tag RHRSW Pump D1 and its associated crosstie valves to inform Operations personnel that it is aligned for EECW system operation and that the D1 pump should remain running to be operable for EECW. [2] To start RHRSW (EECW) Pump D1, **PERFORM** the following: [2.1] **START** RHRSW Pump D1 using one of the following: • RHRSW PUMP D1, 0-HS-23-23A/3 on Unit 3 [2.2] **VERIFY** RHRSW Pump D1 running current is less than 53 amps using one the following: • RHRSW PUMP D1 AMPS, 0-EI-23-23/3 on Unit 3 [2.3] **VERIFY** locally, RHR SERVICE WATER PUMP C1 breaker charging spring recharged by observing amber breaker spring charged light is on and closing spring target indicates charged. [2.4] **VERIFY** RHRSW Pump C1 upper and lower motor bearing oil level is in the normal operating range.
	Driver	If dispatched to check D3 EECW pump breaker, report breaker tripped on overload and breaker smells burnt but no visible smoke or flames (4kv SD BD D)

Simulator Event Guide:

Event 3 Component: EECW pump C3 trip

		8.4 Operation of RHRSW Pump D1 (for EECW in place of D3) [2.5] **NOTIFY** Chemistry of running RHRSW (EECW) pump(s). [2.6] **VERIFY** a caution order has been issued to tag RHRSW Pump D1 and its associated crosstie valves to inform Operations personnel that it is aligned for EECW system operation and that the D1 pump should remain running to be operable for EECW.
	Driver	When chemistry contacted, acknowledge report When contacted as Work Control for Caution Order, acknowledge direction and inform will begin working on a Caution Order When dispatched as intake AUO to check Oil Levels and close 0-23-563 valve wait 2 minutes and insert trigger 2 (mrf sw05 close), then report oil levels are normal and the 0-23-563 valve is closed When contacted to check breaker charging spring recharged for the D1 EECW pump, wait 2 minutes and inform amber breaker spring charged light is on and closing spring target indicates charged (BKR 4kv SD BD 3EB). When contacted as Intake AUO for second Oil Level check, report Oil Levels are normal
	SRO	Evaluate Technical Specification 3.7.2 before the D1 EECW Pump is aligned 3.7.2 Emergency Equipment Cooling Water (EECW) System and Ultimate Heat Sink (UHS) LCO 3.7.2 The EECW System with three pumps and UHS shall be OPERABLE. APPLICABILITY: MODES 1, 2, and 3.
		Condition A: One required EECW pumps inoperable. (D3 and B3) Required Action A.1: Restore the required EECW pump to OPERABLE status. Completion Time: 7 days
	SRO	In addition due to DG 3B Inoperable, 4 hour from DG 3B inoperability C3 EECW Pump will have to be declared inoperable per Tech Spec 3.8.1 Condition B.3 and at that time Tech Spec 3.7.2 Condition B will be required to be entered. Condition B: Two or more required EECW pumps inoperable. (D3, B3, and C3) Required Action B.1: Be in MODE 3. Completion Time: 12 hours Required Action B.2: Be in MODE 4. Completion Time: 36 hours

Simulator Event Guide:

Event 3 Component: EECW pump C3 trip

	SRO	Evaluate Technical Specification 3.7.1 after the D1 EECW Pump is aligned 3.7.1 Residual Heat Removal Service Water (RHRSW) System and Ultimate Heat Sink (UHS) LCO 3.7.1 ----------NOTE---------- The number of required RHRSW pumps may be reduced by one for each fueled unit that has been in MODE 4 or 5 for □ 24 hours. ---------- Four RHRSW subsystems and UHS shall be OPERABLE with the number of OPERABLE pumps as listed below: 1. 1 unit fueled - four OPERABLE RHRSW pumps. 2. 2 units fueled - six OPERABLE RHRSW pumps. 3. 3 units fueled - eight OPERABLE RHRSW pumps. APPLICABILITY: MODES 1, 2, and 3.
		Condition A: One required RHRSW pump inoperable Required Action A.1: Only applicable for the 2 units fueled condition. (NA) Required Action A.2: Restore required RHRSW pump to OPERABLE status. Completion Time: 30 days
	SRO	In addition due to DG 3B Inoperable, 4 hour from DG 3B inoperability C3 EECW Pump will have to be declared inoperable per Tech Spec 3.8.1 Condition B.3 and at that time Tech Spec 3.7.2 Condition A will be required to be entered.

Simulator Event Guide:

Event 4 Component: CRD flow element fails high causing 3-FIC-85-11 CRD flow control valve to close.

	Driver	When directed by the NRC trigger 4 (imf rd22 100) to fail the CRD flow element
	ATC	Report Alarm 5A-10 CRD ACCUM CHG WTR HDR PRESS HIGH
		A. **VERIFY** pressure high on CRD ACCUM CHG WTR HDR 3-PI-85-13A, B. **CHECK** 3-FCV-85-11A (B) in service. C. **IF** in-service controller has failed, **THEN REFER TO 3**-OI-85. D. **IF** pressure is still greater than 1510 psig after verifying proper controller operation, **THEN THROTTLE** PUMP DISCH THROTTLING, 3-THV-085-0527, to maintain between 1475 and 1500 psig.
	ATC	Report CRD controller has failed in Automatic, takes manual control and restores CRD Parameters including Drive Water DP between 250 and 270 psid
	SRO	Directs ATC to take manual control of 3-FIC-85-11 and restore CRD parameters
	Examiner Note	The crew may use OPDP-1 guidance listed below, or 3-OI-85 Section 8.32 to take manual control of 3-FIC-85-11. **OPDP-1 Conduct of Operations** **3.5 Manual Control of Automatic Systems** A. If an automatic control or an automatic action is confirmed to have malfunctioned, take prompt actions to place that control in manual or to accomplish the desired function. (e.g. Establishment of manual level control following automatic FCV failure to control level or manual start of an EDG that failed to auto start.)
	ATC	**8.32 AUTOMATIC/MANUAL Operation of 3-FIC-85-11** [1] **REVIEW** all Precautions and Limitations in Section 3.6. [2] **IF** transferring 3-FIC-85-11 from AUTO to MANUAL, **THEN**: [2.1] **PLACE** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11 in **BAL**. [2.2] **BALANCE** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, by turning Manual Control Pot inside Control Selector Wheel until red deviation pointer is in the Green Band. [2.3] **PLACE** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, in MAN. [2.4] **ADJUST** CRD SYSTEM FLOW CONTROL, 3-FIC-85-11, manual potentiometer to establish the desired system flow. Refer to Section 5.1 or Section 6.11.

Simulator Event Guide:

Event 5 Instrument: RFPT C Flow instrument fails as is on a trip of RFPT C, Reactor Recirculation System will fail to runback.

	Driver	When directed by the NRC trigger 8 to trip RFPT C ior zdihs03176[1] trip and to fail FW flow element imf fw26e 60
	ATC	Reports a Trip of RFPT 3C, and the following annunciators Panel 6C window 15, 23, and 29
		RFPT C ABNORMAL, RFPT TRIP CIRCUIT ABNORMAL, RFPT TRIPPED
		RFPT C ABNORMAL A. **CHECK** other RFP alarms on Panel 3-9-6 to determine problem area. B. **REFER TO** appropriate alarm response procedure.
		RFPT TRIP CIRCUIT ABNORMAL A. **VERIFY** alarm and RFPT trip by checking Panel 3-9-6, RFPT speed, governor valve position and discharge flow. B. **VERIFY** reactor power is within the capacity of operating RFPs. D. **IF** RFP is tripped, **THEN** REFER TO 3-OI-3, Section 8.1 or 3-AOI-3-1.
		RFPT TRIPPED A. **VERIFY** reactor power is within the capacity of operating RFPs. B. **CHECK** core limits. C. **WHEN** RFPT coasts down to zero speed, unless RFPT is rolling on minimum flow, **THEN VERIFY** turning gear motor starts and engages. D. REFER TO 3-AOI-3-1 or 3-OI-3, Section 8.1.
	SRO	Directs Entry to 3-AOI-3-1 Loss Of Reactor Feedwater or Reactor Water Level High/Low
	ATC	3-AOI-3-1 Loss Of Reactor Feedwater or Reactor Water Level High/Low **AUTOMATIC ACTIONS** Recirc Pumps receive run back signal to 75% speed at 27" (normal range) if the discharge flow of a RFP is less than 889,000 lb/hr 19% (rated flow).
		[1] **VERIFY** applicable automatic actions. [2] **IF** level OR Feedwater flow is lowering due to loss of Condensate, Condensate Booster, or Feedwater Pump(s), **THEN REDUCE** Recirc flow as required to avoid scram on low level.

Simulator Event Guide:

Event 5 Instrument: RFPT C Flow instrument fails as is on a trip of RFPT C, Reactor Recirculation System will fail to runback.

	ATC	Reports annunciator REACTOR WATER LEVEL ABNORMAL and level is below 27 inches and slowly lowering RFPTs 3B and 3A speed is increasing to recover level.
		REACTOR WATER LEVEL ABNORMAL
		A. **VERIFY** Reactor water level hi/low using multiple indications including Average Narrow Range Level on 3-XR-3-53 recorder, 3-LI-3-53, 3-LI-3-60, 3-LI-3-206, and 3-LI-3-253 on Panel 3-9-5. B. **IF** alarm is valid, **THEN REFER TO** 3-AOI-3-1 or 3-OI-3.
	ATC	Reports Power remained stable, pressure remained stable and level is recovering
		For operating Feed Pumps, monitor and maintain the following parameters within ranges described below. RFPT Speed: 5050 rpm maximum (3-9-6). ATC reports RFPT 3A and 3B speed at greater than 5400 RPM
	SRO	If ATC has NOT initiated a power reduction Directs a Core flow runback
	ATC	Initiates a Mid Power Core Flow Runback, to lower RFPT speeds to less than 5050 RPM
	Driver	When called to report reason for RFPT 3C trip, wait 5 minutes and report laborers in area, they believe the tripped the RFPT. Delete override ior zdihs03176[1] trip
	Driver	At direction of NRC trigger 12 Loss of 4kv Unit Board 3C, when called wait 4 minutes and report cause of Unit Board trip is actuation of Unit Board Feeder 86-XXX Lockout Relay. When operator closes Circ Water Pump Discharge Valve ensure trigger 13 goes active

Simulator Event Guide:

Event 6 Instrument: Loss of 4KV Unit BD 3C, Loss of Circ Water Pump 3C and the discharge valve fails to close automatically

	Crew	Respond to 8B-14 4KV UNIT BD 3C UNDERVOLTAGE A. **VERIFY** Unit in stable condition by checking: • Condensate Pump 3C • Condensate Booster Pump 3C • RCW Pump 3C • CCW Pump 3C • CRD Pump 3A B. **IF** undervoltage has occurred, **THEN** 1. **CLEAR** disagreement lights on breakers. 2. **REDUCE** load as necessary to maintain stable operating conditions. 3. Condenser discharge may need to be throttled for two CCW pump operation. **REFER TO** 3-OI-27. C. **CHECK** Unit Bd 3C for abnormal conditions: relay targets, smoke, burned paint, etc. D. **REFER TO** 0-OI-57A to re-energize board.
		Report loss of 4KV Unit Board 3C
	ATC	Reports loss of Condensate Pump 3C and Condensate Booster Pump 3C, Power Pressure Level stable
	BOP	Will respond to a loss of Circ Water Pump 3C, report failure of discharge valve to close and close discharge valve
	ATC/BOP	If discharge Valve is NOT closed, report degrading condenser Vacuum
	SRO	Enters 3-AOI-47-3 Loss of Condenser Vacuum
	DRIVER	IF Operator fails to close CCW Pump 3C Discharge Valve Vacuum will quickly degrade causing a Turbine Trip and Reactor SCRAM. If the Turbine Trips insert trigger 18 loss of Offsite Power. If the operator closes the discharge valve insert trigger 18 at the direction of the NRC

Simulator Event Guide:

Event 6 Instrument: Loss of 4KV Unit BD 3C, Loss of Circ Water Pump 3C and the discharge valve fails to close automatically

	BOP/ATC	3-AOI-47-3 Loss of Condenser Vacuum
		[2] **IF** unable to maintain hotwell pressure below -25 inches Hg as indicated on 3-XR-2-2, with Reactor power less than 30%, **THEN TRIP** the main turbine.
		[4] **REDUCE** reactor power in an attempt to maintain condenser vacuum. [5] **VERIFY** automatic actions.
		[6] **CHECK** CCW pumps for proper operation. If available, **START** additional CCW PUMPS. [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, Panel 9-8, between 20 and 180 scfm. [9] **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)
	DRIVER	IF Operator fails to close CCW Pump 3C Discharge Valve Vacuum will quickly degrade causing a Turbine Trip and Reactor SCRAM. If the Turbine Trips insert trigger 18 loss of Offsite Power. If the operator closes the discharge valve insert trigger 18 at the direction of the NRC

Simulator Event Guide:

Event 7 Major: Station Blackout

	SRO	Directs Reactor SCRAM and enters 3-AOI-100-1
		4.1 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) [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
		4.2 Subsequent Actions [3] **DRIVE** in all IRMs and SRMs from Panel 3-9-5 as time and conditions permit. [3.1] **DOWNRANGE** IRMs as necessary to follow power as it lowers. [4] **VERIFY** SCRAM DISCH VOL VENT & DR VLVS closed by green indicating lights at SDV Display on Panel 3-9-5. [5] **MONITOR** and **CONTROL** Reactor Water Level between +2" and +51", or as directed by US, as follows:
	Crew	Recognize Loss of Off Site Power, Report failure of 4KV SD BD 3EA, DG 3EB, DG 3EC, Only DG operating is 3ED
	SRO	Declares a Station Blackout (SBO) is defined as a loss of 161 and 500kV systems and a failure of the two diesel generators which supply normal power to the two 480V Shutdown Boards on a unit. Currently NO 480V Shutdown Boards are energized.

Simulator Event Guide:

Event 7 Major: Station Blackout

	Crew	Responds to a Loss of Offsite Power IAW 0-AOI-57-1A
		4.1 Immediate Actions [1] **VERIFY** Diesel Generators have started and tied to respective 4kV Shutdown Boards, **THEN DISPATCH** personnel to Diesel Generators. [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).
	BOP	Report only DG 3D is carry 4KV SD BD D, dispatches personnel to determine problems with DGs and SD Boards.
	Crew	Reports trip of RHRSW Pump D1. 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).
	BOP	Performs Attachment 9 of 0-AOI-57-1A
	SRO	Declares a Station Blackout (SBO) is defined as a loss of 161 and 500kV systems and a failure of the two diesel generators which supply normal power to the two 480V Shutdown Boards on a unit. Currently NO 480V Shutdown Boards are energized.
	Driver	When sent to investigate 4KV SD BD 3EA has an actuation of overcurrent relay 51. DG 3A is operating normally. Unknown why DG 3C will not start contacting maintenance. If called as Unit 1 or 2 report all 4 DGs on Unit 1 and 2 have started and are tied to their respective board. IF Unit 1 or is requested to start RHRSW Pumps report UNAVAILABLE to perform.

Simulator Event Guide:

Event 9 Component: Trip of RHRSW D1

	Crew	Reports trip of RHRSW Pump D1. 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).
	BOP	Performs Attachment 9 of 0-AOI-57-1A
		1.0 EECW PUMP ELECTRICAL RESTORATION **NOTES** 1) EECW Pumps may be restored by using one or both of the methods listed in this attachment. 2) Actions in this attachment should be continued until two EECW Pumps from different strainers are in service. [1] **SECURE** any Diesel Generator prior to 8 minutes of operation without cooling water. [2] **IF** no EECW Pumps are in service supplying cooling water to the Diesel Generators, **THEN PERFORM EITHER** of the following to restore an EECW Pump electrically: • **RE-ENERGIZE** 4KV Shutdown Board C per Attachment 8, Energizing a Unit 1/2 4KV Shutdown Board using Another Unit 1/2 DG, **THEN VERIFY** EECW Pump B3 in service. • **RE-ENERGIZE** 4KV Shutdown Board D per Attachment 8, Energizing a Unit 1/2 4KV Shutdown Board using Another Unit 1/2 DG, **THEN VERIFY** EECW Pump D3 in service..
	BOP	B3 and D3 EECW Pumps are not available
		[3] **SECURE** any Diesel Generator prior to 1 hour of operation with only one EECW Pump supplying cooling water.
		[4] **IF** one EECW Pump is in service supplying cooling water to the Diesel Generators, **THEN PERFORM** one of the following:
	BOP	Step is 4 is NA
	Driver	If C1 is the RHRSW pump when called wait one minute and mrf sw06 open, call and report RHRSW PMP C1 & C2 CROSSTIE, 0-SHV-23-544 CLOSED. If A1 is the RHRSW Pump when called wait one minute and mrf sw07 align and report RHRSW PMP A1 CROSSTIE TO EECW, 0-SHV-067-0088 is OPEN and RHRSW PMP A1 & A2 CROSSTIE, 0-SHV-23-504 is CLOSED
	Driver	At direction of **NRC** report problems from the trip of EECW Pump D3 or D1 has been repaired and EECW Pump D3 or D1 is available. Delete imf sw03m or sw03k.

Simulator Event Guide:

Event 9 Component: Trip of RHRSW D1

	Crew	Reports trip of RHRSW Pump D1. 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).
	BOP	Performs Attachment 9 of 0-AOI-57-1A
	BOP	**2.0 EECW PUMP CROSSTIE RESTORATION** [1] **CROSSTIE** desired in-service Number One EECW Pump: • **UNLOCK** and **OPEN** RHRSW PMP A1 CROSSTIE TO EECW, 0-SHV-067-0088 in RHRSW A Room. • **OPEN** RHRSW PMP C1 CROSSTIE TO EECW, 0-FCV-067-0049 in U1/2/3 MCR using one of the handswitches (if DG Aux Board A is energized), or locally in RHRSW C Room using the handwheel. • **OPEN** RHRSW PMP D1 CROSSTIE TO EECW, 0-FCV-067-0048 in U1/2/3 MCR using one of the handswitches (if DG Aux Board B is energized), or locally in RHRSW D Room using the handwheel. [2] **UNLOCK** and **CLOSE** desired in-service Number One EECW Pump crosstie valve to Number Two EECW Pump: • RHRSW PMP A1 & A2 CROSSTIE, 0-SHV-23-504 in RHRSW A Room. • RHRSW PMP C1 & C2 CROSSTIE, 0-SHV-23-544 in RHRSW C Room. • RHRSW PMP D1 & D2 CROSSTIE, 0-SHV-23-563 in RHRSW D Room.
	BOP	**3.0 DIESEL GENERATOR RETURN TO SERVICE** **NOTE** Diesel Generators must be in service before cooling water can be restored. [1] **VERIFY** EECW is in service to the Diesel Generator to be placed in service. [2] **PLACE** Diesel Generators in service. [3] **VERIFY** Diesel Generators have started and tie to respective 4kV Shutdown Boards. [4] **VERIFY** two EECW Pumps (not using the same EECW strainer) are in service supplying Diesel Generators.
	Driver	At direction of **NRC** report problems from the trip of EECW Pump D3 or D1 has been repaired and EECW Pump D3 or D1 is available. Delete imf sw03m or sw03k.

Simulator Event Guide:

Event 7 Major: Station Blackout

	Crew	Responds to a Loss of Offsite Power IAW 0-AOI-57-1A
	Crew	**4.2 Subsequent Actions** [1] **IF** ANY EOI entry condition is met, **THEN REFER** to the appropriate EOI(s). [2] **VERIFY** automatic actions and **PERFORM** any that failed to occur. **NOTES** 1) 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. 2) 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. 3) 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. 4) The North header supply to Unit 1 RBCCW, the North header supply to Unit 2 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, 2-FCV-67-50 or 3-FCV-67-51 opens.
	BOP/ATC	3-AOI-30B-1, Reactor Building Ventilation Failure [2] **IF** this procedure is entered due to Station Blackout (0-AOI-57-1A) **THEN GO TO** Step 4.2[14]. **NOTE** Steps 4.2[14] ,4.2[15] and 4.2[16] may be entered directly from Step 4.2[2] if this procedure is entered due to Station Blackout (0-AOI-57-1A) [14] **IF** reactor building pressure CANNOT be maintained more negative than -0.25 inch H2O, **THEN START** Standby Gas Treatment. **REFER TO** 0-OI-65. [15] **IF** the unit is in Mode 4 or Mode 5 **THEN,** Step 15 and 16 NA Unit not in Mode 4 or 5
	BOP/ATC	Verifies SGT Fans started

Simulator Event Guide:

Event 7 Major: Station Blackout

	Crew	Responds to a Loss of Offsite Power IAW 0-AOI-57-1A
	Crew	**4.2 Subsequent Actions** [3] **REFER** to 1(2)(3)-AOI-78-1, FPC System Failure for a complete Loss of AC POWER, as necessary. NOT NECESSARY [4] **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 **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. [5] **START** Control Air Compressors A, D and G as required and **MONITOR** system pressure. Refer to 0-AOI-32-1. [5.1] **IF** an air compressor trips on high temperature, **THEN** (Otherwise N/A) **NOTIFY** Unit Supervisor for instructions. [6] **REFER** to 3-AOI-32-2, Loss of Control Air, as necessary [7] **PLACE** RPS MG Sets A and B in service. Refer to 3-OI-99.
	Crew	Calls for Control Air and EECW reset, calls for RPS Reset once 4KV SD BD 3EB energized or can request now but should inform Outside US power is not available for reset of RPS.
	Driver	Only after EECW Pump is started, 3 minutes after called for EECW trigger 23 bat eecw and trigger 24 bat eecw-1 and 4 minutes for Control Air trigger 26 bat ca
	Driver	Cannot reset RPS until operator has energized 4KV SD BD 3EB, when 4KV SD BD B is energized and 480 V SD BD 3B is energized wait 3minutes and trigger 25 bat rpsreset.

Simulator Event Guide:

Event 7 Major : Station Blackout

	Crew	Responds to a Loss of Offsite Power IAW 0-AOI-57-1A
	Crew	**NOTES** 1) Station Blackout (SBO) is defined as a loss of 161 and 500kV systems and a failure of the two diesel generators which supply normal power to the two 480 V Shutdown Boards on a unit. Exiting the SBO can occur through Cross-connect capabilities as long as it does not place the Non-SBO unit in jeopardy. Analysis takes credit for only one unit being in an SBO Event. 2) This section is to be performed if at any time during the loss of 161 and 500 kV Offsite power, the required Diesel Generators (for the Unit's 480 V Shutdown Bds) become inoperable thereby placing the unit in a SBO event. All times start with the recognition of an SBO Event, except for the time since shutdown. 3) The purpose of the alternate curves are to replace the normal curves (especially the PSP curve) which would force an Emergency Depressurization (thus losing RCIC level control) before the end of the 4 hour coping period of the SBO analysis. Cooldown must be commenced as soon as possible at near maximum allowable rates to ensure that reactor pressure on the SBO unit is below 235 psig before 155 minutes have elapsed. 4) To support one unit in a LOOP/LOCA and two units in a LOOP, 6 RHR pumps, 2 Core Spray pumps, 6 RHRSW pumps and 2 EECW pumps are required long term (greater than 10 minutes). The units in the LOOP each require 2 RHR pumps and 2 RHRSW pumps in suppression pool cooling for long term cooling requirements until shutdown cooling can be placed in service where only 1 RHR pump and 1 RHRSW pump per non-accident unit is required. DG load management will ensure the 2 hour de-rated DG limit is not exceeded by manually removing non-required loads.

Simulator Event Guide:

Event 7 Major: Station Blackout

	Crew	Responds to a Loss of Offsite Power IAW 0-AOI-57-1A
	CREW	[8] **IF** the Unit(s) are under a "Station Blackout" **THEN PERFORM** the following: **PROCEED TO** Step 4.2[9] [8.1] **ESTABLISH** Level control with RCIC per the EOIs. [8.2] **ESTABLISH** Pressure Control with SRVs per the EOIs. [8.3] **PRIOR** to Reactor pressure decreasing below 450 psig, at panel 9-3, **PLACE** the following switches to TEST/INHIBIT: [8.3.1] ECCS SYS I HI DW PRESS TEST/INHIBIT, HS-75-59 [8.3.2] ECCS SYS I HI DW PRESS TEST/INHIBIT, HS-75-60 [8.4] As soon as possible but within 60 minutes of the SBO event, **INITIATE** a cooldown at less than 90°F per hour in accordance with the EOIs until reactor pressure is between 150 and 230 psig. [8.5] **CONTROL** Reactor Pressure between 150 and 230 psig using SRVs. **NOTES** 1) The following step will allow the use of SBO modified PSP and HCTL curves for EOI usage. The curves are only valid if both 155 minutes have elapsed since the time of reactor shutdown, AND the reactor pressure vessel is maintained below 235 psig. 2) If one curve is substituted, then BOTH curves are to be used. 3) The purpose of the alternate curves are to replace the normal curves (especially the PSP curve) which would force an Emergency Depressurization (thus losing RCIC level control) before the end of the 4 hour coping period of the SBO analysis. [8.6] **IF** the EOI PSP Curve 6, or HCTL Curve 3, is close to being exceeded, **AND** the following conditions apply, (Otherwise N/A), Step is NA
	SRO	Directs Level control in RCIC and pressure control with SRVs, commences a cooldown with SRVs. Direct ECCS Inhibit switches placed in Test/Inhibit
	BOP/ATC	Initiate RCIC for Level Control and Commence Cooldown with SRVs as directed. Inhibit ECCS High Drywell Pressure signal.
	BOP/ATC	When RCIC started reports failure of Flow controller in Auto, takes manual control and controls level with RCIC.

Simulator Event Guide:

Event 7 Major: Station Blackout

	Crew	Responds to a Loss of Offsite Power IAW 0-AOI-57-1A
	Crew	[9] **START** the Diesel Driven Fire Pump. Refer to 0-OI-26. [11] **IF** containment isolation is required, **THEN VERIFY** the following containment isolation valves closed UNLESS they are required to be open by EOIs (RG 1.155): FCV-1-56 MN STM LINE OUTBD DRAIN ISOL FCV-69-2 RWCU OUTBD SUCT ISOLATION FCV-71-3 RCIC OUTBD SUCT ISOLATION FCV-71-18 RCIC SUPPR POOL OUTBD SUCT VALVE FCV-73-3 HPCI STEAM LINE OUTBD ISOL VALVE FCV-73-26 HPCI SUPPR POOL INBD SUCTION VLV FCV-73-30 HPCI MAIN PUMP MINIMUM FLOW VLV FCV-74-47 RHR SHUTDOWN COOLING SUCT OUTBD ISOL VLV **NOTES** 1) The UNIT SUPERVISOR should prioritize board energization to ensure common HVAC equipment powered from 480V boards is returned to service within 1 hour as directed by Attachment 5.
	BOP/ATC	Request start of Diesel Fire Pump. Verifies Containment isolation status, RCIC valves will be open
	Driver	When requested to start Diesel Fire Pump wait one minute and start diesel fire pump irf fp04d start

Simulator Event Guide:

Event 7 Major: Station Blackout

	Crew	Responds to a Loss of Offsite Power IAW 0-AOI-57-1A
		[12] **VERIFY** the following boards are energized. **IF NOT, THEN REFER** to Attachment 1 to restore affected busses while continuing with this instruction.
		Unit 1 / Unit 2 / Unit 3 4KV Shutdown Boards: A, C / B, D / 3EA, 3EB, 3EC, 3ED 480V Shutdown Boards: 1A, 1B / 2A, 2B / 3A, 3B 480V DSL Aux Boards: A / B / 3EA, 3EB 480V RMOV Boards: 1A, 1B / 2A, 2B / 3A, 3B 480V Control Bay Vent Boards: A / B 480V HVAC Board: B [13] **VERIFY** the following LPCI MG Sets in service to their respective Reactor MOV boards. • LPCI MG Sets 3D and 3E
	Crew	Proceed to Attachment 1 to determine how to energize 4KV SD BD 3EB
	Crew	**NOTE** To ensure adequate cooling, required 480V loads should be re-energized within 1 hour of the event. [19] **VERIFY** the following 4kV Shutdown Boards AUTO/LOCKOUT RESET switches in MANUAL: • U-3 4kV Shutdown Boards 3-43-211-3EA, 3-43-211-3EB, 3-43-211-3EC, 3-43-211-3ED. [20] **MAINTAIN** diesel generator loading within the limits of Attachment 6. **NOTES** 1) The following methods for reactor depressurization are listed in order of preference, but plant conditions may warrant other methods or a different order of preference. • HPCI system operating in CST to CST recirc. • RCIC system operating in CST to CST recirc. • Cycle SRVs. [27] **COMMENCE** Reactor depressurization as soon as conditions permit. Cooldown is to be limited to 90°F/hr or less unless otherwise specified by the EOIs.
	SRO	Direct HPCI place in pressure control if possible
	ATC/BOP	Place HPCI in Pressure control, if possible. If level is low can recover level with HPCI and once level is high enough can reset start signal and place HCPI in pressure control mode until Drywell pressure exceeds 2.45 psig.

NRC Scenario 3

Simulator Event Guide:

Event 7 Major: Station Blackout

	Crew	Responds to a Loss of Offsite Power IAW 0-AOI-57-1A
		1.0 RESTORATION OF ELECTRICAL BUSSES [1] **DETERMINE** restoration sequence of electrical busses and **RE-ENERGIZE** busses as necessary. Refer to Table 1.
		Table 1 **Conditions** **Perform** ENERGIZING 4Kv Shutdown Board 3EA using 4Kv Shutdown Board 3EB OR ENERGIZING 4Kv Shutdown Board 3EC using 4Kv Shutdown Board 3ED. Attachment 10
	Driver	If called for Temporary Diesels, They are not available
	Crew	Determines that Attachment 10 is the required attachment to restore power to a Shutdown Board. Energize 4KV SD BD 3EC from DG 3D
	Crew	Attachment 10 ENERGIZING 4KV SD BD 3EA or 3EC during Station Blackout **NOTES** 1) This attachment is used to energize 4kV Shutdown Board 3EA using Shutdown Board 3EB or to energize 4Kv Shutdown Board 3EC using 4Kv Shutdown Board 3ED. 2) The use of 3EB-3EA and 3ED -3EC cross-ties are required to mitigate Unit 3 Station Blackout (SBO) scenarios (i.e. only 3B or 3D Diesel Generators available). 1.0 BOTH 4KV SHUTDOWN BOARDS 3EA AND 3EC ARE DE-ENERGIZED [1] **IF** both 4Kv Shutdown Boards 3EA and 3EC are de-energized, **THEN PERFORM** the following: [1.1] **DETERMINE** which 4Kv Shutdown Board is energized (3EB or 3ED). [1.2] **RE-ENERGIZE** the desired shutdown board (3EA or 3EC) using the available board (3EB or 3ED) using Step 1.0[2] or STEP 1.0[3] as applicable.
	SRO	**Emergency Plan classification 5.1-A1 or 5.1-S** 5.1-A1 Loss of voltage to ANY THREE unit specific 4KV shutdown boards from Table 5.1 for greater than 15 minutes **AND** Only ONE source of power available to the remaining board. OPERATING CONDITION: Mode 1 or 2 or 3 5.1-S Loss of voltage to ALL unit specific 4KV shutdown boards from Table 5.1 for greater than 15 minutes. OPERATING CONDITION: Mode 1 or 2 or 3

Simulator Event Guide:

Event 7 Major: Station Blackout

	Crew	Attachment 10 ENERGIZING 4KV SD BD 3EA or 3EC during Station Blackout
		[3] **IF** desired to re-energize 4KV Shutdown Board 3EC using cross-tie from 4Kv Shutdown Board 3ED, **THEN PERFORM** the following: [3.1] **VERIFY** Diesel Generator 3D is supplying 4Kv Shutdown Board 3ED. [3.2] **VERIFY** 4Kv Shutdown Board 3EC is de-energized. [3.3] **VERIFY OPEN** 4Kv Bus Tie Board breaker 1632 (3-IL-210-1/6B). [3.4] **VERIFY** 4KV SD BD 3EC AUTO/LOCKOUT RESET switch, 3-43-211-3EC, is tripped to MANUAL. [3.5] **VERIFY** 4KV SD BD 3ED AUTO/LOCKOUT RESET switch, 3-43-211-3ED, is tripped to MANUAL. [3.6] **PLACE in ON** synchronizing switch 4KV SD BD 3ED BKR 1628 SYNC, 3-25-211-3ED/1A. [3.7] **CLOSE** 4KV SD BD 3ED ALT FDR BKR 1628, 3-HS-211-3ED/1A. [3.8] **PLACE in OFF** synchronizing switch 4KV SD BD 3ED BKR 1628 SYNC, 3-25-211-3ED/1A. [3.9] **PLACE in ON** synchronizing switch 4KV SD BD 3EC BKR 1626 SYNC, 3-25-211-3EC/3A. [3.10] **CLOSE** 4KV SD BD 3EC ALT FDR BKR 1626, 3-HS-211-3EC/3A. [3.11] **PLACE in OFF** synchronizing switch 4KV SD BD 3EC BKR 1626 SYNC, 3-25-211-3EC/3A. [3.12] **VERIFY** 4Kv Shutdown Board 3EC is energized.
	Crew	When 4KV SD BD 3EC is energized verifies 480V SD BD 3B energized and the following 480V RMOV BDs, 3C, 3D and 3E energize

NRC Scenario 3

Simulator Event Guide:

Event 7 Major: Station Blackout

	SRO	Enters EOI-1 on Reactor Level
	SRO	EOI-1 (Reactor Pressure)
		Monitor and Control Reactor Pressure
		IF Drywell Pressure Above 2.4 psig? – NO
		IF Emergency Depressurization is Anticipated and the Reactor will remain subcritical without boron under all conditions, **THEN** Rapidly depressurize the RPV with the Main Turbine Bypass Valves irrespective of cooldown rate? - NO
		IF Emergency Depressurization is or has been required THEN exit RC/P and enter C2 Emergency Depressurization? - NO
		IF RPV water level cannot be determined? - NO
		Is any MSRV Cycling? – YES, but MSIVs closed
		IF Steam cooling is required? - NO
		IF Suppression Pool level and temperature cannot be maintained in the safe area of Curve 3?- NO
		IF Suppression Pool level cannot be maintained in the safe area of Curve 4? - NO
		IF Drywell Control air becomes unavailable? - NO
		IF Boron injection is required? - NO
	SRO	Directs a Pressure Band with SRVs IAW **APPX 11A**, and a controlled cooldown IAW Station Blackout. In addition may direct pressure control with HPCI **(APPX 11C)**
	SRO	EOI-1 (Reactor Level)
		Monitor and Control Reactor Water Level. Directs Verification of PCIS isolations.
	ATC/BOP	Verifies PCIS isolations.
	SRO	Directs ATC to Restores and Maintains RPV Water Level between (+) 2 to (+) 51 inches with the following injection source. **(RCIC, App 5C)** may also direct at this time HPCI **(App 5D),** when the LOCA starts HPCI will be directed to maintain level (+) 2 to (+) 51 inches
	ATC	Initiates RCIC IAW **App 5C**

Simulator Event Guide:

Event 8 Instrument: RCIC Controller fails in Auto, Manual available

	ATC/BOP	Maintain Directed Level Band with RCIC, **Appendix 5C.**
		1. **VERIFY RESET** and **OPEN** 3-FCV-71-9, RCIC TURB TRIP/THROT VALVE RESET.
		2. **VERIFY** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller in AUTO with setpoint at 600 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.
		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 600 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.
		9. IF BOTH of the following exist? - NO
		10. **ADJUST** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller as necessary to control injection.
		Reports level controller malfunction and takes manual control to inject with RCIC

Simulator Event Guide:

Event 8 Instrument: RCIC Controller fails in Auto, Manual available

	ATC/BOP	Maintain Directed Level Band with HPCI, **Appendix 5D.**
		CAUTION • Operating HPCI Turbine below 2400 rpm may result in unstable system operation and equipment damage. • Operating HPCI Turbine with suction temperatures above 140°F may result in equipment damage.
		4. **VERIFY** 3-IL-73-18B, HPCI TURBINE TRIP RX LVL HIGH amber light extinguished. 5. **VERIFY** at least one SGTS train in operation. 6. **VERIFY** 3-FIC-73-33, HPCI SYSTEM FLOW/CONTROL, controller in AUTO and set for 5300 gpm. 7. **PLACE** 3-HS-73-47A, HPCI AUXILIARY OIL PUMP, handswitch in START. 8. **PLACE** 3-HS-73-10A, HPCI STEAM PACKING EXHAUSTER, handswitch in START. 9. **OPEN** the following valves: • 3-FCV-73-30, HPCI PUMP MIN FLOW VALVE • 3-FCV-73-44, HPCI PUMP INJECTION VALVE. 10. **OPEN** 3-FCV-73-16, HPCI TURBINE STEAM SUPPLY VLV, to start HPCI Turbine. 11. **CHECK** proper HPCI operation by observing the following: a. HPCI Turbine speed accelerates above 2400 rpm. 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 5300 gpm. d. 3-FCV-73-30, HPCI PUMP MIN FLOW VALVE, closes as flow exceeds 1200 gpm. 12. **VERIFY** HPCI Auxiliary Oil Pump stops and the shaft-driven oil pump operates properly. 13. WHEN HPCI Auxiliary Oil Pump stops, THEN **PLACE** 3-HS-73-47A, HPCI AUXILIARY OIL PUMP, handswitch in AUTO. 14. **ADJUST** 3-FIC-73-33, HPCI SYSTEM FLOW/CONTROL, controller as necessary to control injection.

Simulator Event Guide:

Event 7 Major: Station Blackout

	ATC/BOP	Commence pressure control with **Appendix 11A**, Alternate RPV Pressure Control Systems MSRVs
		1. IF Drywell Control Air is NOT available, THEN **EXECUTE** EOI Appendix 8G, CROSSTIE CAD TO DRYWELL CONTROL AIR, **CONCURRENTLY** with this procedure. 2. IF Suppression Pool level is at or below 5.5 ft, THEN **CLOSE** MSRVs and **CONTROL** RPV pressure using other options. 3. **OPEN** MSRVs using the following sequence to control RPV pressure as directed by SRO: a. 1 3-PCV-1-179 MN STM LINE A RELIEF VALVE. b. 2 3-PCV-1-180 MN STM LINE D RELIEF VALVE. c. 3 3-PCV-1-4 MN STM LINE A RELIEF VALVE. d. 4 3-PCV-1-31 MN STM LINE C RELIEF VALVE. e. 5 3-PCV-1-23 MN STM LINE B RELIEF VALVE. f. 6 3-PCV-1-42 MN STM LINE D RELIEF VALVE. g. 7 3-PCV-1-30 MN STM LINE C RELIEF VALVE. h. 8 3-PCV-1-19 MN STM LINE B RELIEF VALVE. i. 9 3-PCV-1-5 MN STM LINE A RELIEF VALVE. j. 10 3-PCV-1-41 MN STM LINE D RELIEF VALVE. k. 11 3-PCV-1-22 MN STM LINE B RELIEF VALVE. l. 12 3-PCV-1-18 MN STM LINE B RELIEF VALVE. m. 13 3-PCV-1-34 MN STM LINE C RELIEF VALVE.

Simulator Event Guide:

Event 7 Major: Station Blackout

	ATC/BOP	Commence pressure control with **Appendix 11C**, Alternate RPV Pressure Control Systems HPCI TEST MODE
		CAUTION • Operating HPCI Turbine below 2400 rpm may result in unstable system operation and equipment damage. • Operating HPCI Turbine with suction temperatures above 140°F may result in equipment damage.
		4. IF HPCI Turbine is operating, THEN **ALIGN** HPCI in test mode as follows: a. **OPEN** 3-FCV-73-35, HPCI PUMP CST TEST VLV. b. **OPEN** 3-FCV-73-36, HPCI/RCIC CST TEST VLV. c. **CLOSE** 3-FCV-73-44, HPCI PUMP INJECTION VALVE. d. **CONTINUE** in this procedure at Step 6. 5. IF HPCI is in standby readiness, THEN **START** HPCI as follows: a. **VERIFY** at least one SGTS Train in operation. b. **VERIFY** 3-FIC-73-33, HPCI SYSTEM FLOW/CONTROL, controller in AUTO and set for 5300 gpm. c. **PLACE** 3-HS-73-47A, HPCI AUXILIARY OIL PUMP handswitch, in START. d. **PLACE** 3-HS-73-10A, HPCI STEAM PACKING EXHAUSTER, in START. e. **OPEN** the following valves: • 3-FCV-73-36, HPCI/RCIC CST TEST VLV • 3-FCV-73-35, HPCI PUMP CST TEST VLV • 3-FCV-73-30, HPCI PUMP MIN FLOW VALVE. f. **OPEN** 3-FCV-73-16, HPCI TURBINE STEAM SUPPLY VLV, to start HPCI Turbine. g. **VERIFY** HPCI Auxiliary Oil Pump starts and turbine accelerates above 2400 rpm.

Simulator Event Guide:

Event 7 Major: Station Blackout

	ATC/BOP	Commence pressure control with **Appendix 11C**, Alternate RPV Pressure Control Systems HPCI TEST MODE
		6. **VERIFY** proper HPCI minimum flow valve operation as follows: a. IF HPCI flow is above 1200 gpm, THEN **VERIFY CLOSED** 3-FCV-73-30, HPCI PUMP MIN FLOW VALVE. b IF HPCI flow is below 600 gpm, THEN **VERIFY OPEN** 3-FCV-73-30, HPCI PUMP MIN FLOW VALVE. 7. **THROTTLE** 3-FCV-73-35, HPCI PUMP CST TEST VLV, to control HPCI pump discharge pressure at or below 1100 psig. 8. **ADJUST** 3-FIC-73-33, HPCI SYSTEM FLOW/CONTROL, controller to control RPV pressure. 9. IF HPCI injection to the RPV becomes necessary, THEN **ALIGN** HPCI to the RPV as follows: a. **OPEN** 3-FCV-73-44, HPCI PUMP INJECTION VALVE. b. **THROTTLE** 3-FCV-73-35, HPCI PUMP CST TEST VLV, to control injection

Simulator Event Guide:

Event 7 Major: Station Blackout

	Crew	Enter EOI-2 on Suppression Pool Temperature
	SRO	**Enters EOI-2 on Suppression Pool Temperature** **DW/T** Monitor and control Drywell temperature below 160F using available Drywell cooling Can Drywell Temperature be maintained below 160F, No Operate all available drywell cooling Before Drywell Temperature rises to 200°F enter EOI-1 and Scram Reactor, Completed **PC/P** Monitor and control PC pressure below 2.4 psig using the Vent System (AOI-64-1), PC pressure above 2.4 psig unable to vent When PC pressure CANNOT be maintained below 2.4 psig, YES **PC/H** Verify H2O2 analyzer in service **(APP 19)** When H2 is detected in PC (2.4% on control room indicators continue, does not continue **SP/T** **MONITOR** and **CONTROL** suppr pl temp below 95°F using available suppr pl cooling **(APPX 17A),** Pool Temp below 95° WHEN suppr pl temp CANNOT be maintained below 95°F, directs RHR Pump 3D in Pool Cooling **SP/L** **MONITOR** and **CONTROL** suppr pl lvl between -1 in. and -6 in. **(APPX 18)** Can suppr pl lvl be maintained above -6 in., YES Can suppr pl lvl be maintained below -1 in., YES

Simulator Event Guide:

Event 7 Major: Station Blackout

	SRO	**Emergency Plan classification 5.1-A1 or 5.1-S** 5.1-A1 Loss of voltage to ANY THREE unit specific 4KV shutdown boards from Table 5.1 for greater than 15 minutes **AND** Only ONE source of power available to the remaining board. OPERATING CONDITION: Mode 1 or 2 or 3 5.1-S Loss of voltage to ALL unit specific 4KV shutdown boards from Table 5.1 for greater than 15 minutes. OPERATING CONDITION: Mode 1 or 2 or 3

NRC Scenario 3

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

CRD Pump 3A, EHC Pump 3A, and EECW Pump B3

Operations/Maintenance for the Shift:

DG 3B is operating in parallel with Offsite power for the last hour, parallel with system operation is no longer desired.

Evolutions for the shift are to restore power to 100%, IAW 3-GOI-100-12, Power Maneuvering step 21 and to remove DG 3B from parallel operation and shutdown DG 3B IAW 3-OI-82

Unit 1 and 2 are at 100% Power

Unusual Conditions/Problem Areas:

The following Control Rods are identified as SLOW: 30-19, 34-23, 14-51, 02-19, 46-51, and 06-43.

NRC Scenario 4

Facility: **Browns Ferry NPP** Scenario No.: **NRC – 4** Op-Test No.: **1306**

Examiners:_____ Operators: **SRO:**_____

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 80% power, RFPT 3B and A3 RHRSW Pumps are tagged out.

Turnover: Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 30B. Raise power to 85% with flow and hold for RFPT 3B repairs.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP TS-SRO	Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 30B, Refuel damper 64-9 fails in mid position when Refuel Fans are in Off and is Open when Refuel Fans operating
2		R-ATC R-SRO	Commence power increase with flow to 85%
3	ed10b	C-ATC C-BOP TS-SRO	Loss of 480V SD BD 3B
4	Batch File	C-BOP C-SRO	Stator Water Cooling Pump trip
5	fw30a	I-ATC I-SRO	RFPT 3A Governor fails low
6	imf tc10b	I-ATC I-SRO	EHC Pressure Transducer failure
7	Batch File	M-ALL	ATWS
8	Batch File	M-ALL	LOCA Loss of RPV Water Level
9	hp07	C	Loss of HPCI 120 VAC Power Supply

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

neid 5/22/11

Critical Tasks - Five

With reactor scram required and the reactor not shutdown, to prevent an uncontrolled RPV depressurization and subsequent power excursion, inhibit ADS.

1. Safety Significance:
   Precludes core damage due to an uncontrolled reactivity addition.

2. Cues:
   Procedural compliance.

3. Measured by:
   ADS logic inhibited prior to an automatic initiation unless all required injection systems are Terminated and Prevented.

4. Feedback:
   RPV pressure trend.
   RPV level trend.
   ADS "ADS LOGIC BUS A/B INHIBITED" annunciator status.

With a reactor scram required and the reactor not shutdown, initiate action to reduce power by injecting boron (If still critical with challenge to BIIT) and inserting control rods.

1. Safety Significance:
   Shutting down reactor can preclude failure of containment or equipment necessary for the safe shutdown of the plant.

2. Cues:
   Procedural compliance.
   Suppression Pool temperature.

3. Measured by:
   Observation - If operating IAW EOI-1 and C-5, US determines that SLC is required (indicated by verbal direction or EOI placekeeping action) before exceeding 110 degrees in the Suppression Pool.
   AND
   RO places SLC A / B Pump control switch in ON, when directed by US.
   AND
   Control Rod insertion commenced in accordance EOI Appendixes.

4. Feedback:
   Reactor Power trend.
   Control Rod indications.
   SLC tank level.

Critical Tasks - Five

During an ATWS, when conditions with Emergency Depressurization required, Terminate and Prevent RPV injection (except for CRD, SLC and RCIC) from ECCS and Feedwater until reactor pressure is below the MARFP 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 MARFP.
   AND
   Observation - Feedwater terminated and prevented until less than the MARFP.

4. Feedback:
   Reactor power trend, power spikes, reactor short period alarms.
   Injection system flow rates into RPV.

With RPV pressure <MARFP, 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 MARFP, 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.

Critical Tasks – Five

When Suppression Chamber Pressure exceeds 12 psig, initiate Drywell Sprays while in the safe region of the Drywell Spray Initiation Limit (DSIL) curve and prior to exceeding the PSP limit.

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

OR

Before Drywell temperature rises to 280°F, initiate Drywell Sprays while in the safe region of the Drywell Spray Initiation Limit (DSIL) curve.

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

NRC Scenario 4

Events

1. BOP operator will alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 30B. Refuel damper 64-9 fails in mid position when Refuel Fans are in off and is open when Refuel Fans operating. Tech Spec 3.6.4.2 Condition A, required action A.1 and A.2.

2. ATC commences power increase 85% using recirculation flow.

3. The Crew will respond to a loss of 480V SD BD 3B, this will cause a loss of RPS B, loss of 480V RMOV BDs 3B and 3C. The Inboard MSIV A will have inadvertently closed. The crew will need to lower power to meet the main steam line flow guidance IAW 3-AOI-3-1. The crew will need to restore power to 480V SD BD 3B, reset RPS, reset PCIS and restore systems. The SRO will also have to enter the following AOIs; 3-AOI-1-3, 3-AOI-70-1, and 3-AOI-99-1. SRO will refer to the TRM and determine Technical Surveillance Requirement 3.4.1.1 to monitor Reactor Coolant Conductivity continuously cannot be met and samples must be drawn every 4 hours. SRO will refer to Tech Spec 3.6.1.3 for failed closed MSIV and enter condition A. SRO will refer to Tech Spec 3.4.5 and determine Condition B is required for inoperable containment atmospheric monitoring equipment.

4. The running Stator Water Cooling Pump will trip and the standby pump will fail to AUTO start. The BOP operator will be required to start the standby Stator Water Cooling pump to restore system flow and prevent an automatic Turbine Trip/Reactor scram.

5. RFPT 3A flow controller will slowly fail low, RFPT 3A speed will continue to decrease until the ATC or Crew notices. The controller will fail to respond until the ATC takes manual control with handswitch. The Operator will be able to restore RFPT 3A speed in manual. SRO should direct entry into 3-AOI-3-1.

6. An ATWS will occur on the scram and the power supply to HPCI will fail, leaving RCIC as the only source of high pressure makeup besides SLC and CRD. The crew will insert control rods manually, and maintain reactor level.

7. With RCIC, CRD and SLC as the only source of high pressure makeup as the LOCA degrades RPV Level will continue to lower. The SRO will determine Emergency Depressurization is required to restore RPV Level. The crew will ED and restore RPV Level with available systems.

Terminate the scenario when the following conditions are satisfied or upon request of Lead Examiner:

Control Rods are being inserted

Emergency Depressurization complete

Reactor Level is restored

NRC Scenario 4

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 4

9 Total Malfunctions Inserted: List (4-8)

2 Malfunctions that occur after EOI entry: List (1-4)

4 Abnormal Events: List (1-3)

2 Major Transients: List (1-2)

2 EOI's used: List (1-3)

2 EOI Contingencies used: List (0-3)

75 Validation Time (minutes)

5 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

NRC Scenario 4

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Alternate Reactor and Refuel Zone Fans			
RO U-30A-NO-02	288000A4.01	3.1	2.9
Raise Power with Recirc Flow			
RO U-000-NO-06 SRO S-000-AD-31	202002A4.07	3.3	3.3
Loss of 480V SD BD 3B			
RO U-57B-AL-06 SRO S-57B-AL-09	262001A2.04	3.8	4.2
Reactor Feed Pump Turbine Governor Failure			
RO U-003-AL-09 SRO S-003-AB-01	259002A4.01	3.8	3.6
Stator Water Cooling Pump Trip			
RO U-35A-AL-02 SRO S-070-AB-01	245000A4.03	2.7	2.8
EHC Pressure Transducer Failure			
RO U-047-AB-02 SRO S-047-AB-02	241000A2.03	4.1	4.2
LOCA/Low Level ED			
RO U-003-AL-24 RO U-000-EM-01 SRO S-000-EM-14 SRO S-000-EM-15 SRO S-000-EM-01	295031EA2.04	4.6	4.8
ATWS			
RO U-000-EM-03 RO U-000-EM-22 RO U-000-EM-28 SRO S-000-EM-03 SRO S-000-EM-18	295015AA2.01	4.1	4.3

Procedures Used/Referenced:

Procedure Number	Procedure Title
3-OI-30A	Refuel Zone Ventilation System
3-OI-30B	Reactor Zone Ventilation System
3-GOI-100-12	Power Maneuvering
3-OI-68	Reactor Recirculation System
3-ARP-9-8B	Panel 9-8 3-XA-55-8B
3-ARP-9-8C	Panel 9-8 3-XA-55-8C
3-ARP-9-4C	Panel 9-4 3-XA-55-4C
3-AOI-99-1	Loss of Power to One RPS Bus
3-AOI-1-3	Main Steam Isolation Valve Closure at Power
3-AOI-70-1	Loss of Reactor Building Closed Cooling Water
3-OI-99	Reactor Protection System
3-AOI-64-2D	Group 6 Ventilation System Isolation
	Technical Specifications
	Technical Requirements Manual
3-ARP-9-7A	Panel 9-7 3-XA-55-7A
3-ARP-9-8A	Panel 9-8 3-XA-55-8A
3-ARP-9-5A	Panel 9-5 3-XA-55-5A
3-AOI-3-1	Loss Of Reactor Feedwater or Reactor Water Level High/Low
3-ARP-9-7B	Panel 9-7 3-XA-55-7B
3-AOI-47-2	Turbine EHC Control System Malfunctions
3-AOI-100-1	Reactor Scram
3-EOI-1	RPV Control
3-C-5	Level/Power Control
3-EOI Appendix-1D	Insert Control Rods Using Reactor Manual Control System
3-EOI Appendix-1F	Manual Scram
3-EOI Appendix-2	Defeating ARI Logic Trips
3-EOI Appendix-11A	Alternate Pressure Control Systems MSRVs
3-EOI Appendix-5C	Injection System Lineup RCIC
3-EOI-2	Primary Containment Control
3-EOI Appendix-17A	RHR System Operation Suppression Pool Cooling
3-EOI Appendix-17C	RHR System Operation Suppression Chamber Sprays
3-EOI Appendix-17B	RHR System Operation Drywell Sprays
3-AOI-85-3	CRD System Failure
3-EOI Appendix-7B	Alternate RPV Injection System Lineup SLC System
3-EOI Appendix-4	Prevention of Injection
3-C-2	Emergency RPV Depressurization
3-EOI Appendix-6B	Injection Subsystems Lineup RHR System I LPCI Mode
3-EOI Appendix-6C	Injection Subsystems Lineup RHR System II LPCI Mode
EPIP-1	Emergency Classification

Console Operator Instructions

A. Scenario File Summary

Batch File

```
#RFPT 3B and EECW Pump A3 tagout
ior ypobkrrhrswpa3 fail_ccoil
ior zlohs2385a[1] off
ior ypomtreopb3 fail_control_power
ior ypobkrmopb1 fail_ccoil
ior ypobkrmopb2 fail_ocoil
ior ypomtrtgmb fail_control_power
ior ypovfcv0312 fail_power_now
ior ypovfcv0295 fail_power_now
ior ypovfcv01129 fail_power_now
ior ypovfcv01133 fail_power_now

#Loss of 480V SD BD B
imf ed10b (e1 0)
ior zdihs0114a[1] (e1 0) close
mrf rp09 (e3 0) reset
trg e3 = bat restorerpsb
ior zdixs5771[1] (e4 0) normal

#B stator water pump trip
irf eg02 (e5 0) off
ior ypobkrscwpa (e5 0) fail_ccoil
ior zdihs3535a[2] (e5 0) stop
ior zlohs3535a[1] (e5 0) off

#rfpt governor drift
imf fw30a (e10 0) 0 2500 72
trg e11 nrcrfptA
trg e11 = dmf fw30a

#B EHC Pressure transducer failure
ior zdihs0116[1] (e14 0) select
ior zdihs47204[1] (e14 0) null
ior zlohs0116[1] off
ior zlohs47204[1] on
imf tc10b (e14 0) 82 2200 79
```

#major
trg e18 nrcmodesw
bat nrcstickquad
Imf th22 (e18 1:00) LOCA
Imf th21 (e18 10:00) 1 15:00 LOCA
imf hp07 (e18 0) HPCI Fails
trg e23 = bat app01f
trg e24 = bat app02
trg e25 = bat nrcstickquad-1
mrf rd06 (e26 0) close
mrf rd06 (e27 0) open
trg e28 = bat nrcatws95

Trigger Files

nrcrfptA
zdihs468a[4] .ne. 1

nrcmsivD
zdihs0152a[1].eq.1

Scenario 4

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 203
Simulator Setup	**Load Batch**	bat nrc1306-4
Simulator Setup	manual	Tag RFPT 3B and EECW Pump A3
Simulator Setup		Verify file loaded. Log in to EHC System to ensure when operators try to access they are able to.

RCP required (80% - 85% with flow) and RCP for Urgent Load Reduction
Provide marked up copy of 3-GOI-100-12

Simulator Event Guide:

Event 1 Component: Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 30B

	SRO	Direct Refuel and Reactor Zone Fans alternated
	BOP	6.1 Alternating Refueling Zone Supply and Exhaust Fans 3-OI-30A
		[1] **NOTIFY** Unit 1 and Unit 2 Operators that the Refuel Zone fans are being alternated. [2] **VERIFY** the Refueling Zone supply and exhaust fans are operating. **REFER TO** Section 5.1. [3] **REVIEW** precautions and limitations in Section 3.0. **NOTES** 1) The preferred method to start the alternate Refueling Zone supply and exhaust fans is to use the common control Switch, 3-HS-64-3A, on Panel 3-9-25. 2) Refueling Zone supply and exhaust dampers, 3-FCO-064-0005,0006,0009, and 0010 will open or close automatically as necessary when fans are stopped and started. 3) Refueling Zone supply and exhaust fans are alternated every six weeks.
		[4] **PLACE** REFUEL ZONE FANS AND DAMPERS switch, 3-HS-64-3A, in OFF. [5] **CHECK** that the two red lights A(B) extinguish and the two green lights A(B) illuminate above REFUEL ZONE FANS AND DAMPERS switch, 3-HS-64-3A.
	BOP	**NOTE** If any damper does not meet the requirements of step 6.1[6] IMMEDIATELY notify the Unit supervisor to evaluate SCIV damper operability (refer to TRM appendix A). If any listed damper indicates not full closed, it should be considered inoperable for its SCIV function, and the required actions of Tech Spec LCO 3.6.4.2 entered for all units. [6] **CHECK** the red (open) damper position indication lights extinguish and the green (closed) lights illuminate above the following control switches: • 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 [7] **PLACE** REFUEL ZONE FANS AND DAMPERS switch, 3-HS-64-3A, in SLOW 3A (SLOW 3B) to start alternate fans.
	BOP	Report Failure of REFUEL ZONE EXH OUTBD ISOL DMPR, 3-HS-64-9

Simulator Event Guide:

Event 1 Component: Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 30B

	BOP	[8] **CHECK** that the two green lights A(B) extinguish and the two red lights A(B) illuminate above REFUEL ZONE FANS AND DAMPERS switch, 3-HS-64-3A. [9] **CHECK** the red (open) damper position indication lights illuminate and green (closed) lights extinguish above the following control switches: • 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
		NOTE A five minute time delay should be observed following Refuel Zone Supply and Exhaust Fan SLOW Start. The time delay allows the discharge dampers to fully open after SLOW start. [10] **IF** Refueling Zone Supply and Exhaust Fan FAST speed operation is necessary, **THEN: PERFORM** the following: [10.1] **PLACE** REFUEL ZONE FANS AND DAMPERS switch, 3-HS-64-3A, in FAST 3A (FAST 3B). [10.2] **CHECK** that the two green lights A(B) remain extinguished and the two red lights A(B) remain illuminated above REFUEL ZONE FANS AND DAMPERS switch, 3-HS-64-3A.
		[11] **CHECK** the following conditions: • SUPPLY FANS FILTER DIFF PRESS Indicator, 3-PDI-064-0022, indicates less than 0.6 inches H2O at the Reactor Building/Refuel Floor Supply fan intake room at El 565'. • REFUELING ZONE STATIC PRESS INTLK, 1-PDS-064-0061A/C, on refuel floor Panel 25-220 indicates between (negative) -0.25 inches to -0.40 inches.
	BOP	Contacts AUO for the above information
	Driver	When contacted wait 4 minutes and report 3-PDI-064-0022, indicates 0.4 inches H2O and that 1-PDS-064-0061A/C, indicates -0.3 inches.

Simulator Event Guide:

Event 1 Component: Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 30B

	SRO	Direct Refuel and Reactor Zone Fans alternated
	BOP	6.1 Alternating Reactor Zone Supply and Exhaust Fans 3-OI-30B
		[1] **VERIFY** the Reactor Zone supply and exhaust fans are operating. **REFER TO** Section 5.1. [2] **REVIEW** all Precautions and Limitations in Section 3.0. **NOTES** 1) The preferred method to start the standby Reactor Zone supply and exhaust fans is to use the common control switch (3-HS-64-11A) on Panel 3-9-25. 2) Reactor Zone supply and exhaust dampers, 3-FCO-064-0013, 0014, 0042, and 0043 will open or close automatically as necessary when fans are stopped and started. 3) The Steam Vault Exhaust Booster Fan should normally be in service whenever the Unit is operating with Reactor Building Ventilation in service and fans in fast speed. Operation of the Steam Vault Exhaust Booster Fan with Reactor Zone Exhaust fans out of service is an ALARA concern due to backflow into the Reactor Building lower level ventilation ductwork. However, the Steam Vault Exhaust Booster fan may remain in service with Reactor Zone Exhaust fans out of service to cool the steam tunnel for short durations such as alternating fans, cycling reactor zone dampers, or RPS power transfers.
		[3] **IF** Reactor Zone Ventilation is to remain Out of Service for an extended period (≥3 hours) and it is desired to leave the Steam Vault Exhaust Booster Fan in service, **THEN** (Otherwise N/A): Step is NA
		[4] **IF** required, **THEN SHUT DOWN** Steam Vault Exhaust Booster Fan. **REFER TO** Section 7.4. (Otherwise N/A). Step is NA [5] **PLACE** REACTOR ZONE FANS AND DAMPERS Switch, 3-HS-64-11A, in OFF. [6] **VERIFY** dampers close and fans stop as indicated by illuminated green lights above the following switches: • 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 • REACTOR ZONE EXH OUTBD ISOL DMPR, 3-HS-64-43 • REACTOR ZONE FANS AND DAMPERS, 3-HS-64-11A \ [7] **PLACE** REACTOR ZONE FANS AND DAMPERS Switch, 3-HS-64-11A, in SLOW A (SLOW B) to start alternate fans.

Simulator Event Guide:

Event 1 Component: Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 30B

	BOP	[8] **VERIFY** dampers open and fans start as indicated by illuminated red lights above the following switches: • 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 • REACTOR ZONE EXH OUTBD ISOL DMPR, 3-HS-64-43 • REACTOR ZONE FANS AND DAMPERS, 3-HS-64-11A [9] **IF** fast speed Reactor Zone Supply and Exhaust Fan operation is required, five minutes should be allowed after slow start for the discharge dampers to FULLY OPEN, **THEN** [9.1] **PLACE** REACTOR ZONE FANS AND DAMPERS switch, 3-HS-64-11A, in FAST A (FAST B). [9.2] **VERIFY** that the two green lights A(B) remain extinguished and the two red lights A(B) remain illuminated above REACTOR ZONE FANS AND DAMPERS Switch, 3-HS-64-11A.
		[10] **VERIFY** the following conditions: [10.1] **VERIFY** REACTOR ZONE PRESS DIFFERENTIAL Indicator, 3-PDIC-064-0002, on 3-LPNL-925-0213, located at R17-P El 639', indicates between -0.25 inches and -0.40 inches H2O. [10.2] **IF** REACTOR ZONE PRESS DIFFERENTIAL Indicator, 3-PDIC-64-2, is not between -0.25 inches and -0.40 inches H2O, **THEN REFER TO** 3-AOI-30B-1, Reactor Building Ventilation Failure.
		[11] **IF** required, **THEN START** Steam Vault Exhaust Booster Fan. **REFER TO** Section 5.4. NOT Required
	BOP	Contacts AUO for the above information
	Driver	When contacted wait 4 minutes and report 3-PDIC-064-0002, indicates -0.35 inches H2O.

Simulator Event Guide:

Event 1 Component: Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 30B

	SRO	3.6.4.2 Secondary Containment Isolation Valves (SCIVs) LCO 3.6.4.2 Each SCIV shall be OPERABLE. APPLICABILITY: MODES 1, 2, and 3, During operations with a potential for draining the reactor vessel (OPDRVs). ACTIONS ----------NOTES---------- 1. Penetration flow paths may be unisolated intermittently under administrative controls. 2. Separate Condition entry is allowed for each penetration flow path. 3. Enter applicable Conditions and Required Actions for systems made inoperable by SCIVs. ----------
		Condition A. One or more penetration flow paths with one SCIV inoperable. Required Action A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange. Completion Time: 8 hours AND Required Action A.2 Verify the affected penetration flow path is isolated. Completion Time: Once per 31 days
	SRO	Call Work Control for a clearance on the REFUEL ZONE SPLY OUTBD ISOL DMPR, 3-FCV-64-5
		TRM Appendix A Power Operated Secondary Containment Isolation Valves 3-DMP-64-9 REFUELING ZONE EXH DUCT OUTBD ISOL DMPR $\leq$ 10 SEC

Simulator Event Guide:

Event 2 Reactivity: Power increase with Recirc Flow

	SRO	Notifies ODS of power increase.
		Directs Power increase using Recirc Flow, per 3-GOI-100-12. [20] **IF** desired to raise power with only two(2) Reactor feedpumps in service, **THEN RAISE** Reactor power, as desired, maintaining each Reactor feedpump less than 5050 RPM.
	ATC	Raise Power w/Recirc, IAW 3-OI-68, Section 6.2
		D. Individual pump speeds should be mismatched by ~60 RPM during dual pump operation between 1200 and 1300 RPM to minimize harmonic vibration (this requirement may be waived for short time periods for testing or maintenance). [1] **IF** desired to control Recirc Pumps 3A and/or 3B speed with Recirc Individual Control, **THEN PERFORM** the following; • Raise Recirc Pump 3A using, RAISE SLOW (MEDIUM), 3-HS-96-15A(15B). **AND/OR** • Raise Recirc Pump 3B using, RAISE SLOW (MEDIUM), 3-HS-96-16A(16B).
		[2] **WHEN** desired to control Recirc Pumps 3A and/or 3B speed with the RECIRC MASTER CONTROL, **THEN ADJUST** Recirc Pump speed 3A &3B using the following push buttons as required: RAISE SLOW, 3-HS-96-31 RAISE MEDIUM, 3-HS-96-32
	NRC	At RR Pump Speeds of 1260rpm and 1200 rpm, power will be 85% and RFPT RPMs will be just below 5025
	Driver	When directed by NRC, Trigger 1 Loss of 480V SD BD 3B, If crew attempts to close alternate supply breaker or is going to close alternate supply breaker delete ED10B in order to allow the crew to energized the Board
	Driver	Wait 2 minutes and report license class 1404 was in the field, a trainee accidently tripped the normal feeder breaker. No problems indicated on Board.

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	Crew	Responds to numerous alarms, diagnoses a loss of 480V SD BD 3B and 480V RMOV Bds 3B and 3C
		Responds to the following alarms; 8B-30, 8C-17, 24, 29, 31, 4C-12 and 3D -32.
	SRO	Enters 3-AOI-99-1, 3-AOI-1-3 and 3-AOI-70-1.
	BOP	Alarm 8B-30: 480V SHUTDOWN BD 3B UV OR XFR A. **CHECK** for indication of 480V Shutdown Bd "3B" loss: • RWCU Pump 3B shutdown • Fuel pool cooling Pump 3B shutdown • 480V Shutdown Bd 3B voltage (3-EI-57-30) 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. C. **IF** manual transfer is accomplished, **THEN REFER TO** 0-OI-57B, 3-OI-99, and appropriate OIs for recovery or realignment of equipment. D. **IF** manual transfer is **NOT** accomplished, **THEN REFER TO** Tech Spec Section 3.8.1. Dispatches personnel to Breaker, may attempt to energize 480V SD BD 3B
	Driver	If crew attempts to close alternate supply breaker or is going to close alternate supply breaker delete ED10B in order to allow the crew to energized the Board
	Driver	DO NOT Call until requested to investigate. Wait 2 minutes and report license class 1404 was in the field, a trainee accidently tripped the normal feeder breaker. No problems indicated on Board. If the crew directs you to restore 480V SD BD 3B to Normal supply trigger 4, ior zdihs5771[1] normal, if directed to restore Board on alternate supply change normal to ALT (alternate)

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	BOP	Alarm 8C-24: 480V REACTOR MOV BD 3B OR 3E UV OR XFR A. **CHECK** light indications for loss of any 480V equipment. B. **CHECK** 480V Rx MOV Bd 3B & 3E for abnormal conditions: relay targets, smoke, burned paint, breaker position, etc. C. **IF** Normal or Alternate feeder breaker tripped, **THEN MANUALLY DEPRESS** mechanical trip/reset mechanism on breaker face to reset Bell Alarm lockout device. D. **IF** undervoltage or transfer has occurred: 1. **REFER TO** TS Section 3.8.7. 2. **RESET** possible half-scram. **REFER TO** 3-OI-99.
	BOP	Alarm 8C-29: I&C BUS B VOLTAGE ABNORMAL A. **VERIFY** the Alarm by checking: • Loss of instrument power and remote position indication to Core Spray Div II and RHR Div II (Panel 3-9-3) • RWCU Filter Demin 3B Isolation • Reactor Zone/Refuel Zone Ventilation Isolation Verifies I&C Bus B Auto transferred to alternate feeder
		Alarm 8C-29: 480V REACTOR MOV BD 3C UV OR XFR A. **VERIFY** automatic action. B. **CHECK** light indications for loss of 480V equipment. C. **CHECK** board for abnormal conditions: relay targets, smoke, burned paint, breaker position, etc. D. **IF** Normal or Alternate feeder breaker tripped, **THEN MANUALLY DEPRESS** mechanical trip/reset mechanism on breaker face to reset Bell Alarm lockout device. E. **REFER TO** 0-OI-57B to re-energize or transfer the board.
	Driver	When requested to restore steam tunnel booster fan wait two minutes and mrf PC14 start

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	ATC	Alarm 4C-12: RBCCW PUMP DISCH. HDR PRESS LOW A. **VERIFY** 3-FCV-70-48 CLOSING/CLOSED. B. **VERIFY** RBCCW pumps A and B in service. C. **VERIFY** RBCCW surge tank low level alarm is reset. E. **REFER TO** 3-AOI-70-1 for RBCCW System failure and 3-OI-70 for starting spare pump. When 480V RMOV BD 3B is restored should **VERIFY** 3-FCV-70-48 CLOSING
	BOP	Report Alarm 3D-32: Reactor Zone Differential Pressure Low EOI-3 Entry Condition.
	SRO	Enters EOI-3 Secondary Containment Control
	Driver	When requested to restore RPS B, if requested to place on alternate trigger 3, mrf rp09 reset and bat restorerpsb, if requested to restore to normal then bat rpsreset and mrf rp09 reset. If place back on normal ensure to reset alternate supply circuit protectors mrf rp03 reset.

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	ATC	Announces Power, Pressure and Level stable on Board loss
	Crew	3-AOI-99-1, Loss of Power to One RPS Bus
		4.1 Immediate Actions [1] **STOP** all testing with potential RPS half-scrams or PCIS logic isolation signals. NOTES 3) Loss of RPS will isolate 3-RM-90-256, Drywell Air Monitor, and TS LCO 3.4.5 Condition B should be entered. **4.2 Subsequent Actions** [1] **VERIFY** automatic actions occur. [2] **ATTEMPT** to determine cause of loss of RPS Bus using indicating lights inside RPS Circuit Protector cabinets. [3] **NOTIFY** Chemistry RWCU is isolated and no longer in-service and a sampling LCO per TRM 3.4.1 is to be entered. [4] **NOTIFY** Electrical Maintenance to correct cause. [5] **RESTORE** power to RPS Bus A(B) using alternate power supply. **REFER TO** 3-OI-99 section for Immediate Restoration of Power to RPS Bus A(B) Using Alternate Power Supply. [5.1] **DISPATCH** operator to Aux. Instrument Room to reset ATU GROSS FAILURES. [6] **WHEN** system restoration is desired, **THEN RESTORE** systems to normal. **REFER TO** 3-OI-99 section for Restoration to Normal Following RPS Bus Power Loss.
	Driver	When requested to restore RPS B, if requested to place on alternate trigger 3, mrf rp09 reset and bat restorerpsb, if requested to restore to normal then bat rpsreset and mrf rp09 reset. If place back on normal ensure to reset alternate supply circuit protectors mrf rp03 reset.

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	ATC/BOP	Reports MSIV A Inboard Valve shut on loss of board.
	SRO	Enters 3-AOI-1-3, Main Steam Isolation Valve Closure at Power
	ATC	**4.2 Subsequent Actions** [1] **IF** any EOI entry condition is met, **THEN ENTER** the appropriate EOI(s). [2] **LOWER** reactor power with recirc flow and insert control rods as directed by the Reactor Engineer/Unit Supervisor as necessary to ensure that rated steam line flow 3.54 x 106 lb/hr is not exceeded as indicated on Main Steam Line Flow Indicators. **REFER TO** 3-GOI-100-12 or 3-GOI-100-12A for the power reduction. [6] **IF** Drywell control air pressure is normal, **THEN INITIATE** trouble-shooting of the MSIV. (Otherwise N/A) Step is NA [7] **EVALUATE** Technical Specification 3.6.1.3, Primary Containment Isolation Valves.
	SRO	Directs ATC to lower power to less than 3.54 x 106 lb/hr on Main Steam Line Flow Indicators. Directs recirc pump speeds matched when outside of the 1200 to 1300 rpm band.
	BOP	Places MSIV A Inboard Valve handswitch in the close position
	ATC	Lowers power as directed by SRO

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	SRO	Enters 3-AOI-70-1, Loss of Reactor Building Closed Cooling Water
	ATC	**4.1 Immediate Actions** [1] **IF** RBCCW Pump(s) has tripped, **THEN** Perform the following (Otherwise N/A): • **SECURE** RWCU Pumps. • **VERIFY** RBCCW SECTIONALIZING VLV, 3-FCV-70-48 **CLOSED**. Verifies RWCU Tripped, cannot verify sectionalizing valve at this time NO Power
		4.2 Subsequent Actions [1] **IF** Reactor is at power **AND** Drywell Cooling cannot be immediately restored, **AND** core flow is above 60%,**THEN:** [2] **IF** any EOI entry condition is met, **THEN ENTER** appropriate EOI(s) (otherwise N/A). One RBCCW Pump is in service with sectionalizing valve open due to loss of power
		[3] **IF** RBCCW Pump(s) has tripped and it is desired to restart the tripped RBCCW pump, **THEN PERFORM** the following (otherwise N/A): [3.1] **INSPECT** the tripped RBCCW pump and its associated breaker for any damage or abnormal conditions. [3.2] **IF** no damage or abnormal conditions are found, **THEN ATTEMPT** to restart tripped RBCCW pump(s).
	ATC	When power is restored to 480V SD BD 3B RBCCW Pump will auto start

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	SRO	Enters 3-AOI-70-1, Loss of Reactor Building Closed Cooling Water
	ATC	**4.1 Immediate Actions** [1] **IF** RBCCW Pump(s) has tripped, **THEN** Perform the following (Otherwise N/A): • **SECURE** RWCU Pumps. • **VERIFY** RBCCW SECTIONALIZING VLV, 3-FCV-70-48 **CLOSED**. Verifies RWCU Tripped, cannot verify sectionalizing valve at this time NO Power
		4.2 Subsequent Actions [1] **IF** Reactor is at power **AND** Drywell Cooling cannot be immediately restored, **AND** core flow is above 60%,**THEN:** [2] **IF** any EOI entry condition is met, **THEN ENTER** appropriate EOI(s) (otherwise N/A). One RBCCW Pump is in service with sectionalizing valve open due to loss of power
		[3] **IF** RBCCW Pump(s) has tripped and it is desired to restart the tripped RBCCW pump, **THEN PERFORM** the following (otherwise N/A): [3.1] **INSPECT** the tripped RBCCW pump and its associated breaker for any damage or abnormal conditions. [3.2] **IF** no damage or abnormal conditions are found, **THEN ATTEMPT** to restart tripped RBCCW pump(s).

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	SRO	Enters 3-OI-99, Reactor Protection System
	ATC/BOP	**8.3 Restoration to Normal Following RPS Bus Power Loss** [1] **OBTAIN** Unit Supervisor/SRO's permission to restore to normal. [2] **MOMENTARILY PLACE** SCRAM RESET, 3-HS-99-5A/S5, as follows: [2.1] RESET FIRST. (Group 2/3) [2.2] RESET SECOND. (Group 1/4) [2.3] NORMAL [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, 3-IL-99-5A/AB • SYSTEM B BACKUP SCRAM VALVE, 3-IL-99-5A/CD C. Scram Discharge Volume vent and drain valves indicate OPEN.
		[4] At Panel 3-9-4, **RESET** PCIS trip logic as follows: [4.1] **MOMENTARILY PLACE** PCIS DIV I RESET, 3-HS-64-16A-S32, to left and right RESET positions. [4.2] **CHECK** the following red lights ILLUMINATED: • MSIV GROUP A1, 3-IL-64-A1 • MSIV GROUP B1, 3-IL-64-B1 [4.3] **MOMENTARILY PLACE** PCIS DIV II RESET, 3-HS-64-16A-S33, to left and right RESET positions. [4.4] **CHECK** the following red lights ILLUMINATED: • MSIV GROUP A2, 3-IL-64-A2 • MSIV GROUP B2, 3-IL-64-B2
		[6] **RESTORE** Reactor and Refuel Zone Ventilation to normal operation. REFER TO 3-AOI-64-2D, Group 6 Ventilation System Isolation.
	BOP	3-AOI-64-2D, Group 6 Ventilation System Isolation

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	SRO	Enters 3-OI-99, Reactor Protection System
	BOP	**8.3 Restoration to Normal Following RPS Bus Power Loss** [7] **RESTORE** Standby Gas Treatment System to standby readiness. REFER TO 0-OI-65.
	BOP	[8] At Panel 3-9-3, **PLACE** PSC head tank pumps in service as follows: • **PLACE** SUPPR POOL DRAIN INBD ISOL VALVE, 3-HS-75-57A, in AUTO After OPEN. • **PLACE** SUPPR POOL DRAIN OUTBD ISOL VALVE, 3-HS-75-58A, in AUTO After OPEN. [10] At Panel 3-9-3, **RESTORE** Drywell DP Compressor to automatic operation as follows: [10.1] **DEPRESS** DRYWELL DP CPRSR SUCT VLV RESET pushbutton, 3-HS-64-139A. [10.2] **DEPRESS** DRYWELL DP CPRSR DISCH VLV RESET pushbutton, 3-HS-64-140A. [10.3] **VERIFY OPEN** DW TO SGT INBD ISOL VALVE using 3-HS-64-31. [10.4] **VERIFY OPEN** SUPPR CHBR SGT INBD ISOL VALVE using 3-HS-64-34.
	BOP	[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** DRYWELL EQPT DR INBD ISOL VLV, 3-HS-77-15A, in AUTO After OPEN. [11.3] **PLACE** DRYWELL EQPT DR OUTBD ISOL VLV, 3-HS-77-15B, in AUTO After OPEN. [11.4] **PLACE** DRYWELL FLOOR DR INBD ISOL VLV, 3-HS-77-2A, in AUTO After OPEN. [11.5] **PLACE** DRYWELL FLOOR DR OUTBD ISOL VLV, 3-HS-77-2B, in AUTO After OPEN.
	Driver	when directed by NRC trigger 5 for Stator water pump trip

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	SRO	Enters 3-OI-99, Reactor Protection System
	BOP	**8.3 Restoration to Normal Following RPS Bus Power Loss** [12] **IF** DW Radiation Monitor CAM, 3-RM-90-256 was secured due to a preplanned transfer, **THEN** (otherwise **N/A**) Step is NA
		[13] **IF** DW Radiation Monitor CAM, 3-RM-90-256, isolated due to loss of RPS, **THEN MOMENTARILY DEPRESS** the following RESET pushbuttons on Panel 3-9-2. • DW RAD MON UPPER INBD SUPPLY ISV RESET, 3-HS-90-254A-A (opens FCV-90-254A) • DW RAD MON LOWER INBD SUPPLY ISV RESET, 3-HS-90-254B-A (opens FCV-90-254B) • DW RAD MON OUTBD RETURN ISV RESET, 3-HS-90-257A-A (opens FCV-90-257A • DW RAD MON OUTBD SUPPLY ISV RESET, 3-HS-90-255A (opens FCV-90-255 • DW RAD MON INBD RETURN ISV RESET, 3-HS-90-257B-A (opens FCV-90-257B)
		[14] At Panel 3-9-54, **PLACE** H2/02 Analyzer in service per 3-OI-76.
		[15] At Panel 3-9-55, **VERIFY** DRYWELL OR SUPPRESSION CHAMBER EXHAUST TO SGTS, 3-FIC-84-20, in AUTO with setpoint at 100 scfm.
		[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. [20] **RESTORE** Main Steam System to normal. REFER TO 3-OI-1. [22] At Panel 3-9-13, **DEPRESS** TIP ISOLATION RESET pushbutton, 3-HS-94-7D-S2.
	ATC/BOP	Depresses Fault rest pushbuttons on each VFD on Panel 9-4 in able to clear Recirc Drive Alarms on Panel 9-4A and 4B.

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	BOP	3-AOI-64-2D, Group 6 Ventilation System Isolation
		[1] **IF** any EOI entry condition is met, **THEN ENTER** appropriate EOI(s). [2] **VERIFY** Group 6 isolation valves penetrating Primary Containment are closed. **UTILIZE** Panel 3-9-3 mimic or Containment Isolation Status System on Panel 3-9-4. [3] **IF** Refuel Zone Isolation is due to high radiation, as indicated on 3-RM-90-140 and/or 3-RM-90-141, Panel 3-9-10, and/or associated recorder on Panel 3-9-2, **THEN**. (Otherwise N/A) Step is NA
		[7] **CHECK** the following to confirm condition: • REACTOR & REFUEL ZONE EXHAUST RADIATION, 3-RR-90-144 • RX & REFUEL ZONE EXH CH A RAD MON RTMR, 3-RM-90-140/142 • RX & REFUEL ZONE EXH CH B RAD MON RTMR, 3-RM-90-141/143
		[13] **WHEN** initiating signal has been corrected **AND** necessary repairs are made, **THEN** [13.1] **VERIFY** PCIS RESET: • **RESET** PCIS DIV I RESET, 3-HS-64-16A-S32. • **RESET** PCIS DIV II RESET, 3-HS-64-16A-S33. [13.2] **RESET** Reactor/Refuel isolation logic, as required: • **PLACE** REFUEL ZONE FANS AND DMPRS, 3-HS-64-3A, in OFF. • **PLACE** REACTOR ZONE FANS AND DMPRS, 3-HS-64-11A, in OFF. [13.3] **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 3A (SLOW 3B). [13.4] For the fans started, **VERIFY** that the dampers open and fans start as indicated by illuminated red lights above the following switches: • 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. • 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.
	Driver	when directed by NRC trigger 5 for Stator water pump trip

NRC Scenario 4

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	SRO	Tech Spec Actions from loss of 480V SD BD 3B
		Evaluate TRM 3.4.1
		TSR 3.4.1.1 Monitor reactor coolant conductivity. Continuously OR 4 hours when the continuous conductivity monitor is inoperable and the reactor is not in MODE 4 or 5 OR 8 hours when the continuous conductivity monitor is inoperable and the reactor is in MODE 4 or 5
		Informs Chemistry have lost Continuous reactor coolant conductivity monitoring
	SRO	Evaluate Tech Spec 3.4.5
		3.4.5 RCS Leakage Detection Instrumentation LCO 3.4.5 The following RCS leakage detection instrumentation shall be OPERABLE: a. Drywell floor drain sump monitoring system; and b. One channel of either primary containment atmospheric particulate or atmospheric gaseous monitoring system. APPLICABILITY: MODES 1, 2, and 3. Condition B: Required primary containment atmospheric monitoring system inoperable. Required Action B.1: Analyze grab samples of primary containment atmosphere. Completion Time: Once per 12 hours Required Action B.2: Restore required primary containment atmospheric monitoring system to OPERABLE status. Completion Time: 30 days
	Driver	when directed by NRC trigger 5 for Stator water pump trip

Simulator Event Guide:

Event 3 Component: Loss of 480V SD BD 3B

	SRO	Tech Spec Actions from loss of 480V SD BD 3B
	SRO	Evaluate Technical Specification 3.6.1.3.
		3.6.1.3 Primary Containment Isolation Valves (PCIVs) LCO 3.6.1.3 Each PCIV, except reactor building-to-suppression chamber vacuum breakers, shall be OPERABLE. APPLICABILITY: MODES 1, 2, and 3, When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation." Condition A: NOTE Only applicable to penetration flow paths with two PCIVs. One or more penetration flow paths with one PCIV inoperable except due to MSIV leakage not within limits Required Action A.1: Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. Completion Time: 8 hours for main steam lines Required Action A.2: NOTE Isolation devices in high radiation areas may be verified by use of administrative means. Verify the affected penetration flow path is isolated. Completion Time: Once per 31 days for isolation devices outside primary containment
	Driver	when directed by NRC trigger 5 for Stator water pump trip

Simulator Event Guide:

Event 4 Component: Stator Water Cooling Pump trip

	BOP	Responds to alarms 7A-22 and 8A-1
	BOP	Announces trip of Stator Water Cooling Pump 3B
		7A-22, GEN STATOR COOLANT SYS ABNORMAL A. **IF** while performing the action of this ARP 3-XA-55-9-8A Window 1 alarms **THEN,** 1. **VERIFY** all available Stator Cooling Water Pumps running. 2. Attempt to **RESET** alarm 3. **IF** alarm fails to reset, AND reactor power is above turbine bypass valve capability **THEN SCRAM** the Reactor B. **VERIFY** a stator cooling water pump is running and **CHECK** stator temperature recorder, 3-TR-57-59, Panel 3-9-8. C. **CHECK** alarm by dispatching personnel to check the Stator Coolant Control Cabinet.
		8A-1, TURBINE TRIP TIMER INITIATED A. **CHECK** Stator Cooling Water Flow and Temperature and Generator Stator temperatures using ICS. B. **VERIFY** all available Stator Cooling Water Pumps running.
		NOTE The full capacity of the Turbine Bypass valves with all nine valves open is 25% reactor power. To determine the capacity of the bypass valves, subtract 3% for each out of service bypass valve from the 25%. (Example, one bypass valve out of service, [25% - 3% = 22%], therefore, the capacity of the bypass valves with one bypass valve out of service is 22%.) C. **IF** all of the following conditions exist: • Alarm fails to reset, • Low Stator Cooling Water flow OR High Generator or Stator Cooling temperatures are observed on ICS, • Reactor Power is above turbine bypass valve capability, **THEN, SCRAM** the reactor. (Otherwise N/A)
	BOP	Starts Stator Water Cooling Pump 3B
	Driver	When dispatched wait two minutes and report pump is extremely hot to touch, at breaker breaker is tripped no other indications
	Driver	When directed by NRC to insert RFPT 3A governor failure, verify start value is between 71 and 72. If not modify start value to the current value and ensure final severity is set to zero and ensure ramp time remains unchanged and then insert trigger 10 mf fw30a (e10 0) 0 1300 72, When operator takes manual control of RFPT 3A ensure trigger 11 goes active to allow the operator to control. Be prepared to insert the next event if the crew decides to scram, see next page driver instructions.

Simulator Event Guide:

Event 5 Instrument: RFPT 3A Governor slowly fails low

	ATC	Notices lowering speed on RFPT 3A or rising speed on RFPT 3C, or responds alarm 5A-8.
		5A-8, REACTOR WATER LEVEL ABNORMAL
		A. **VERIFY** Reactor water level hi/low using multiple indications including Average Narrow Range Level on 3-XR-3-53 recorder, 3-LI-3-53, 3-LI-3-60, 3-LI-3-206, and 3-LI-3-253 on Panel 3-9-5. B. **IF** alarm is valid, **THEN REFER TO** 3-AOI-3-1 or 3-OI-3.
	ATC	Report Reactor level less than 27 inches and lowering, reports RFPT 3A flow has lowered. Takes manual control of RFPT 3A to attempt to control RPV Level
	SRO	Directs entry 3-AOI-3-1, Loss Of Reactor Feedwater or Reactor Water Level High/Low
	ATC	[1] **VERIFY** applicable automatic actions. [2] **IF** level OR Feedwater flow is lowering due to loss of Condensate, Condensate Booster, or Feedwater Pump(s), **THEN REDUCE** Recirc flow as required to avoid scram on low level.
		[4] **IF** Feedwater Control System has failed, **THEN** [4.1] **PLACE** individual RFPT Speed Control Raise/Lower switches in Manual Governor (depressed position with amber light illuminated). [4.2] **ADJUST** RFP Discharge flows with RFPT Speed Control Raise/Lower switches as necessary to maintain level.
		[24] **IF** unit remains on-line, **THEN PERFORM** the following: • **RETURN** Reactor water level to normal operating level of 33"(normal range). • **REQUEST** Nuclear Engineer check core limits.
	Driver	when directed by NRC or if the crew decides to scram, verify start value is between 79 and 80. If not modify start value to the current value and ensure final severity is set to 82 and ensure ramp time remains unchanged and then insert trigger 14 . imf tc10b (e14 0) 82 1600 79

Simulator Event Guide:

Event 6 Instrument: EHC Pressure Transducer Failure

	ATC/BOP	Responds to alarm 7B-6, EHC/TSI SYSTEM A. On EHC Workstation computer on Panel 3-9-7, Alarm Summary screen, **ATTEMPT** to RESET alarm input. B. **IF** necessary, **THEN REQUEST** assistance from Site Engineering.
	ATC	Recognizes lowering Reactor Pressure and generator megawatts.
	SRO	Directs entry into 3-AOI-47-2.
		3-AOI-47-2 Turbine EHC Control System Malfunctions **4.1 Immediate Actions** [1] **IF** Reactor Pressure lowers to or below 900 psig, **THEN MANUALLY SCRAM** the Reactor and **CLOSE** the MSIVs.
		4.2 Subsequent Actions [3] **IF** a Group 1 isolation has occurred, **THEN PLACE** EHC PUMP 3A and 3B, 3-HS-47-1A and 3-HS-47-2A, to PULL TO LOCK.
	BOP	Places EHC Pumps 3A and 3B in Pull to Lock
	SRO	Directs manual scram, closing of the MSIV's, and entry into 3-AOI-100-1.
	ATC	Manually scrams the reactor.

Simulator Event Guide:

Event 7 Major: ATWS

	ATC	3-AOI-100-1, Reactor Scram
		4.1 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 (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. (N/A) [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
		4.2 Subsequent Actions [2] **IF** all control rods **CAN NOT** be verified fully inserted, **THEN PERFORM** the following: [2.1] **INITIATE** ARI by Arming and Depressing BOTH of the following: • ARI Manual Initiate, 3-HS-68-119A • ARI Manual Initiate, 3-HS-68-119B [2.2] **VERIFY** the Reactor Recirc Pumps (if running) at minimum speed at Panel 3-9-4. [2.3] **REPORT** "ATWS Actions Complete" and power level.
		[3] **DRIVE** in all IRMs and SRMs from Panel 3-9-5 as time and conditions permit. [3.1] **DOWNRANGE** IRMs as necessary to follow power as it lowers.

Simulator Event Guide:

Event 7 Component: ATWS

	SRO	Enters EOI-1 on Reactor Level
	SRO	EOI-1 (Reactor Pressure)
		Monitor and Control Reactor Pressure
		IF Drywell Pressure Above 2.4 psig? – NO
		IF Emergency Depressurization is Anticipated and the Reactor will remain subcritical without boron under all conditions, **THEN** Rapidly depressurize the RPV with the Main Turbine Bypass Valves irrespective of cooldown rate? - NO
		IF Emergency Depressurization is or has been required THEN exit RC/P and enter C2 Emergency Depressurization? - NO
		IF RPV water level cannot be determined? - NO
		Is any MSRV Cycling? – YES, but MSIVs closed
		IF Steam cooling is required? - NO
		IF Suppression Pool level and temperature cannot be maintained in the safe area of Curve 3?- NO
		IF Suppression Pool level cannot be maintained in the safe area of Curve 4? - NO
		IF Drywell Control air becomes unavailable? - NO
		IF Boron injection is required? - NO
	SRO	Directs a Pressure Band with SRVs IAW **APPX 11A**
	SRO	EOI-1 (Reactor Level)
		Monitor and Control Reactor Water Level. Directs Verification of PCIS isolations.
	ATC/BOP	Verifies PCIS isolations.
	SRO	IF It has NOT been determined that the reactor will remain subcritical without boron under all conditions THEN Exit RC/L and Enter C5, Level/Power control.
	SRO	Exits RC/L and Enters 3-C-5, Level/Power Control

Simulator Event Guide:

Event 7 Major: ATWS

	ATC/BOP	Commence pressure control with **Appendix 11A**, Alternate RPV Pressure Control Systems MSRVs
		1. IF Drywell Control Air is NOT available, THEN **EXECUTE** EOI Appendix 8G, CROSSTIE CAD TO DRYWELL CONTROL AIR, **CONCURRENTLY** with this procedure. 2. IF Suppression Pool level is at or below 5.5 ft, THEN **CLOSE** MSRVs and **CONTROL** RPV pressure using other options. 3. **OPEN** MSRVs using the following sequence to control RPV pressure as directed by SRO: a. 1 3-PCV-1-179 MN STM LINE A RELIEF VALVE. b. 2 3-PCV-1-180 MN STM LINE D RELIEF VALVE. c. 3 3-PCV-1-4 MN STM LINE A RELIEF VALVE. d. 4 3-PCV-1-31 MN STM LINE C RELIEF VALVE. e. 5 3-PCV-1-23 MN STM LINE B RELIEF VALVE. f. 6 3-PCV-1-42 MN STM LINE D RELIEF VALVE. g. 7 3-PCV-1-30 MN STM LINE C RELIEF VALVE. h. 8 3-PCV-1-19 MN STM LINE B RELIEF VALVE. i. 9 3-PCV-1-5 MN STM LINE A RELIEF VALVE. j. 10 3-PCV-1-41 MN STM LINE D RELIEF VALVE. k. 11 3-PCV-1-22 MN STM LINE B RELIEF VALVE. l. 12 3-PCV-1-18 MN STM LINE B RELIEF VALVE. m. 13 3-PCV-1-34 MN STM LINE C RELIEF VALVE.

NRC Scenario 4

Simulator Event Guide:

Event 7 Major: ATWS

	SRO	EOI-1 (Power)
		Monitor and Control Reactor Power
		Verify Reactor Mode Switch in shutdown – Yes
		Initiate ARI – completed
		Will tripping Recirc Pumps cause trip of main turbine, RFP, HPCI or RCIC – No
		Is reactor power above 5% or unknown - No
		SLC Leg When periodic APRM oscillations greater than 25% peak to peak persist – continue OR Before Suppression Pool temperature rises to 110°F - continue
		Direct SLC injection (APPX 3A)
		Inhibit ADS
		Verify RWCU system isolation – completed earlier
		Insert Control Rods Leg Reset ARI and defeat ARI logic trip **(APPX 2)**
		Insert Control Rods using any of the following methods:
		APPX-1A – Deenergize scram solenoids – No
		APPX-1B – Vent the scram air header – No
		APPX-1C – Scram individual control rods – No
		APPX-1D – Drive Control Rods – Yes
		APPX-1E – Vent control rod over piston - No
		APPX-1F – Reset scram/RE-SCRAM – Yes
		APPX-1G – Raise CRD cooling water dp - No

NRC Scenario 4

Simulator Event Guide:

Event 7 Major: ATWS

	ATC	Inserting Control Rods
		Calls for **3-EOI Appendix-2** and the field portion of 3-**EOI Appendix-1F**
		3-EOI Appendix-1F 2. WHEN RPS Logic has been defeated, THEN **RESET** Reactor Scram. 3. **VERIFY OPEN** Scram Discharge Volume vent and drain valves. 4. **DRAIN** SDV UNTIL the following annunciators clear: • WEST CRD DISCH VOL WTR LVL HIGH HALF SCRAM (Panel 3-9-4, 3-XA-55-4A, Window 1) • EAST CRD DISCH VOL WTR LVL HIGH HALF SCRAM (Panel 3-9-4, 3-XA-55-4A, Window 29). 5. **DISPATCH** personnel to **VERIFY OPEN** 3-SHV-085-0586, CHARGING WATER ISOL. 6. WHEN CRD Accumulators are recharged, THEN **INITIATE** manual Reactor Scram and ARI.
		3-EOI Appendix-1D 1. **VERIFY** at least one CRD pump in service. 2. IF Reactor Scram or ARI CANNOT be reset, THEN **DISPATCH** personnel to **CLOSE** 3-SHV-085-0586, CHARGING WATER SOV. 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: a. **SELECT** control rod. b. **PLACE** CRD NOTCH OVERRIDE switch in EMERG ROD IN position UNTIL control rod is NOT moving inward. c. **REPEAT** Steps 5.a and 5.b for each control rod to be inserted.
	Driver	When called for Appendix 2 wait 2 minutes and trigger 24, Appendix-1F wait 3 minutes and trigger 23, when SCRAM is reset trigger 25 to unstick rods. Before the crew scrams or the insert trigger 28 for bat nrcatws95 If requested to close 85-586 trigger 26 to close and trigger 27 to open

Simulator Event Guide:

Event 9 Component: Loss of HPCI 120 VAC Power Supply

	SRO	Enters C-5, Level/Power Control
		Inhibit ADS
	ATC/BOP	Inhibits ADS
	SRO	Is any main steam line open - No
		Is reactor power above 5% or unknown - No
		Maintain RPV water level between -180 inches and +51 inches with the following injection sources: **CRD – APPX 5B, RCIC – APPX 5C, SLC – APPX 7B**
	SRO	Directs a Level Band maintained by RCIC
	ATC	Initiate RCIC IAW **Appendix-5C** and maintains level in directed band, if possible
	BOP	Reports Loss of HPCI 120 VAC Power Supply, HPIC NOT available for Level Control
	Crew	Calls for investigation and repair in order to use HPCI for Level control

Simulator Event Guide:

Event 7 Component: ATWS

	ATC/BOP	Maintain Directed Level Band with RCIC, **Appendix 5C.**
		1. **VERIFY RESET** and **OPEN** 3-FCV-71-9, RCIC TURB TRIP/THROT VALVE RESET.
		2. **VERIFY** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller in AUTO with setpoint at 600 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.
		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 600 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.
		9. IF BOTH of the following exist? - NO
		10. **ADJUST** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller as necessary to control injection.

Simulator Event Guide:

Event 7 Component: ATWS

	Crew	Report rising Drywell Pressure
	SRO	**Enters EOI-2 on High Drywell Pressure** **PC/P** Monitor and control PC pressure below 2.4 psig using the Vent System (AOI-64-1), PC pressure above 2.4 psig unable to vent When PC pressure CANNOT be maintained below 2.4 psig, Continues Before suppression chamber pressure rises to 12 psig - Continues Initiate suppression chamber sprays using only those pumps NOT required to assure adequate core cooling by continuous injection **(App 17C),** Direct Appendix 17C When suppression chamber pressure exceeds 12 psig, Stops the first time through when the LOCA worsens will continue at that time Is Suppression Pool Level below 19 Feet, YES Is Drywell Temperatures and Pressures within the safe area of curve 5, YES Directs Shutdown of Recirc Pumps and Drywell Blowers Initiate DW Sprays using only those pumps NOT required to assure adequate core cooling by continuous injection **(App 17B)** When Suppression chamber pressure CANNOT be maintained in the safe area of Curve 5 Continue, Does not continue

NRC Scenario 4

Simulator Event Guide:

Event 7 Component: ATWS

	Crew	Report rising Drywell Pressure
	SRO	**Enters EOI-2 on High Drywell Pressure** **PC/H** Verify H2O2 analyzer in service **(APP 19)** When H2 is detected in PC (2.4% on control room indicators continue, does not continue
	SRO	**Enters EOI-2 on High Drywell Pressure** **SP/T** **MONITOR** and **CONTROL** suppr pl temp below 95°F using available suppr pl cooling **(APPX 17A),** Pool Temp below 95° WHEN suppr pl temp CANNOT be maintained below 95°F, directs RHR Pumps in Pool Cooling **Enters EOI-2 on High Drywell Pressure** **SP/L** **MONITOR** and **CONTROL** suppr pl lvl between -1 in. and -6 in. **(APPX 18)** Can suppr pl lvl be maintained above -6 in., YES Can suppr pl lvl be maintained below -1 in., YES

Simulator Event Guide:

Event 7 Component: ATWS

	ATC/BOP	**3-EOI APPENDIX-17A**, RHR System Operation Suppression Pool Cooling
		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 3A 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 3D 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 OVERRIDE.
		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. **CAUTION** RHR System flows below 7000 gpm or above 10000 gpm for one-pump operation may result in excessive vibration and equipment damage.
	ATC/BOP	Aligns directed RHR Pumps in Pool Cooling

Simulator Event Guide:

Event 7 Component: ATWS

	ATC/BOP	**3-EOI APPENDIX-17A**, RHR System Operation Suppression Pool Cooling
		i. **THROTTLE** 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. m. IF Additional Suppression Pool Cooling flow is necessary, THEN **PLACE** additional RHR and RHRSW pumps in service using Steps 2.b through 2.l.
	ATC/BOP	Aligns directed RHR Pumps in Pool Cooling

Simulator Event Guide:

Event 8 Major: LOCA

	ATC/BOP	**3-EOI APPENDIX-17C**, RHR System Operation Suppression Chamber Sprays
		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 auto open signal as necessary by **PLACING** 3-HS-74-155A(B), LPCI SYS I(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. 4. IF Directed by SRO to spray the Suppression Chamber using Fire Protection, THEN **CONTINUE** in this procedure at Step 8.
		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. 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.
	ATC/BOP	Aligns directed RHR Pumps in Suppression Chamber Sprays

Simulator Event Guide:

Event 8 Major: LOCA

	ATC/BOP	**3-EOI APPENDIX-17C**, RHR System Operation Suppression Chamber Sprays
		h. IF RHR System I(II) is operating ONLY in Suppression Chamber Spray mode, THEN **CONTINUE** in this procedure at Step 5.k. i. **VERIFY CLOSED** 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE. j. **RAISE** system flow by placing the second RHR System I(II) pump in service as necessary. 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 3A 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 3D RHRSW OUTLET VLV. n. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers.
	ATC/BOP	Aligns directed RHR Pumps in Suppression Chamber Sprays

Simulator Event Guide:

Event 8 Major: LOCA

	ATC/BOP	**3-EOI APPENDIX-17B**, RHR System Operation Drywell Sprays
		1. BEFORE Drywell pressure drops below 0 psig, **CONTINUE** in this procedure at Step 7. 2. IF Adequate core cooling is assured, **OR** Directed to spray the Drywell irrespective of adequate core cooling, THEN **BYPASS** LPCI injection valve auto open signal as necessary by **PLACING** 3-HS-74-155A(B), LPCI SYS I(II) OUTBD INJ VLV BYPASS SEL in **BYPASS**. 3. **VERIFY** Recirc Pumps and Drywell Blowers shutdown. 4. IF Directed by SRO to spray the Drywell using Standby Coolant supply, THEN **CONTINUE** in this procedure at Step 8. 5. IF Directed by SRO to spray the Drywell using Fire Protection, THEN **CONTINUE** in this procedure at Step 9.
		6. **INITIATE** Drywell 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) LPCI INBD INJECT VALVE, is OPEN, THEN **VERIFY CLOSED** 3-FCV-74-52(66), RHR SYS I(II) LPCI OUTBD INJECT VALVE. 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.
	ATC/BOP	Aligns directed RHR Pumps in Drywell Sprays

Simulator Event Guide:

Event 8 Major: LOCA

	ATC/BOP	**3-EOI APPENDIX-17B**, RHR System Operation Drywell Sprays
		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 II RHR Pump in service. i. **MONITOR** RHR Pump NPSH using Attachment 2. j. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger(s). k. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1350 and 4500 gpm RHRSW flow: • 3-FCV-23-34, RHR HX 3A 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 3D RHRSW OUTLET VLV. l. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers. 7. WHEN EITHER of the following exists: • Before drywell pressure drops below 0 psig, **OR** • Directed by SRO to stop Drywell Sprays, THEN **STOP** Drywell Sprays as follows: a. **VERIFY CLOSED** the following valves: • 3-FCV-74-100, RHR SYS I U-2 DISCH XTIE • 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. b. **VERIFY OPEN** 3-FCV-74-7(30), RHR SYSTEM I(II) MIN FLOW VALVE. c. IF RHR operation is desired in ANY other mode, THEN **EXIT** this EOI Appendix. d. **STOP** RHR Pumps.
	ATC/BOP	Aligns directed RHR Pumps in Drywell Sprays

Simulator Event Guide:

Event 8 Major: LOCA

	SRO	C5 – Level/Power Control
	SRO	As Level continues to lower with RCIC injection, directs use of SLC **APPX-7B**
	ATC	Initiates **SLC IAW APPX 7B**
		2. IF RPV injection is needed immediately ONLY to prevent or mitigate fuel damage, THEN **CONTINUE** at Step 10 to inject SLC Boron Tank to RPV. 10. **UNLOCK** and **PLACE** 3-HS-63-6A, SLC PUMP 3A/3B, control switch in START PUMP 3A or START PUMP 3B (Panel 3-9-5). 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). • 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). 12. IF Proper system operation CANNOT be verified, THEN **RETURN TO** Step 10 and **START** other SLC pump.
	SRO	As RPV Level continues to lower, CAN RPV water level be restored and maintained above -180 inches - No
		Are at least 2 MSRVs open - No
		Emergency Depressurization is Required 3-C-2 and 3-C-5
		Will the reactor remain subcritical without boron under all conditions - NO
		When all injection into the RPV is stopped and prevented except from RCIC, CRD, and SLC per C5, Level/Power control Step C5-22
		Stop and Prevent ALL injection into RPV Except from RCIC, CRD, and SLC **(APPX 4)**

Simulator Event Guide:

Event 8 Major: LOCA

	BOP/ATC	Stop and Prevent ALL injection into RPV Except from RCIC, CRD, and SLC (**APPX 4**)
		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: 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: 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.
		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.
		c. **CLOSE** the following valves BEFORE RPV pressure drops below 450 psig: • 3-FCV-3-19, RFP 3A DISCHARGE VALVE • 3-FCV-3-12, RFP 3B DISCHARGE VALVE • 3-FCV-3-5, RFP 3C DISCHARGE VALVE • 3-LCV-3-53, RFW START-UP LEVEL CONTROL

Simulator Event Guide:

Event 8 Major: LOCA

	SRO	C2 Emergency Depressurization and C5 – Level/Power Control
		Is suppression pool level above 5.5 feet – Yes
		Open all ADS Valves
	BOP/ATC	Opens all 6 ADS Valves
	SRO	Can at least two MSRVs be opened per C2 Emergency RPV Depressurization - Yes
		When RPV pressure is below MSCP Table 1A – 190 psig
		Start and Slowly raise RPV injection with the following injection sources to restore and maintain RPV water level above -180 inches
		Directs injection with LPCI **APPX 6B and 6C** to restore RPV Level to directed band
	BOP/ATC	Injects with LPCI IAW **APPX 6B and/or 6C** to restore RPV water level
	SRO	Emergency Classification EPIP-1 1.1-S1 Reactor water level can NOT be maintained above -162 inches. (TAF) OR 1.2-S Failure of automatic scram, manual scram, and ARI to bring the reactor subcritical.

Simulator Event Guide:

Event 8 Major: LOCA

	BOP/ATC	Injects with LPCI IAW **APPX 6B** to restore RPV water level
		1. IF Adequate core cooling is assured, **AND** It becomes necessary to bypass the LPCI injection valve auto open signal to control injection, THEN .**PLACE** 3-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS.** 2. **VERIFY OPEN** 3-FCV-74-1, RHR PUMP 3A SUPPR POOL SUCT VLV. 3. **VERIFY OPEN** 3-FCV-74-12, RHR PUMP 3C SUPPR POOL SUCT VLV. 4. **VERIFY CLOSED** the following valves: • 3-FCV-74-61, RHR SYS I DW SPRAY INBD VLV • 3-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV • 3-FCV-74-57, RHR SYS I SUPPR CHBR/POOL ISOL VLV • 3-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE • 3-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV 5. **VERIFY** RHR Pump 3A and/or 3C running. 6. WHEN RPV pressure is below 450 psig, THEN **VERIFY OPEN** 3-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE. 7. IF RPV pressure is below 230 psig, THEN **VERIFY CLOSED** 3-FCV-68-79, RECIRC PUMP 3B DISCHARGE VALVE. 8. **THROTTLE** 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, as necessary to control injection. 9. **MONITOR** RHR Pump NPSH using Attachment 1. 10. **PLACE** RHRSW pumps in service as soon as possible on ANY RHR Heat Exchangers discharging to the RPV. 11. **THROTTLE** the following in-service RHRSW outlet valves to maintain flow between 1350 and 4500 gpm: • 3-FCV-23-34, RHR HX 3A RHRSW OUTLET VLV • 3-FCV-23-40, RHR HX 3C RHRSW OUTLET VLV.

Simulator Event Guide:

Event 8 Major: LOCA

	BOP/ATC	Injects with LPCI IAW **APPX 6C** to restore RPV water level
		1. IF Adequate core cooling is assured, **AND** It becomes necessary to bypass the LPCI injection valve auto open signal to control injection, THEN .**PLACE** 3-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.** 2. **VERIFY OPEN** 3-FCV-74-24, RHR PUMP 3B SUPPR POOL SUCT VLV. 3. **VERIFY OPEN** 3-FCV-74-35, RHR PUMP 3D SUPPR POOL SUCT VLV. 4. **VERIFY CLOSED** the following valves: • 3-FCV-74-75, RHR SYS II DW SPRAY INBD VLV • 3-FCV-74-74, RHR SYS II DW SPRAY OUTBD VLV • 3-FCV-74-71, RHR SYS II SUPPR CHBR/POOL ISOL VLV • 3-FCV-74-72, RHR SYS II SUPPR CHBR SPRAY VALVE • 3-FCV-74-73, RHR SYS II SUPPR POOL CLG/TEST VLV 5. **VERIFY** RHR Pump 3B and/or 3D running. 6. WHEN RPV pressure is below 450 psig, THEN **VERIFY OPEN** 3-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE. 7. IF RPV pressure is below 230 psig, THEN **VERIFY CLOSED** 3-FCV-68-3, RECIRC PUMP 3A DISCHARGE VALVE. 8. **THROTTLE** 3-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE, as necessary to control injection. 9. **MONITOR** RHR Pump NPSH using Attachment 1. 10. **PLACE** RHRSW pumps in service as soon as possible on ANY RHR Heat Exchangers discharging to the RPV. 11. **THROTTLE** the following in-service RHRSW outlet valves to maintain flow between 1350 and 4500 gpm: • 3-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV • 3-FCV-23-52, RHR HX 3D RHRSW OUTLET VLV.

NRC Scenario 4

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

RFPT 3B and EECW Pump A3

Operations/Maintenance for the Shift:

Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 30B.

Commence a power increase to 85% in accordance with the RCP

Unit 1 and 2 are at 100% Power

Unusual Conditions/Problem Areas:

The following Control Rods are identified as SLOW: 30-19, 34-23, 14-51, 02-19, 46-51, and 06-43.

Facility: **Browns Ferry NPP** Scenario No.: **NRC – 5** Op-Test No.: **1306**

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

Initial Conditions: 100% power, DG D and RBCCW 2B Pump are tagged out. Spare RBCCW Pump is aligned for operation.

Turnover: Return LPRM 8-49B to Operate from a Bypassed Condition IAW 2-OI-92B. Lower Power with flow to 91% for Main Turbine Valve Testing.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Return LPRM 8-49B to Operate IAW 2-OI-92B
2		R-ATC R-SRO	Commence power decrease with flow to 90%
3	ed18a	C-BOP TS-SRO	Loss of I&C Bus A
4	ad01c	R-ATC TS-SRO C-BOP	ADS SRV 1-22 leaking
5	th18a	C-ATC C-SRO	VFD Cooling Water Pump 2A trips with failure of the standby pump to auto start
6	th10/11a	C-ATC R-ATC TS-SRO	LOCA - Recirculation Pump 2A Inboard and Outboard seal failure
7	Batch File	M-ALL	Two Level instruments fail high tripping Feedwater and HPCI / LOCA / ED on Reactor Level
8	ed10a	C	Loss of 480V SD Board 2A
9	Batch	I	RHR and Core Spray Division 2 Injection Valves will not Auto open
10	rc08	C	RCIC Steam Valve fails to Auto open

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

rec'd 5/22/

Critical Tasks - Four

With RPV pressure below the Shutoff Head of the available Low Pressure system(s), operate available Low Pressure system(s) to restore RPV water level above T.A.F. (-162 inches).

1. Safety Significance:
   Maintaining adequate core cooling.

2. Cues:
   Procedural compliance.
   Pressure below low pressure ECCS system(s) shutoff head.

3. Measured by:
   Operator manually starts or initiates at least one low pressure ECCS system and injects into the RPV to restore water level above -162 inches.

4. Feedback:
   Reactor water level trend.
   Reactor pressure trend.

With an injection system(s) operating and the reactor shutdown and at pressure, after RPV water level drops to -162 inches, transition to Emergency Depressurization before RPV level lowers to -180 inches.

1. Safety Significance:
   Maintain adequate core cooling, prevent degradation of fission product barrier.

2. Cues:
   Procedural compliance.
   Water level trend.

3. Measured by:
   Observation - At least 6 SRV's opened

4. Feedback:
   RPV pressure trend.
   SRV status indications.

Critical Tasks – Four

To prevent an uncontrolled RPV depressurization when Reactor level cannot be restored and maintained above -162 inches, inhibit ADS.

1. Safety Significance:
   Maintain adequate core cooling, prevent degradation of fission product barrier.

2. Cues:
   Procedural compliance.

3. Measured by:
   ADS logic inhibited prior to an automatic initiation.

4. Feedback:
   RPV pressure trend.
   RPV level trend.
   ADS "ADS LOGIC BUS A/B INHIBITED" annunciator status.

When Suppression Chamber Pressure exceeds 12 psig, initiate Drywell Sprays while in the safe region of the Drywell Spray Initiation Limit (DSIL) curve and prior to exceeding the PSP limit.

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 operator will return LPRM 8-49B to Operate IAW 2-OI-92B.

2. ATC lowers power to 90% using recirculation flow.

3. The crew will respond to a momentary loss of I&C Bus A. The in-service SJAE (A) will isolate and numerous alarms will come in. The BOP operator will shift SJAE's to B or reset SJAE A and return to service IAW 2-OI-66 or 2-AOI-47-3. Reactor Zone Differential pressure low will alarm and the operator will have to reset Refuel and Reactor Zone fans. When one of the SJAE's are restored high H2 will result in Off Gas, the SRO will evaluate TRM 3.7.2 and enter Condition A. The H2O2 analyzer will isolate requiring the SRO to evaluate TRM 3.3.11 and 3.6.2. The Drywell CAM will isolate requiring the SRO to evaluate Tech Spec 3.4.5.

4. During I&C Bus A loss, Main Steam Relief Valve open will alarm. When power is restored to I&C Bus A the alarm will clear but ADS SRV 1-22 will be leaking by and the acoustic monitor will indicate the leak by. SRO should enter 2-AOI-1-1, the ATC will lower power to less than 90%. When power is below 90% the BOP operator will perform 2-AOI-1-1 actions to attempt to close the SRV. SRO will refer to Tech Specs and determine TS 3.5.1 condition F is applicable.

5. The VFD Cooling Water Pump for the A Reactor Recirc VFD will trip and the standby pump will fail to start. The ATC will start the standby VFD Cooling Water Pump to restore cooling water preventing a VFD and Reactor Recirc Pump trip.

6. #1 and #2 recirc pump seal failure – ATC will note alarm and report #2 seal carrying full pressure. A short time later seal #2 will fail ATC will note that a small LOCA exists. ATC will trip and isolate A RR Pump IAW with 2-AOI-68-1A. ATC will insert control rods to exit Region 2 of the power to flow map. SRO will determine Technical Specification 3.4.1 Condition A, is applicable again with 24 hours to establish single loop conditions.

7. Level instruments 208A and 208D will fail high, causing a high level trip of Main Turbine, RFPTs and HPCI. RCIC will be the only major source of high pressure injection and the steam supply valve to RCIC will fail to auto open. The Crew will maintain reactor level until the LOCA is beyond the ability of RCIC to control. The SRO will determine ED is required in order to restore level with available low pressure systems.

8. After the scram 480V Shutdown Board 2A will fail due to a lockout, this will prevent operation of Core Spray Division 1 System for injection. RHR Loop 1 may be used for injection but no throttle capability with exist. RHR Loop 1 will not be available for Containment cooling operation.

9. With Division 2 Accident logic bypassed RHR and Core Spray will not auto start on any accident signals. The crew will have to manually start pumps and open injection valves. RHR Loop 2 will be available for Containment Cooling functions until required for injection.

Terminate the scenario when the following conditions are satisfied or upon request of Lead Examiner:

Emergency Depressurization complete

Reactor Level is restored

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER:5

10 Total Malfunctions Inserted: List (4-8)

4 Malfunctions that occur after EOI entry: List (1-4)

4 Abnormal Events: List (1-3)

1 Major Transients: List (1-2)

2 EOI's used: List (1-3)

2 EOI Contingencies used: List (0-3)

75 Validation Time (minutes)

4 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Restore an LPRM from Bypass			
RO U-92B-NO-05	215005A4.04	3.2	3.2
Lower Power with Recirc Flow			
RO U-068-NO-03 SRO S-000-AD-31	2.1.23	4.3	4.4
Loss of I&C Bus A			
RO U-57C-AB-03 SRO S-57C-AB-03	262001A2.04	3.8	4.2
ADS SRV leaking			
RO U-001-AB-01 SRO S-001-AB-01	239002A2.03	4.1	4.2
VFD Cooling Water Pump Failure			
RO U-068-AL-19 SRO S-068-AB-01	202001A2.22	3.1	3.2
RR Pump Seal Failure			
RO U-068-AL-09 SRO S-068-AB-01	203000A4.02	4.1	4.1
Loss of 480V SD BD 2A			
RO U-57B-AL-06 SRO S-57B-NO-07	226001A4.05	3.3	3.3

LOCA/Low Level ED

RO U-003-AL-24	295031EA2.04	4.6	4.8
RO U-000-EM-01			
RO U-000-EM-13			
SRO S-000-EM-14			
SRO S-000-EM-15			
SRO S-000-EM-01			

NRC Scenario 5

acility: **Browns Ferry NPP** Scenario No.: **NRC – 5** Op-Test No.: **1306**

Examiners:_____ Operators: **SRO:**_____

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 100% power, DG D and RBCCW 2B Pump are tagged out. Spare RBCCW Pump is aligned for operation.

Turnover: Return LPRM 8-49B to Operate from a Bypassed Condition IAW 2-OI-92B. Lower Power with flow to 91% for Main Turbine Valve Testing.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Return LPRM 8-49B to Operate IAW 2-OI-92B
2		R-ATC R-SRO	Commence power decrease with flow to 90%
3	ed18a	C-BOP TS-SRO	Loss of I&C Bus A
4	ad01c	R-ATC TS-SRO C-BOP	ADS SRV 1-22 leaking
5	th18a	C-ATC C-SRO	VFD Cooling Water Pump 2A trips with failure of the standby pump to auto start
6	th10/11a	C-ATC R-ATC TS-SRO	LOCA - Recirculation Pump 2A Inboard and Outboard seal failure
7	Batch File	M-ALL	Two Level instruments fail high tripping Feedwater and HPCI / LOCA / ED on Reactor Level
8	ed10a	C	Loss of 480V SD Board 2A
9	Batch	I	RHR and Core Spray Division 2 Injection Valves will not Auto open
10	rc08	C	RCIC Steam Valve fails to Auto open

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

Critical Tasks - Four

With RPV pressure below the Shutoff Head of the available Low Pressure system(s), operate available Low Pressure system(s) to restore RPV water level above T.A.F. (-162 inches).

1. Safety Significance:
   Maintaining adequate core cooling.

2. Cues:
   Procedural compliance.
   Pressure below low pressure ECCS system(s) shutoff head.

3. Measured by:
   Operator manually starts or initiates at least one low pressure ECCS system and injects into the RPV to restore water level above -162 inches.

4. Feedback:
   Reactor water level trend.
   Reactor pressure trend.

With an injection system(s) operating and the reactor shutdown and at pressure, after RPV water level drops to -162 inches, transition to Emergency Depressurization before RPV level lowers to -180 inches.

1. Safety Significance:
   Maintain adequate core cooling, prevent degradation of fission product barrier.

2. Cues:
   Procedural compliance.
   Water level trend.

3. Measured by:
   Observation - At least 6 SRV's opened

4. Feedback:
   RPV pressure trend.
   SRV status indications.

Critical Tasks – Four

To prevent an uncontrolled RPV depressurization when Reactor level cannot be restored and maintained above -162 inches, inhibit ADS.

1. Safety Significance:
   Maintain adequate core cooling, prevent degradation of fission product barrier.

2. Cues:
   Procedural compliance.

3. Measured by:
   ADS logic inhibited prior to an automatic initiation.

4. Feedback:
   RPV pressure trend.
   RPV level trend.
   ADS "ADS LOGIC BUS A/B INHIBITED" annunciator status.

When Suppression Chamber Pressure exceeds 12 psig, initiate Drywell Sprays while in the safe region of the Drywell Spray Initiation Limit (DSIL) curve and prior to exceeding the PSP limit.

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

NRC Scenario 5

Events

1. BOP operator will return LPRM 8-49B to Operate IAW 2-OI-92B.

2. ATC lowers power to 90% using recirculation flow.

3. The crew will respond to a momentary loss of I&C Bus A. The in-service SJAE (A) will isolate and numerous alarms will come in. The BOP operator will shift SJAE's to B or reset SJAE A and return to service IAW 2-OI-66 or 2-AOI-47-3. Reactor Zone Differential pressure low will alarm and the operator will have to reset Refuel and Reactor Zone fans. When one of the SJAE's are restored high H2 will result in Off Gas, the SRO will evaluate TRM 3.7.2 and enter Condition A. The H2O2 analyzer will isolate requiring the SRO to evaluate TRM 3.3.11 and 3.6.2. The Drywell CAM will isolate requiring the SRO to evaluate Tech Spec 3.4.5.

4. During I&C Bus A loss, Main Steam Relief Valve open will alarm. When power is restored to I&C Bus A the alarm will clear but ADS SRV 1-22 will be leaking by and the acoustic monitor will indicate the leak by. SRO should enter 2-AOI-1-1, the ATC will lower power to less than 90%. When power is below 90% the BOP operator will perform 2-AOI-1-1 actions to attempt to close the SRV. SRO will refer to Tech Specs and determine TS 3.5.1 condition F is applicable.

5. The VFD Cooling Water Pump for the A Reactor Recirc VFD will trip and the standby pump will fail to start. The ATC will start the standby VFD Cooling Water Pump to restore cooling water preventing a VFD and Reactor Recirc Pump trip.

6. #1 and #2 recirc pump seal failure – ATC will note alarm and report #2 seal carrying full pressure. A short time later seal #2 will fail ATC will note that a small LOCA exists. ATC will trip and isolate A RR Pump IAW with 2-AOI-68-1A. ATC will insert control rods to exit Region 2 of the power to flow map. SRO will determine Technical Specification 3.4.1 Condition A, is applicable again with 24 hours to establish single loop conditions.

7. Level instruments 208A and 208D will fail high, causing a high level trip of Main Turbine, RFPTs and HPCI. RCIC will be the only major source of high pressure injection and the steam supply valve to RCIC will fail to auto open. The Crew will maintain reactor level until the LOCA is beyond the ability of RCIC to control. The SRO will determine ED is required in order to restore level with available low pressure systems.

8. After the scram 480V Shutdown Board 2A will fail due to a lockout, this will prevent operation of Core Spray Division 1 System for injection. RHR Loop 1 may be used for injection but no throttle capability with exist. RHR Loop 1 will not be available for Containment cooling operation.

9. With Division 2 Accident logic bypassed RHR and Core Spray will not auto start on any accident signals. The crew will have to manually start pumps and open injection valves. RHR Loop 2 will be available for Containment Cooling functions until required for injection.

Terminate the scenario when the following conditions are satisfied or upon request of Lead Examiner:

Emergency Depressurization complete

Reactor Level is restored

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 5

10 Total Malfunctions Inserted: List (4-8)

4 Malfunctions that occur after EOI entry: List (1-4)

4 Abnormal Events: List (1-3)

1 Major Transients: List (1-2)

2 EOI's used: List (1-3)

2 EOI Contingencies used: List (0-3)

75 Validation Time (minutes)

4 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

NRC Scenario 5

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Restore an LPRM from Bypass			
RO U-92B-NO-05	215005A4.04	3.2	3.2
Lower Power with Recirc Flow			
RO U-068-NO-03 SRO S-000-AD-31	2.1.23	4.3	4.4
Loss of I&C Bus A			
RO U-57C-AB-03 SRO S-57C-AB-03	262001A2.04	3.8	4.2
ADS SRV leaking			
RO U-001-AB-01 SRO S-001-AB-01	239002A2.03	4.1	4.2
VFD Cooling Water Pump Failure			
RO U-068-AL-19 SRO S-068-AB-01	202001A2.22	3.1	3.2
RR Pump Seal Failure			
RO U-068-AL-09 SRO S-068-AB-01	203000A4.02	4.1	4.1
Loss of 480V SD BD 2A			
RO U-57B-AL-06 SRO S-57B-NO-07	226001A4.05	3.3	3.3
LOCA/Low Level ED			
RO U-003-AL-24 RO U-000-EM-01 RO U-000-EM-13 SRO S-000-EM-14 SRO S-000-EM-15 SRO S-000-EM-01	295031EA2.04	4.6	4.8

Procedures Used/Referenced:

Procedure Number	Procedure Title
2-OI-92B	Average Power Range Monitoring
2-GOI-100-12	Power Maneuvering
2-OI-68	Reactor Recirculation System
2-AOI-57-5A	Loss of I&C Bus A
2-ARP-9-8C	Panel 9-8 2-XA-55-8C
2-ARP-9-7A	Panel 9-7 2-XA-55-7A
2-ARP-9-6C	Panel 9-6 2-XA-55-6C
2-ARP-9-7C	Panel 9-7 2-XA-55-7C
2-ARP-9-3C	Panel 9-3 2-XA-55-3C
2-ARP-9-3D	Panel 9-3 2-XA-55-3D
2-ARP-9-53	Panel 9-53 2-XA-55-53
2-EOI-3	Secondary Containment Control
2-AOI-64-2D	Group 6 Ventilation System Isolation
2-EOI Appendix-8F	Restoring Refuel Zone and Reactor Zone Ventilation Fans Following Group 6 Isolation
2-OI-66	Off-Gas System
2-AOI-66-1	Off-Gas H2 High
	Technical Specifications
	Technical Requirements Manual
2-AOI-1-1	Relief Valve Stuck open
2-OI-74	Residual Heat Removal System
2-EOI-2	Primary Containment Control
2-EOI Appendix-18	Suppression Pool Water Inventory Removal and Makeup
2-ARP-9-4A	Panel 9-4 2-XA-55-4A
2-AOI-68-1A	Recirc Pump Trip/Core Flow Decrease OPRMs Operable
2-AOI-100-1	Reactor Scram
2-EOI-1	RPV Control
2-EOI Appendix-8B	Reopening MSIVs / Bypass Valve Operation
2-EOI-1-C-1	Alternate Level Control
2-EOI Appendix-6A	Injection Subsystems Lineup Condensate
2-EOI Appendix-17C	RHR System Operation Suppression Chamber Sprays
2-EOI Appendix-17B	RHR System Operation Drywell Sprays
2-EOI-3-C-2	Emergency RPV Depressurization
2-EOI Appendix-5B	Injection System Lineup CRD
2-EOI Appendix-7B	Alternate RPV Injection System Lineup SLC System
2-EOI Appendix-6B	Injection Subsystems Lineup RHR System I LPCI Mode
2-EOI Appendix-6C	Injection Subsystems Lineup RHR System II LPCI Mode
2-EOI Appendix-6E	Injection Subsystems Lineup Core Spray System II
EPIP-1	Emergency Classification

Console Operator Instructions

A. Scenario File Summary

Batch File NRC/1306nrc-5

ior zlo0il211d20b[1] off	
ior zlo0il211d20b[2] off	
ior zlo0hs2110d20a[1] off	Tag DG D
ior zlo0hs2110d20a[2] off	
ior zlo0hs2110d20a[2] off	
mrf dg01d open	
ior zdihs708a null	
ior zlohs708a[1] off	Tag RBCCW 2B
ior zlohs708a[2] off	
ior zlohs708a[3] off	
ior zlohs682a2a[1] on	
ior zlohs682a2a[2] off	A VFD Cooling Pump Trip
mrf th18b trip	
trg 1 NRC/avfd	
trg 1= bat NRC/130605-1	A VFD Cooling Pump Trip
imf th30f (e5 0) 100	
imf th30h (e5 60) 100 45 55	Level 8 instrument failures
imf rc08	RCIC steam supply valve failure
imf th10a (e3 0) 100	
imf th11a (e3 60) 100 90 0	RR 2A Pump seal
mrf cs09b inhibit	
mrf rh15 inhibit	Div 2 accident logic bypassed
ior zloil7556a off	
ior zloil74154a off	
mrf ed13 open	momentary loss of I&C Bus A

Batch File NRC/1306nrc-5-1

imf th21 (none 330) .6 600 .1	LOCA
imf ed10a (none 370)	Loss of 480V SD BD 2A

Preference File NRC/1306nrc-5

pfk 01 tog	
pfk 02 ann silence	
pfk 03 mrf sw02 align	align spare RBCCW Pump
pfk 04 bat NRC/1306nrc-5	
pfk 05 imf ed18a	Loss of I&C Bus A
pfk 06 ior zdihs682a1a[1] off	VFD A Cooling Pump trip
pfk 07 imf ad01c 10	ADS SRV Leak by
pfk 08 trg! e3	RR Pump A Seal Failure
pfk 09 trg! e5	Loss of Feedwater
pfk 10 bat NRC/1306nrc-5-1	LOCA and Loss of 480V SD BD 2A
pfk 11 mrf ad01c out	
pfk 12 ior xa553e10 alarm_on	
pfk s1	
pfk s2 mmf ad01c 100	
pfk s3 mmf ad01c 10	
pfk s4 mmf ad01c 100	
pfk s5 mmf ad01c 10	
pfk s6 bat app18rhra	
pfk s7 bat app18rhrb	
pfk s8 mrf ed13 close	

Scenario 5

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 28
	manual	Bypass LPRM 8-49B
	restorepref	NRC/1306nrc-5
	F3	mrf sw02 align RBCCW wait one minute and turn off RBCCW Pump 2B
Simulator Setup	**Load Batch F4**	bat NRC/1306nrc-5
Simulator Setup	manual	Tag DG D and RBCCW Pump 2B
Simulator Setup		Verify file loaded, Clear alarms for Reactor Recirc

RCP required (100% - 90% with flow) and RCP for Urgent Load Reduction

Simulator Event Guide:

Event 1 Normal: Return LPRM 8-49B to Operate from a Bypassed Condition IAW 2-OI-92B

	SRO	Directs BOP to return LPRM 8-49B to Operate IAW 2-OI-92B
	BOP	Return LPRM 8-49B to Operate IAW 2-OI-92B
		6.4 Returning an LPRM to Operate From a Bypassed Condition [1] **REVIEW** all precautions and limitations. **REFER TO** Section 3.0. [2] **REFERENCE** Illustration 4 to find the APRM/LPRM Channel associated with the desired LPRM to be returned to normal. [3] At Panel 2-9-14, **DEPRESS** any softkey to illuminate the display on the desired APRM/LPRM channel chassis. [4] **DEPRESS** the "ETC" softkey until "BYPASS SELECTIONS" illuminates on the bottom row of the display. [5] **DEPRESS** "BYPASS SELECTIONS" softkey, enter the password, and **DEPRESS** "ENT". [6] **SELECT** the desired LPRM to be returned to service by using the left or right arrows on the softkey board until the inverse video illuminates the correct LPRM. [7] **DEPRESS** the "OPERATE" softkey. [8] **CHECK** the "BYP/HV OFF" is replaced by "OPERATE" below the selected LPRM. [9] **DEPRESS** "EXIT" softkey to return display to the desired bargraph. [10] **VERIFY**, as a result of returning this LPRM to operate, that any alarms received on Panel 2-9-5 or on the APRM/LPRM channel are reset.
	BOP	Contacts Reactor Engineer and informs Reactor Engineering that LPRM 8-49B is returned to service.
	Driver	Acknowledge information

Simulator Event Guide:

Event 2 Reactivity: Power decrease with Recirc Flow

	SRO	Notifies ODS of power decrease.
		Directs Power decrease using Recirc Flow, IAW 2-GOI-100-12. [1] **REVIEW** all Precautions and Limitations listed in Section 3.0. [2] **VERIFY** Prerequisite listed in Section 4.0 is satisfied. [3] **NOTIFY** Operations Duty Specialist (ODS) and Chattanooga Load Coordinator of impending power reduction. [4] **NOTIFY** Radiation Protection of purpose for power reduction, the target power level (see above note), and **RECORD** time Radiation Protection notified in NOMS Narrative Log. [6] **IF** power is being reduced (less than 10%) for any of the following reasons: • Weekly Control Rod Exercise • Main Turbine Valve Testing • Ultimate heat Sink temperature > 92.5°F [6.1] **REDUCE** Recirculation flow. **REFER TO** 2-OI-68. [6.2] **MAINTAIN** Reactor thermal power within the limits shown on ICS and 0-TI-248, Station Reactor Engineer, as appropriate. [10] **PERFORM** the following while reducing Reactor power: [10.1] **WHEN** Reactor power is at approximately 90%, **THEN REFER TO** 2-OI-3 and **START** a RFP Injection Water Pump.
	ATC	Lower Power w/Recirc, IAW 2-OI-68, Section 6.2
	Crew	Calls Reactor Engineering to run thermal case when reactivity control plan is completed.
	Driver	When directed by NRC, insert preference key F5 imf ed18a Loss of I&C Bus A, followed by F7 imf ad01c 10 and after 5 seconds Shift F8 mrf ed13 close
	NRC	Two additional power decreases in Scenario, can continue when ready. will have to mismatch speeds at 1300 rpm.

Simulator Event Guide:

Event 2 Reactivity: Power decrease with Recirc Flow

	ATC	Lower Power w/Recirc, IAW 2-OI-68, Section 6.2
		D. Individual pump speeds should be mismatched by ~60 RPM during dual pump operation between 1200 and 1300 RPM to minimize harmonic vibration (this requirement may be waived for short periods for testing or maintenance). [1] **IF** desired to control Recirc Pumps 2A and/or 2B speed with Recirc Individual Control, **THEN PERFORM** the following: • **RAISE** Recirc Pump 2A using RAISE SLOW (MEDIUM), 2-HS-96-15A(15B). (Otherwise N/A) • **LOWER** Recirc Pump 2A using SLOW(MEDIUM)(FAST), 2-HS-96-17A(17B)(17C). (Otherwise N/A). AND/OR • **RAISE** Recirc Pump 2B using RAISE SLOW (MEDIUM), 2-HS-96-16A(16B). (Otherwise N/A) • **LOWER** Recirc Pump 2B using SLOW(MEDIUM)(FAST), 2-HS-96-18A(18B)(18C). (Otherwise N/A). [2] **WHEN** desired to control Recirc Pumps 2A and/or 2B speed with the RECIRC MASTER CONTROL, **THEN ADJUST** Recirc Pump Speed 2A & 2B using the following pushbuttons as required. **RAISE** SLOW, 2-HS-96-31 **RAISE** MEDIUM, 2-HS-96-32 **LOWER** SLOW, 2-HS-96-33 **LOWER** MEDIUM, 2-HS-96-34 **LOWER** FAST, 2-HS-96-35
	Driver	When directed by NRC, insert preference key F5 imf ed18a Loss of I&C Bus A, followed by F7 imf ad01c 10 and after 5 seconds Shift F8 mrf ed13 close. When dispatched wait two minutes and report Failure of 9-9 Throwover Switch, switch tripped to alternate.
	NRC	Two additional power decrease in Scenario, can continue when ready

NRC Scenario 5

Simulator Event Guide:

Event 3 Component: Loss of I&C Bus A

	Crew	Respond to numerous alarms when I&C Bus A deenergizes. The most significant of these are 8C-21, 6C-12, 3C-25, 7C-22 and 3D-3, 19, and 32.
	ATC	Announces Power, Level, and Pressure are stable
	BOP	Alarm 8C-21, I&C BUS A VOLTAGE ABNORMAL A. **VERIFY** alarm by checking the following: • Loss of instrument power and remote position indication to Core Spray Div I and RHR Div I (Panel 9-3). • RWCU Filter Demin A isolation. • Reactor Building/Refuel Zone Ventilation isolation. B. **NOTIFY** Unit 3 Unit Supervisor. C. **REFER TO** 2-AOI-57-5A and 0-GOI-300-2.
	SRO	Announce entry to 2-AOI-57-5A, Loss of I&C Bus A.
	ATC	Alarm 6C-12, RFPT GOVERNOR POWER FAILURE OR GOV ABNORMAL A. **VERIFY** RFPT/RFPs continue to control Reactor Water Level. B. **IF** a RFPT/RFP has tripped, **THEN VERIFY** other RFPTs in Automatic operation raise or lower output flow to maintain reactor water level. C. **DISPATCH** personnel to UNIT 2 Auxiliary Instrument Room to PERFORM the following at Panels 2-9-48,49,50: • **CHECK** Power Supply lights illuminated. • **CHECK** display screens for Governor abnormal conditions. Announced RPV Level stable, dispatches personnel
	BOP	Alarm 3C-25, MAIN STEAM RELIEF VALVE OPEN A. **CHECK** MSRV DISCHARGE TAILPIPE TEMPERATURE, 2-TR-1-1, on Panel 2-9-47 and SRV Tailpipe Flow Monitor on Panel 2-9-3 for raised temperature and flow indications. B. **REFER TO** 2-AOI-1-1.
	BOP	Announce Main Steam Relief Valve Open alarm cleared, but have indication on acoustic monitor of SRV partially open or leaking by. ADS SRV 1-22
	NRC	Action for SRV 1-22 are on PAGE 22
	NOTE	3C-25 alarms on a loss of I&C Bus A, when the bus re-energizes ADS SRV will show acoustic monitoring indication of leaking by. BOP operator should report to SRO and SRO enter 2-AOI-1-1. These events will occur under event four.

Simulator Event Guide:

Event 3 Component: Loss of I&C Bus A

	Crew	Respond to numerous alarms when I&C Bus A deenergizes. The most significant of these are 8C-21, 6C-12, 3C-25, 7C-22 and 3D-3, 19, and 32.
	BOP	Alarm 7C-22, DRYWELL/SUPPR CHAMBER H2O2 ANALYZER FAILURE A. **CHECK** Panel 2-9-54 and 2-9-55 for abnormal indicating lights such as low flow, H2 or O2 downscale, pump off, etc. B. **IF** sample pump is **NOT** running, **THEN ATTEMPT** to start pump using 2-HS-76-110/S5. C. **IF** sample pump will **NOT** start **OR** H2/O2 analyzer malfunction, **THEN PLACE** H2/O2 Analyzer in Service per 2-OI-76 section 5.4. D. **REFER TO** TRM 3.3.11 and TRM Section 3.6.2.
	BOP	Resets H2/O2 ANALYZER ISOLATION RESET, 2-HS-76-91 Resets Alarm on 2-MON-76-110, touch screen.
	BOP	Alarm 3D-19, DRYWELL LEAK DETECTION RADIATION DNSC A. **DETERMINE** cause of alarm by performing the following: 1. **CHECK** AIR PARTICULATE MONITOR CONTROLLER, 2-MON-90-50 on Panel 2-9-2 for condition bringing in alarm 2. **DISPATCH** personnel to determine which alarm is annunciating using the HELP button (**REFER TO** 2-OI-90 for complete annunciator list). E. **REFER TO** Tech Specs 3.4.4, 3.4.5, and TRM 3.3.10 for CAM LCO requirements and **IMPLEMENT** appropriate TS/TRM actions as required. F. **WHEN** conditions permit, **THEN RESET** alarm per 2-OI-90, Section 6.5.
	BOP	Determines DW Radiation Monitor Cam isolated, resets the following to restore to operation. UPPER INBD SUPPLY ISOL VALVE RESET, 2-HS-90-254A-A LOWER INBD SUPPLY ISOL VALVE RESET, 2-HS-90-254B-A OUTBD RETURN ISOL VALVE RESET, 2-HS-90-257A-A OUTBD SUPPLY ISOL VALVE RESET, 2-HS-90-255A INBD RETURN ISOL VALVE RESET, 2-HS-90-257B-A

Simulator Event Guide:

Event 3 Component: Loss of I&C Bus A

	Crew	Respond to numerous alarms when I&C Bus A deenergizes. The most significant of these are 8C-21, 6C-12, 3C-25, 7C-22 and 3D-3, 19, and 32.
	BOP	Alarms 3D-3, RX BLDG VENTILATION ABNORMAL A. **IF** PCIS group 6 isolation exists, **THEN REFER TO** 2-AOI-64-2d. B. **NOTIFY** Unit Supervisors, Unit 1 and Unit 3. C. **VERIFY** standby fans start. D. **DISPATCH** personnel to check Bldg ΔP (PDIC 64-2, El 639', Rx Bldg.) E. **IF** ΔP is at or above -0.17 in. H2O **THEN ENTER** 2-EOI-3 Flowchart, 2-XA-55-3D, window 32.
	BOP	Alarms 3D-32, REACTOR ZONE DIFFERENTIAL PRESSURE LOW D. **IF** alarm is valid, **THEN INFORM** Unit Supervisor of 2-EOI-3 entry condition. E. **REQUEST** personnel to check fans locally for any apparent problems. F. **REFER TO** 2-OI-30B and **PLACE** standby fan in service to restore normal differential pressure.
	SRO	Enters 2-EOI-3, Secondary Containment Control and 2-AOI-64-2D, Group 6 Ventilation System Isolation
		Directs Reactor and Refuel Zone Ventilation returned to service by either 2-EOI Appendix-8F, Restoring Refuel Zone and Reactor Zone Ventilation Fans Following Group 6 Isolation or 2-AOI-64-2D
	NOTE	The above procedures for restoring ventilation are basically the same will describe Appendix-8F below. The only action in EOI-3 is to restore ventilation.

Simulator Event Guide:

Event 3 Component: Loss of I&C Bus A

	ATC/BOP	Appendix 8F - Restoring Refuel Zone and Reactor Zone Ventilation Fans Following Group 6 Isolation
		1. **VERIFY** PCIS Reset. 2. **PLACE** Refuel Zone Ventilation in service as follows (Panel 2-9-25): a. **VERIFY** 2-HS-64-3A, REFUEL ZONE FANS AND DAMPERS, control switch is in OFF. b. **PLACE** 2-HS-64-3A, REFUEL ZONE FANS AND DAMPERS, control switch to SLOW A (SLOW B). c. **CHECK** two SPLY/EXH A(B) green lights above 2-HS-64-3A, REFUEL ZONE FANS AND DAMPERS, control switch extinguish and two SPLY/EXH A(B) red lights illuminate. d. **VERIFY OPEN** the following dampers: • 2-FCO-64-5, REFUEL ZONE SPLY OUTBD ISOL DMPR • 2-FCO-64-6, REFUEL ZONE SPLY INBD ISOL DMPR • 2-FCO-64-9, REFUEL ZONE EXH OUTBD ISOL DMPR • 2-FCO-64-10, REFUEL ZONE EXH INBD ISOL DMPR.
		3. **PLACE** Reactor Zone Ventilation in service as follows (Panel 2-9-25): a. **VERIFY** 2-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch is in OFF. b. **PLACE** 2-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch in SLOW A (SLOW B). c. **CHECK** two SPLY/EXH A(B) green lights above 2-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch extinguish and two SPLY/EXH A(B) red lights illuminate. d. **VERIFY OPEN** the following dampers: • 2-FCO-64-13, REACTOR ZONE SPLY OUTBD ISOL DMPR • 2-FCO-64-14, REACTOR ZONE SPLY INBD ISOL DMPR • 2-FCO-64-42, REACTOR ZONE EXH INBD ISOL DMPR • 2-FCO-64-43, REACTOR ZONE EXH OUTBD ISOL DMPR.
		5. IF Reactor Zone Fan fast speed is desired following 5 minutes of slow speed operation, THEN **PLACE** 2-HS-64-11A, REACTOR ZONE FANS AND DAMPERS, control switch in FAST A (FAST B). 6. IF Refuel Zone Fan fast speed is desired following 5 minutes of slow speed operation, THEN **PLACE** 2-HS-64-3A, REFUEL ZONE FANS AND DAMPERS, control switch in FAST A (FAST B).

Simulator Event Guide:

Event 3 Component: Loss of I&C Bus A

	SRO	Enters 2-AOI-57-5A
		4.2 Subsequent Actions [1] **VERIFY** Automatic Actions have occurred. [2] **IF** a Reactor Scram occurs, **THEN PERFORM** 2-AOI-100-1 concurrently with this procedure. [3] **VERIFY** a flow path for Condensate System, or **STOP** the condensate pumps/booster pumps. REFER TO 2-OI-2. [4] **START** Standby Gas Train(s) and **CHECK** Reactor Building pressure at or below 0.25" H2O vacuum (PDIC 64-1, Panel 25-215; PDIC 64-2, Panel 25-213). REFER TO 0-OI-65, Section Standby Gas Treatment System Manual Initiation. [5] **VERIFY** SJAE B in service to maintain condenser vacuum. REFER TO 2-OI-66.
		[6] **IF** Auto Transfer of Panel 2-9-9, Cabinet 2, failed **THEN** (otherwise N/A) [7] **WHEN** Reactor water level is normal, **THEN RESET** PCIS Group 6 inboard isolation and **RETURN** the affected systems to service or standby readiness. REFER TO 2-AOI-100-1, if a Reactor Scram occurred, otherwise REFER TO 2-AOI-64-2D.
	SRO	Directs restoration of Reactor Building DP, should restore Ventilation IAW Appendix-8F or 2-AOI-64-2D. May call Unit 1 to start Standby Gas Fans
	SRO	Directs restoration of SJAE, IAW 2-OI-66 hard card
	BOP	Restores SJAE to service, Standby SJAE System Lineup Hard Card

Simulator Event Guide:

Event 3 Component: Loss of I&C Bus A

	BOP	Restores SJAE to service, Standby SJAE System Lineup Hard Card
		[1] **VERIFY RESET** Off-Gas isolation using 2-HS-90-155, OG OUTLET/DRAIN ISOLATION VLVS.
	NOTE	With power back to I&C Bus A, once RO resets 2-HS-90-155, can place SJAE A back in service or can transfer to SJAE B. All steps are listed below for either.
		[2] **VERIFY OPEN** the following valves: • 2-HS-66-11(15), SJAE 2A(2B) INLET VALVE. • 2-HS-1-155A(156A), STEAM TO SJAE 2A(2B). [3] **VERIFY** in **AUTO/OPEN** 2-HS-66-14(18), SJAE 2A(2B) OG OUTLET VALVE. [4] **PLACE** 2-HS-1-150(152), SJAE 2A(2B) PRESS CONTROLLER, in **CLOSE** and then in **OPEN**. [5] **VERIFY OPEN** the following valves (red light illuminated): • 2-PCV-1-151/166 (153/167), STEAM TO SJAE 2A(2B) STAGES 1,2, AND 3. • 2-FCV-1-150(152), SJAE 2A(2B) INTMD CONDENSER DRAIN.
		[6] **MONITOR** hotwell pressure as indicated on recorder 2-XR-2-2, HOTWELL TEMP AND PRESS, on Panel 2-9-6. [7] **FOR** the SJAE not being placed in service, **VERIFY CLOSED** the following valves: • 2-HS-66-18(14), SJAE 2B(2A) OG OUTLET VALVE. • 2-HS-1-152(150), SJAE 2B(2A) PRESSURE CONTROLLER. • 2-HS-1-156A(155A) STEAM TO SJAE 2B(2A)
	BOP	Acknowledge Panel 2-9-53 Alarms, Report high hydrogen levels 53-3 and 13, HIGH OFFGAS % H2 TRAIN A, and HIGH OFFGAS % H2 TRAIN BB

Simulator Event Guide:

Event 3 Component: Loss of I&C Bus A

	BOP	Report high hydrogen levels 53-3 and 13, HIGH OFFGAS % H2 TRAIN A, and HIGH OFFGAS % H2 TRAIN BB
		A. **CHECK** Off-gas Hydrogen Analyzer, 2-H2R-66-96 (CH 1) on Panel 2-9-53 to verify H_2 concentration. B. **IF** alarm is valid, **THEN REFER TO** 2-AOI-66-1.
	SRO	Enters 2-AOI-66-1, Off-Gas H2 High
	BOP/ATC	[1] **PLACE** both OFFGAS TRAIN A(B) AUTO CHANNEL CHECK / BYPASS control switches, 2-HS-066-1007 and 1008, on OFFGAS SAMPLE PANEL, 2-LPNL-925-0588, in BYPASS to assure continuous availability of hydrogen monitoring. [2] **IF** HWC System injection is in service, **THEN** (otherwise N/A) [3] **VERIFY** proper operation of in service SJAE. [4] **IF** hydrogen concentration is greater than or equal to 4%, **THEN R**EFER TO TRM 3.7.2. [10] **MONITOR** the following parameters at Control Room Panel 9-53 and 9-8: • RECOMBINER 2A/2B TEMPERATURE, 2-TRS-66-77, for abnormal trend; either rising or lowering. • OFF GAS HYDROGEN ANALYZER, 2-H2R-66-96, for hydrogen concentration.
	NOTE	H2 concentration will rise to 8 to 12% and return to a normal value of less than 1%

Simulator Event Guide:

Event 3 Component: Loss of I&C Bus A

	SRO	Tech Specs for Loss of I&C Bus A
		For Drywell CAM 3.4.5 RCS Leakage Detection Instrumentation LCO 3.4.5 The following RCS leakage detection instrumentation shall be OPERABLE: a. Drywell floor drain sump monitoring system; and b. One channel of either primary containment atmospheric particulate or atmospheric gaseous monitoring system. APPLICABILITY: MODES 1, 2, and 3. Condition B: Required primary containment atmospheric monitoring system inoperable. Required Action B.1: Analyze grab samples of primary containment atmosphere. Completion Time: Once per 12 hours Required Action B.2: Restore required primary containment atmospheric monitoring system to OPERABLE status. Completion Time: 30 days
		For High H2 TR 3.7.2 Airborne Effluents LCO 3.7.2 Whenever the SJAE is in service, the concentration of hydrogen in the offgas downstream of the recombiners shall be limited to $\leq$ 4% by volume. APPLICABILITY: During main condenser offgas treatment system operation Condition A: With the concentration of hydrogen >4% by volume. Required Action A.1: Restore the concentration to within the limit. Completion Time: 48 hours
	NOTE	Below is event 4 which started with the failure of I&C Bus A, depending on SRO priorities may have addressed SRV first and then restoration from Bus loss.

Simulator Event Guide:

Event 3 Component: Loss of I&C Bus A

	SRO	Tech Specs for Loss of I&C Bus A
		For H2O2 Monitor TR 3.3.11 Hydrogen Monitoring Instrumentation LCO 3.3.11 The primary containment hydrogen analyzer shall be OPERABLE APPLICABILITY: MODE 1 during the time period a. From 24 hours after THERMAL POWER is > 15% RTP following startup, to b. 24 hours prior to reducing THERMAL POWER to < 15% RTP prior to the next scheduled reactor shutdown. Condition A: Primary containment hydrogen analyzer inoperable. Required Action A.1: Restore primary containment analyzer to OPERABLE status. Completion Time: 7 days
		TR 3.6.2 Oxygen Concentration Monitor LCO 3.6.2 The Primary Containment oxygen concentration monitor shall be OPERABLE. APPLICABILITY: MODE 1 during the time period a. From 24 hours after THERMAL POWER is > 15% RTP following startup, to b. 24 hours prior to reducing THERMAL POWER to < 15% RTP prior to the next scheduled reactor shutdown. Condition A: Primary containment oxygen concentration monitor inoperable. Required Action A.1: Begin alternate sampling and analyze results. Completion Time: Immediately AND Once per 7 days thereafter.
	NOTE	Below is event 4 which started with the failure of I&C Bus A, depending on SRO priorities may have addressed SRV first and then restoration from Bus loss.

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

	NOTE	Event 4 started with the failure of I&C Bus A, depending on SRO priorities may have addressed SRV first and then restoration from Bus loss.
	SRO	Enters 2-AOI-1-1
	BOP	**4.1 Immediate Action** [1] **IDENTIFY** stuck open relief valve by **OBSERVING** the following: • SRV TAILPIPE FLOW MONITOR, 2-FMT-1-4, on Panel 2-9-3, OR • MSRV DISCHARGE TAILPIPE TEMPERATURE recorder, 2-TR-1-1 on Panel 2-9-47.
	ATC	[2] **IF** relief valve transient occurred while operating above 90% power, **THEN REDUCE** reactor power to ≤90% RTP with recirc flow.
	BOP	[3] **WHILE OBSERVING** the indications for the affected Relief valve on the Acoustic Monitor; **CYCLE** the affected relief valve control switch several times as required: • CLOSE to OPEN to CLOSE positions [4] **IF** all SRVs are CLOSED, **THEN CONTINUE** at Step 4.2.4. (N/A)
		4.2 Subsequent Action **4.2.2 Attempt to close valve from Panel 9-3:** [1] **PLACE** the SRV TAILPIPE FLOW MONITOR POWER SWITCH in the OFF position. [2] **PLACE** the SRV TAILPIPE FLOW MONITOR POWER SWITCH in the ON position. [3] **IF** all SRVs are CLOSED, **THEN CONTINUE** at Step 4.2.4. (N/A) [4] **PLACE** MSRV AUTO ACTUATION LOGIC INHIBIT, 2-XS-1-202 in INHIBIT: [5] **IF** relief valve closes, **THEN OPEN** breaker or **PULL** fuses as necessary using Attachment 1 (Unit 2 SRV Solenoid Power Breaker/Fuse Table). [6] **PLACE** MSRV AUTO ACTUATION LOGIC INHIBIT 2-XS-1-202, in AUTO. [7] **IF** the SRV valve did not close, **THEN PERFORM** the appropriate section from table below. RELIEF VALVE / STEP Number / Switch Location / Breaker Location / Fuse Location SRV 1-22 / Step 4.2.3[2] / Panel 25-32 / Multiple / Panel 25-32

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

	Driver	Actions for SRV 1-22, wait two minutes and for taking control at panel 25-32 Preference key F12 and F11 mrf ad01c out, for cycling SRV preference key shift F2 open, shift F3 close to 10, shift F4 open, shift F5 close to 10. Contact control room and determine if valve closed. When told to remove power preference key F11. When back to normal at panel 25-32 delete override for annunciator xa553e10. When told to power back up srv 1-22 mrf ad01c IN.
	Driver	[2] **IF** 2-PCV-1-22 is NOT closed, **THEN PERFORM** the following: [2.1] On Panel 2-25-32 **PLACE** the transfer switch associated MAIN STM LINE B RELIEF VALVE XFR, 2-XS-1-22 in EMERG position . [2.2] **IF** the SRV does **NOT** close, **THEN PERFORM** the following while **OBSERVING** the indications for the 2-PCV-1-22 on the Acoustic Monitor: • **CYCLE** the MAIN STM LINE B RELIEF VALVE, 2-HS-1-22C to the following positions several times. CLOSE/AUTO to OPEN to CLOSE/AUTO [2.3] **IF** the SRV does **NOT** close, **THEN PERFORM** the following: A. **VERIFY** the MAIN STM LINE B RELIEF VALVE, 2-HS-1-22C, in the CLOSE/AUTO position. B. **PLACE** the transfer switch associated MAIN STM LINE B RELIEF VALVE XFR, 2-XS-1-22 in NORM position .
	Driver	[2.4] **IF** the SRV does **NOT** close, **THEN REMOVE** the power from 2-PCV-1-22 by performing one of the following: A. **OPEN** the following breakers (Preferred method) [2.5] **IF** the valve does **NOT** close, **THEN CLOSE** the breakers or **REINSTALL** fuses removed in Step 4.2.3[2.4].
	BOP	[2.6] **CONTINUE** at Step 4.2.4.

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

	BOP	[2.6] **CONTINUE** at Step 4.2.4.
		4.2.4 Other Actions and Documentation [1] **NOTIFY** Reactor Engineering of current conditions. [2] **IF** ANY EOI entry condition is met, **THEN ENTER** the appropriate EOI(s). [3] **REFER TO** Technical Specifications Sections 3.5.1 and 3.4.3 for Automatic Depressurization System and relief valve operability requirements. [4] **INITIATE** suppression pool cooling as necessary to maintain suppression pool temperature less than 95°F. [5] **IF** the relief valve can **NOT** be closed AND suppression pool temperature CANNOT be maintained less than or equal to 95°F, **THEN PLACE** the reactor in Mode 4 in accordance with 2-GOI-100-12A. [6] **DOCUMENT** actions taken and **INITIATE** Work Order (WO) for the valve.
	SRO	Directs Suppression Pool Cooling IAW 2-OI-74
	BOP	Initiates Pool Cooling as directed
	SRO	Refers to Tech Specs 3.5.1 ECCS - Operating LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of six safety/relief valves shall be OPERABLE. APPLICABILITY: MODE 1, MODES 2 and 3, except high pressure coolant injection (HPCI) and ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig. Condition E: One ADS valve inoperable. Required Action E.1: Restore ADS valve to OPERABLE status. Completion Time: 14 days.
	BOP/ATC	Inform SRO when Suppression Pool Level meets EOI-2 entry requirements
	SRO	Enter EOI-2 on Suppression Pool Level
	NOTE	One RHR Pump will almost maintain pool temperature depending on reactor power, Do NOT expect pool temperature to exceed 95°F.

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

	BOP	Initiates Pool Cooling as directed
		8.5 Initiation of Loop I(II) Suppression Pool Cooling **CAUTION** PSA concerns with RHR in Suppression Pool Cooling Mode with a LOCA and a LOSP identify that severe water hammer may occur during the pump restart. Therefore, the following guidelines should be used to try and maintain the system below the PSA Risk Assessment goals: • RHR in suppression pool cooling should be minimized. • Two Loops of RHR in suppression pool cooling should be minimized. • Use two pumps per loop, if needed, to minimize total time spent in suppression pool cooling. • Suppression pool cooling run times are tracked in 2-SR-2 to ensure risk assessment goals are not exceeded. **NOTES** 1) Suppression Pool Cooling is required to be initiated whenever necessary to maintain suppression pool temperature less than 95°F or when directed by other procedures. [1] **VERIFY** RHR Loop I(II) is in Standby Readiness. **REFER TO** Section 4.0 [2] **REVIEW** the precautions and limitations in Section 3.0. [3] **NOTIFY** other units of placing Loop I(II) of RHR in suppression pool cooling, the subsequent start of common equipment (i.e., RHRSW pumps) and associated alarms are to be expected.
		[4] **NOTIFY** Radiation Protection for impending action to initiate Suppression Pool Cooling. **RECORD** name and time of Radiation Protection representative notified in NOMS narrative log
		[5] **IF** possible, **THEN BEFORE** placing RHRSW in service, **NOTIFY** Chemistry that RHRSW sampling is to be initiated (RHRSW sampling requirements). [6] **VERIFY** at least one RHRSW Pump is operating on each EECW Header.
	BOP	Makes Plant announcements prior to starting RHRSW Pumps and RHR Pumps.
	NOTE	One RHR Pump will almost maintain pool temperature constant depending on reactor power, Do NOT expect pool temperature to exceed 95°F.

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

<table>
<tr><td></td><td>BOP</td><td>Initiates Pool Cooling as directed</td></tr>
<tr><td></td><td></td><td>[7] PLACE RHR Pump and Heat Exchanger A(C) in service as follows:
[7.1] START an RHRSW Pump to supply RHR Heat Exchanger A(C).

[7.2] ESTABLISH RHRSW flow by performing one the following:

[7.2.1] REQUEST another unit establish minimum flow for Pump which will be utilized for Suppression Pool Cooling, (RHRSW Pump A(C) and establish minimum flow. (between 4000 and 4500 gpm RHRSW flow) REFER TO 0-OI-23.
OR
[7.2.2] THROTTLE OPEN RHR HX 2A(2C) RHRSW OUTLET VLV, 2-FCV-23-34(40), as required for cooling (if another is maintaining minimum flow) and/or to maintain between 4000 and 4500 gpm RHRSW flow as indicated on 2-FI-23-36(42), RHR HTX 2A(2C) RHRSW FLOW. □

[7.3] VERIFY CLOSED RHR SYS I LPCI INBD INJECT VALVE, 2-FCV-74-53.</td></tr>
<tr><td></td><td></td><td>[7.4] IF NO RHR PUMP (1A OR 1C) is operating in Suppression Pool Cooling, THEN VERIFY CLOSED RHR SYS I SUPPR POOL CLG/TEST VALVE, 2-FCV-74-59.

[7.5] VERIFY CLOSED RHR SYS I SUPPR CHBR SPRAY VALVE, 2-FCV-74-58.

[7.6] VERIFY CLOSED RHR SYS I DW SPRAY OUTBD VLV, 2-FCV-74-60.

[7.7] VERIFY OPEN RHR SYS I SUPPR CHBR/POOL ISOL VLV, 2-FCV-74-57.</td></tr>
<tr><td></td><td></td><td>[7.8] IF desired to operate without the Drywell DP Compressor, THEN:</td></tr>
<tr><td></td><td></td><td>[7.9] START RHR PUMP A(C) using 2-HS-74-5A(16A).

[7.10] THROTTLE RHR SYS I SUPPR POOL CLG/TEST VLV, 2-FCV-74-59, to maintain RHR flow within limits, as indicated on RHR SYS I CTMT SPRAY FLOW, 2-FI-74-56:

<table>
<tr><th>RHR Pumps in Operation</th><th>1</th><th>2</th></tr>
<tr><td>Loop Flow</td><td>7,000 to 10,000 gpm & Blue light illuminated</td><td><13,000 gpm & Blue light illuminated</td></tr>
</table>
</td></tr>
</table>

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

	BOP	Initiates Pool Cooling as directed
		[7.11] **IF** desired to raise Suppression Pool Cooling flow and only one Loop I pump is in service, **THEN PLACE** the second Loop I RHR Pump and Heat Exchanger in service by **REPERFORMING** Step 8.5[7] for the second pump. [8] **CHECK** pump motor breaker charging spring recharged for all 4160 Volt pump motors operated in this section, as follows: • Amber breaker spring charged light on, • Closing spring target indicates charged.
		[10] **PLACE** RHR Pump and Heat Exchanger B(D) in service as follows: [10.2] **ESTABLISH** RHRSW flow by one of the following methods: [10.2.1] **REQUEST** another unit establish minimum flow for Pump which will be utilized for Suppression Pool Cooling, and establish minimum flow. (between 4000 and 4500 gpm RHRSW flow) REFER TO 0-OI-23. **OR** [10.2.2] **THROTTLE OPEN** RHR HX 2B(2D) RHRSW OUTLET VLV, 2-FCV-23-46(52), as required for cooling (if another is maintaining minimum flow) and/or to maintain between 4000 and 4500 gpm RHRSW flow as indicated on 2-FI-23-48(54), RHR HX 2B(2D) RHRSW FLOW.
		[10.3] **VERIFY CLOSED** RHR SYS II LPCI INBD INJECT VALVE, 2-FCV-74-67. [10.4] **IF NO** RHR PUMP (1B or 1D) is operating in Suppression Pool Cooling, **THEN VERIFY CLOSED** RHR SYS II SUPPR POOL CLG/TEST VLV, 2-FCV-74-73. [10.5] **VERIFY CLOSED** RHR SYS II SUPPR CHBR SPRAY VALVE, 2-FCV-74-72. [10.6] **VERIFY CLOSED** RHR SYS II DW SPRAY OUTBD VLV, 2-FCV-74-74. [10.7] **VERIFY OPEN** RHR SYS II SUPPR CHBR/POOL ISOL VLV, 2-FCV-74-71.
	Driver	For Pump motor breaker amber spring charge light ON and closing spring target indicates charged.

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

<table>
<tr><td></td><td>BOP</td><td>Initiates Pool Cooling as directed</td></tr>
<tr><td></td><td></td><td>[10.8] IF desired to operate without the Drywell DP Compressor, THEN:</td></tr>
<tr><td></td><td></td><td>[10.9] START RHR PUMP 2B(2D) using 2-HS-74-28A(39A).

[10.10] THROTTLE RHR SYS II SUPPR POOL CLG/TEST VLV, 2-FCV-74-73, to maintain RHR flow within limits, as indicated on RHR SYS II CTMT FLOW, 2-FI-74-70.

<table>
<tr><td>RHR Pumps in Operation</td><td>1</td><td>2</td></tr>
<tr><td>Loop Flow</td><td>7,000 to 10,000 gpm & Blue light illuminated</td><td><13,000 gpm & Blue light illuminated</td></tr>
</table></td></tr>
<tr><td></td><td></td><td>[11] IF desired to RAISE Suppression Pool Cooling flow and only one Loop II pump is in service, THEN PLACE the second Loop II RHR Pump AND Heat Exchanger in service. REPERFORM Step 8.5[10] for the second pump.

[12] CHECK pump motor breaker charging spring recharged for all 4160 Volt pump motors operated in this section, as follows:
• Amber breaker spring charged light on,
• Closing spring target indicates charged.</td></tr>
<tr><td></td><td>SRO</td><td>Tech Spec

3.6.2.2 Suppression Pool Water Level
LCO 3.6.2.2 Suppression pool water level shall be ≥ -6.25 inches with and -7.25 inches without differential pressure control and ≤ -1.0 inches.

APPLICABILITY: MODES 1, 2, and 3.

Condition A: Suppression pool water level not within limits.
Required Action A.1: Restore suppression pool water level to within limits.
Completion Time: 2 hours.</td></tr>
<tr><td></td><td>Note</td><td>AS the SRV remains open adding inventory to suppression pool, pool level spec will be appropriate.</td></tr>
</table>

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

	SRO	Enter EOI-2 on Suppression Pool Level
	SRO	**PC/H** Verify H2O2 analyzer in service (APP 19) When H2 is detected in PC (2.4% on control room indicators continue, does not continue
		SP/T **MONITOR** and **CONTROL** suppr pl temp below 95°F using available suppr pl cooling (APPX 17A), Pool Temp below 95° WHEN suppr pl temp CANNOT be maintained below 95°F, does not continue **PC/P** Monitor and control PC pressure below 2.4 psig using the Vent System (AOI-64-1), PC pressure above 2.4 psig unable to vent When PC pressure CANNOT be maintained below 2.4 psig, does not continue **DW/T** Monitor and control Drywell temperature below 160F using available Drywell cooling Can Drywell Temperature be maintained below 160F, YES
		SP/L **MONITOR** and **CONTROL** suppr pl lvl between -1 in. and -6 in. (APPX 18) Can suppr pl lvl be maintained above -6 in., YES Can suppr pl lvl be maintained below -1 in., YES
	SRO	Direct Appendix 18, Suppression Pool Water Inventory Removal And Makeup
	BOP	Calls for Operator to perform field action of Appendix 18

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

	BOP	Calls for Operator to perform field action of Appendix 18
		3. IF Directed by SRO, THEN **REMOVE** water from Suppression Pool as follows: a. **DISPATCH** personnel to perform the following (Unit 2 RB, El 519 ft, Torus Area): 1) **VERIFY OPEN** 2-SHV-074-0786A(B), RHR DR PUMP 2A(2B) DISCH TO MN CNDR/RW SOV. 2) **OPEN** the following valves: • 2-SHV-074-0564A(B), RHR DR PMP 2A(2B) SEAL WATER SUPPLY SOV • 2-SHV-074-0529A(B), RHR DRAIN PUMP A(B) SHUTOFF VLV. 3) **UNLOCK** and **OPEN** 2-SHV-074-0765A(B), RHR DR PUMP 2A(2B) DISCH SOV. 4) **NOTIFY** Unit Operator that RHR Drain Pump 2A(2B) is lined up to remove water from Suppression Pool. 5) **REMAIN** at torus area UNTIL Unit 2 Operator directs starting of RHR Drain Pump 2A(2B).
		b. IF Main Condenser is desired drain path, THEN **OPEN** 2-FCV-74-62, RHR MAIN CNDR FLUSH VALVE. c. IF Radwaste is desired drain path, THEN **PERFORM** the following: 1) **ESTABLISH** communications with Radwaste. 2) **OPEN** 2-FCV-74-63, RHR RADWASTE SYS FLUSH VALVE d. **NOTIFY** personnel in Unit 2 RB, El 519 ft, Torus Area to start RHR Drain Pump 2A(2B). e. **THROTTLE** 2-FCV-74-108, RHR DR PUMP 2A/B DISCH HDR VALVE, as necessary.
	Driver	When dispatched to remove water from the suppression pool, wait 10 minutes and call and report aligned step 4 above, when the operator calls you back to start the RHR Drain Pump Shift F6 for bat app18rhra and Shift F7 for bat app18rhrb

Simulator Event Guide:

Event 4 Component: ADS SRV 1-22 leaking

	BOP	Appendix 18
		4. WHEN Suppression Pool level reaches -5.5 in., THEN **SECURE** RHR Drain System as follows: a. **DISPATCH** personnel to **STOP** the Drain System as follows (Unit 2 RB, El 519 ft, Torus Area): 1) **STOP** RHR Drain Pump 2A(2B). 2) **CLOSE** the following valves: • 2-SHV-074-0564A(B), RHR DR PMP 2A(2B) SEAL WATER SUPPLY SOV • 2-SHV-074-0529A(B), RHR DRAIN PUMP A(B) SHUTOFF VLV. 3) **CLOSE** and **LOCK** 2-SHV-074-0765A(B), RHR DR PUMP 2A(2B) DISCH SOV.
		b. **CLOSE** 2-FCV-74-108, RHR DR PUMP 2A/B DISCH HDR VALVE.
		c. **VERIFY CLOSED** 2-FCV-74-62, RHR MAIN CNDR FLUSH VALVE.
		d. **VERIFY CLOSED** 2-FCV-74-63, RHR RADWASTE SYS FLUSH VALVE.
	Driver	When directed by NRC for VFD Cooling Pump trip, Preference Key F6

NRC Scenario 5

Simulator Event Guide:

Event 5 Component: VFD Cooling Water Pump 2A trip

	Driver	When directed by NRC for VFD Cooling Pump trip, Preference Key F6
	ATC	Respond to the following alarms, 4A-12, 4A-28 and 4A-32
	ATC	Report Trip of Recirc Drive 2A Cooling Pump 2A1, and failure of standby pump to start
		Alarm 4A-12, RECIRC DRIVE 2A COOLANT FLOW LOW Automatic Action Standby RECIRC DRIVE cooling water pump will auto start. A. **VERIFY** RECIRC DRIVE cooling water pump running. B. **DISPATCH** personnel to the RECIRC DRIVE to check the operation of the Recirc Drive cooling water system.
		Alarm 4A-28, RECIRC DRIVE 2A PROCESS ALARM A. **IF** 2-XA-55-4B Window 28 is also in alarm, **THEN (N/A)** B. Refer to ICS screen "VFDAAL" and determine cause of alarm
		Alarm 4A-32, RECIRC DRIVE 2A DRIVE ALARM A. **REFER TO** ICS Group Display "GD @VFDADA" and DETERMINE cause of alarm. B. **IF** a problem with the cooling water system is indicated, **THEN VERIFY** proper operation of cooling water system.
	ATC	Start Standby Recirc Drive 2A Cooling Pump 2A2, dispatches personnel to investigate
	Driver	Wait 4 minutes after dispatched, **THEN** report tripped VFD Pump 2A1 is "hot to the touch", internal bkr closed, 480 volt bkr tripped (480 V SD BD 2A 5C). When directed by NRC initiate RR Pump 2A Seal Failure Preference Key F8

NRC Scenario 5

Simulator Event Guide:

Event 6 Component: LOCA - Recirculation Pump 2A Inboard and Outboard seal failure

	Driver	When directed by NRC initiate RR Pump 2A Seal Failure Preference Key F8
	ATC	Respond to alarm 4A-25, RECIRC PUMP A NO. 1 SEAL LEAKAGE ABN A. **DETERMINE** initiating cause by comparing No. 1 and 2 seal cavity pressure indicators on Panel 2-9-4 or ICS. • Plugging of No. 1 RO - No. 2 seal cavity pressure indicator drops toward zero. • 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. • Failure of No. 2 seal - no. 2 seal pressure is less than 50% of the No. 1 seal. B. **RECORD** pump seal parameters hourly on Attachment 1,
	ATC	Report of failure of number 1 seal or inner seal
		Respond to alarm 4A-18, RECIRC PUMP A N0.2 SEAL LEAKAGE HIGH A. **COMPARE** No. 2 cavity pressure indicator (2-PI-68-63A) to No. 1 cavity pressure indicator (2-PI-68-64A). No. 2 seal degradation is indicated if the pressure at No. 2 seal is less than 50% of the pressure at No. 1 seal.
	ATC	Reports the second seal is failed both pressure indicators trending toward zero psig.
		C. **IF** dual seal failure is indicated, **THEN** 1. **SHUTDOWN** Recirc Pump 2A by depressing RECIRC DRIVE 2A SHUTDOWN, 2-HS-96-19. 2. **VERIFY TRIPPED**, RECIRC DRIVE 2A NORMAL FEEDER, 2-HS-57-17. 3. **VERIFY TRIPPED**, RECIRC DRIVE 2A ALTERNATE FEEDER, 2-HS-57-15. 4. **CLOSE** Recirculation Pump 2A suction valve. 5. **CLOSE** Recirculation Pump 2A discharge valve. 6. **REFER TO** 2-AOI-68-1A or 2-AOI-68-1B AND 2-OI-68. 7. **DISPATCH** personnel to secure Recirculation Pump 2A seal water.
	ATC	Trips RR Pump 2A and closes suction and discharge valves Reports rising Drywell Pressure, reports DW Pressure stable once valves are closed
	SRO	Enters 2-AOI-68-1A, Recirc Pump Trip/Core Flow Decrease OPRMs Operable

Simulator Event Guide:

Event 6 Component: LOCA - Recirculation Pump 2A Inboard and Outboard seal failure

	SRO	Enters 2-AOI-68-1A, Recirc Pump Trip/Core Flow Decrease OPRMs Operable Identifies a trigger value as to when to insert a Reactor SCRAM on Drywell Pressure if Drywell Pressure continues to rise.
		4.2 Subsequent Actions [1] **IF** both Recirc Pumps are tripped in modes 1 or 2, **THEN** (N/A), [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 IMMEDIATELY** take actions to INSERT control rods to less than 95.2% loadline. Refer to 0-TI-464, Reactivity Control Plan Development and Implementation. [4] **RAISE** core flow to greater than 45%. **REFER TO** 2-OI-68. [5] **INSERT** control rods to exit regions if not already exited. Refer to 0-TI-464, Reactivity Control Plan Development and Implementation.
		[6] **MAINTAIN** operating Recirc pump flow less than 46,600 gpm. Refer to 2-OI-68. [7] **WHEN** plant conditions allow, **THEN, MAINTAIN** operating jet pump loop flow greater than 41 x 106 lbm/hr (2-FI-68-46 or 2-FI-68-48).
	SRO	Direct inserting control rods IAW Urgent Load Reduction and Rod Shove Sheets
	ATC	Inserts Control Rods to Exit Region II of the Power to Flow Map
	Driver	When dispatched to isolate seal water wait 5 minutes and then mrf rd03 close and report closed

Simulator Event Guide:

Event 6 Component: LOCA - Recirculation Pump 2A Inboard and Outboard seal failure

	ATC	Inserts Control Rods to Exit Region II of the Power to Flow Map
		Inserts all of the following Control Rods to lower rod line to < 95%: Control Rods 22-31, 30-39, 38-31, 30-23 from 08 to 00 Control Rods 22-39, 38-39, 38-23, 22-23 from 16 to 00 Control Rod 30-31 from 22 to 00 Control Rods 14-31, 30-47, 46-31, 30-15 from 48 to 00
	ATC	Raise Speed of RR Pump B until core flow is 46 to 50% and ensure RR Pump B drive flow is below 46,600 gpm
		Report Exit from Region II of Power to Flow Map
	SRO	Tech Spec 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; APPLICABILITY: MODES 1 and 2. Condition A: Requirements of the LCO not met. Required Action A.1: Satisfy the requirements of the LCO. Completion Time: 24 hours.
	Driver	When directed by NRC, Preference Key F9, Level Instruments Fail high. When mode switch is out of run or NOT in run Preference Key F10

NRC Scenario 5

Simulator Event Guide:

Event 7 Major: Loss of Feedwater and HPCI

	ATC	Report Trip of Main Turbine and RFPTs and Reactor Scram
	ATC	**4.1 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), Step is NA [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) Step is NA [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 Level and trend (recovering or lowering). • Reactor pressure and trend • MSIV position (Open or Closed) • Power level
		[1] **ANNOUNCE** Reactor SCRAM over PA system. [3] **DRIVE** in all IRMs and SRMs from Panel 2-9-5 as time and conditions permit. [3.1] **DOWNRANGE** IRMs as necessary to follow power as it lowers. [5] **MONITOR** and **CONTROL** Reactor Water Level between +2" and +51", or as directed by US, as follows:
	ATC/BOP	Open RCIC Steam Supply Valve to start RCIC for Level Control, RCIC has received an Auto Start signal but the Steam Supply Valve failed to Open.
	Driver	When mode switch is in out of run Preference Key F10

NRC Scenario 5

Simulator Event Guide:

Event 7 Major: Loss of Feedwater and HPCI

	SRO	Enters EOI-1 on RPV Water Level
	SRO	EOI-1 (Reactor Pressure)
		Monitor and Control Reactor Pressure
		IF Drywell Pressure Above 2.4 psig? – NO
		IF Emergency Depressurization is Anticipated and the Reactor will remain subcritical without boron under all conditions, **THEN** Rapidly depressurize the RPV with the Main Turbine Bypass Valves irrespective of cooldown rate? - NO
		IF Emergency Depressurization is or has been required THEN exit RC/P and enter C2 Emergency Depressurization? - NO
		IF RPV water level cannot be determined? - NO
		Is any MSRV Cycling? – No
		IF Steam cooling is required? - NO
		IF Suppression Pool level and temperature cannot be maintained in the safe area of Curve 3?- NO
		IF Suppression Pool level cannot be maintained in the safe area of Curve 4? - NO
		IF Drywell Control air becomes unavailable? - NO
		IF Boron injection is required? - NO
		Stabilize RPV pressure below 1073 psig with the main turbine bypass valves (APPX 8B)
	SRO	Direct a pressure band, may direct a cooldown IAW **Appendix 8B**
	ATC/BOP	Maintain directed pressure with Bypass Valves IAW **Appendix 8B**, Reopening MSIVs / Bypass Valve Operation

Simulator Event Guide:

Event 7 Major: Loss of Feedwater and HPCI

	ATC/BOP	Maintain directed pressure with Bypass Valves IAW **Appendix 8B**, Reopening MSIVs / Bypass Valve Operation
		1. IF pressure control with bypass valves is desired and MSIVs are open, THEN proceed to step 10. 10. Verify Condenser Vacuum is greater than 7" 11. IF manual opening of Bypass Valves is desired, THEN perform the following step: a. Depress the Bypass Valve Opening Jack Raise Pushbutton, 2-HS-47-130B to slowly open the Bypass Valves. b. Adjust BPV Positio0n as necessary by using the raise, 2-HS-47-130B and Lower 2-HS-47-130A pushbuttons to maintain desired cooldown rate. 12. IF EHC Auto Cooldown is desired, THEN perform the following steps: a. Verify EHC is in Pressure Control using 2-HS-47-204 b. Verify Bypass Valve Demand is set at ZERO c. On the EHC Work Station on Panel 2-9-7: 1) Select Main Menu from the toolbar at bottom of the screen. 2) Select Log In on Display Screen and Enter OPS for name and OPS for password. 3) Select Auto Cooldown from list of function on the screen. d. On the Auto Cooldown Display Screen 1) Check the following are displayed. • Turbine Tripped or All Valves Closed – indicates reset • RX Press Ctrl – indicates reset 2) Select the block above the FINAL PRESSURE TARGET 3) Enter the desired pressure using the display screen or keyboard 4) Select OK 5) Depress the START button 6) When Are You Sure You Want to Initiate Auto Cooldown? appears, Select YES 7) Check the following: • EHC PRESSURE SETPOINT, 2-PI-47-162, is lowering • EHC AUTO COOLDOWN displays IN PROCESS

Simulator Event Guide:

Event 7 Major: Loss of Feedwater and HPCI

	SRO	EOI-1 (Reactor Level)
		Monitor and Control Reactor Water Level. Directs Verification of PCIS isolations.
	ATC/BOP	Verifies PCIS isolations.
	SRO	IF It has NOT been determined that the reactor will remain subcritical without boron under all condition THEN EXIT RC/L - NO
		RPV water level CANNOT be determined – NO
		PC water level CANNOT be maintained below 105 feet - NO
		Restore and Maintain RPV water level between +2 inches and +51 inches with RCIC **(APPX 5C)**
	ATC/BOP	RCIC failed to auto start, Opens RCIC Steam Supply Valve and verifies RCIC operation.
		1. **VERIFY** 2-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller in AUTO with setpoint at 600 gpm.
		7. **OPEN** 2-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV, to start RCIC Turbine.
		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 600 gpm. c. 2-FCV-71-40, RCIC Testable Check Vlv, opens by observing 2-ZI-71-40A, DISC POSITION, red light illuminated. d. 2-FCV-71-34, RCIC PUMP MIN FLOW VALVE, closes as flow rises above 120 gpm.

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	ATC/BOP	Report rising Drywell Pressure and Temperature
	ATC/BOP	Report loss of 480V SD BD 2A and 480V RMOV BD 2A
	ATC/BOP	Dispatch personnel to investigate loss of Board
	SRO	Re-Enter EOI-2 on High DW Pressure and Temperature
	ATC/BOP	IF RHR Loop 1 was in Pool Cooling for leaking SRV, then operators report that RHR Loop 1 remains in Pool cooling.
	NOTE	RHR Loop 1 has lost power to almost all valves but NO valves reposition on board loss. There is no throttle path for RHR Loop 1 and NO discharge path to RPV for Core Spray Loop 1
	SRO	**EOI-2 on High Drywell Pressure** **DW/T** Monitor and control Drywell temperature below 160F using available Drywell cooling Can Drywell Temperature be maintained below 160F, NO Operate all available drywell cooling Before Drywell Temperature rises to 200F enter EOI-1 and Scram Reactor, Completed Before Drywell Temperature rises to 280F continue Is Suppression Pool Level below 19 Feet, YES Is Drywell Temperatures and Pressures within the safe area of curve 5, YES Directs Shutdown of Recirc Pumps and Drywell Blowers Initiate DW Sprays using only those pumps NOT required to assure adequate core cooling by continuous injection **(App 17B)**
	Driver	When dispatched for Board loss, wait 4 minutes and report overcurrent trip of supply breaker on 480V SD BD 2A. If requested to energize 480V RMOV BD 2A from alternate supply, wait 3 minutes and report that unable to restore power to Board

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	SRO	**Enters EOI-2 on High Drywell Pressure** **PC/P** Monitor and control PC pressure below 2.4 psig using the Vent System (AOI-64-1), PC pressure above 2.4 psig unable to vent When PC pressure CANNOT be maintained below 2.4 psig, Continues Before suppression chamber pressure rises to 12 psig continue, Continues Initiate suppression chamber sprays using only those pumps NOT required to assure adequate core cooling by continuous injection (App 17C), Direct Appendix 17C When suppression chamber pressure exceeds 12 psig, Continues Is Suppression Pool Level below 19 Feet, YES Is Drywell Temperatures and Pressures within the safe area of curve 5, YES Directs Shutdown of Recirc Pumps and Drywell Blowers Initiate DW Sprays using only those pumps NOT required to assure adequate core cooling by continuous injection **(App 17B)** When Suppression chamber pressure CANNOT be maintained in the safe area of Curve 5 Continue, Does not continue
	SRO	**Enters EOI-2 on High Drywell Pressure** **PC/H** Verify H2O2 analyzer in service **(APP 19)** When H2 is detected in PC (2.4% on control room indicators continue, does not continue

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	SRO	**Enters EOI-2 on High Drywell Pressure** **SP/T** **MONITOR** and **CONTROL** suppr pl temp below 95°F using available suppr pl cooling **(APPX 17A),** Pool Temp below 95° WHEN suppr pl temp CANNOT be maintained below 95°F, does not continue **Enters EOI-2 on High Drywell Pressure** **SP/L** **MONITOR** and **CONTROL** suppr pl lvl between -1 in. and -6 in. **(APPX 18)** Can suppr pl lvl be maintained above -6 in., YES Can suppr pl lvl be maintained below -1 in., YES
	SRO	Direct Suppression Chamber Sprays and Drywell Sprays on RHR Loop II ONLY

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	ATC/BOP	**2-EOI APPENDIX-17C**, RHR System Operation Suppression Chamber Sprays
		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 auto open signal as necessary by **PLACING** 2-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. 4. IF Directed by SRO to spray the Suppression Chamber using Fire Protection, THEN **CONTINUE** in this procedure at Step 8.
		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 2-XS-74-130, RHR SYS II LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE. c. **MOMENTARILY PLACE** 2-XS-74-129, RHR SYS II CTMT SPRAY/CLG VLV SELECT, switch in SELECT. d. IF 2-FCV-74-67, RHR SYS II INBD INJECT VALVE, is OPEN, THEN **VERIFY CLOSED** 2-FCV-74-66, RHR SYS II OUTBD INJECT VALVE. e. **VERIFY OPERATING** the desired RHR System II pump(s) for Suppression Chamber Spray. f. **VERIFY OPEN** 2-FCV-74-71, RHR SYS II SUPPR CHBR/POOL ISOL VLV. g. **OPEN** 2-FCV-74-72, RHR SYS II SUPPR CHBR SPRAY VALVE.
	ATC/BOP	Aligns RHR Loop II Pumps in Suppression Chamber Sprays

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	ATC/BOP	**2-EOI APPENDIX-17C**, RHR System Operation Suppression Chamber Sprays
		h. IF RHR System II is operating ONLY in Suppression Chamber Spray mode, THEN **CONTINUE** in this procedure at Step 5.k. i. **VERIFY CLOSED** 2-FCV-74-30, RHR SYSTEM II MIN FLOW VALVE. j. **RAISE** system flow by placing the second RHR System II pump in service as necessary. 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: • 2-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV • 2-FCV-23-52, RHR HX 3D RHRSW OUTLET VLV. n. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers.
	ATC/BOP	Aligns RHR Loop II Pumps in Suppression Chamber Sprays

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	ATC/BOP	**2-EOI APPENDIX-17B**, RHR System Operation Drywell Sprays
		1. BEFORE Drywell pressure drops below 0 psig, **CONTINUE** in this procedure at Step 7. 2. IF Adequate core cooling is assured, **OR** Directed to spray the Drywell irrespective of adequate core cooling, THEN **BYPASS** LPCI injection valve auto open signal as necessary by **PLACING** 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS**. 3. **VERIFY** Recirc Pumps and Drywell Blowers shutdown. 4. IF Directed by SRO to spray the Drywell using Standby Coolant supply, THEN **CONTINUE** in this procedure at Step 8. 5. IF Directed by SRO to spray the Drywell using Fire Protection, THEN **CONTINUE** in this procedure at Step 9.
		6. **INITIATE** Drywell 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 2-XS-74-130, RHR SYS II LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE. c. **MOMENTARILY PLACE** 2-XS-74-129, RHR SYS II CTMT SPRAY/CLG VLV SELECT, switch in SELECT. d. IF 2-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE, is OPEN, THEN **VERIFY CLOSED** 2-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE. e. **VERIFY OPERATING** the desired System II RHR pump(s) for Drywell Spray. f. **OPEN** the following valves: • 2-FCV-74-74, RHR SYS II DW SPRAY OUTBD VLV • 2-FCV-74-75, RHR SYS II DW SPRAY INBD VLV.
	ATC/BOP	Aligns RHR Loop II Pumps in Drywell Sprays

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	ATC/BOP	**2-EOI APPENDIX-17B**, RHR System Operation Drywell Sprays
		g. **VERIFY CLOSED** 2-FCV-74-30, RHR SYSTEM II MIN FLOW VALVE. h. IF Additional Drywell Spray flow is necessary, THEN **PLACE** the second System II RHR Pump in service. i. **MONITOR** RHR Pump NPSH using Attachment 2. j. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger(s). k. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1350 and 4500 gpm RHRSW flow: • 2-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV • 2-FCV-23-52, RHR HX 3D RHRSW OUTLET VLV. l. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers. 7. WHEN EITHER of the following exists: • Before drywell pressure drops below 0 psig, **OR** • Directed by SRO to stop Drywell Sprays, THEN **STOP** Drywell Sprays as follows: a. **VERIFY CLOSED** the following valves: • 2-FCV-74-100, RHR SYS I U-2 DISCH XTIE • 2-FCV-74-74, RHR SYS II DW SPRAY OUTBD VLV • 2-FCV-74-75, RHR SYS II DW SPRAY INBD VLV. b. **VERIFY OPEN** 2-FCV-74-30, RHR SYSTEM II MIN FLOW VALVE. c. IF RHR operation is desired in ANY other mode, THEN **EXIT** this EOI Appendix. d. **STOP** RHR Pumps.
	ATC/BOP	Aligns RHR Loop II Pumps in Drywell Sprays

NRC Scenario 5

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	ATC/BOP	Report lowering RPV water level unable to maintain with RCIC
	SRO	EOI-1 – Reactor Level RPV water level drops below -120 inches OR The ADS timer has initiated – NO IF RPV water level CANNOT be restored and maintained between +2 and +51 inches, THEN Restore and maintain RPV water level above -162 inches Augment RPV water level control as necessary with any of the following
	SRO	Directs additional level control systems: SLC (boron tank) **APPX-7B** CRD **APPX-5B**
	ATC/BOP	Place SLC and an additional CRD Pump in service IAW **Appendix 7B and 5B**
	SRO	EOI-1 – Reactor Level Can RPV water level be restored and maintained above -162 inches - NO
	SRO	Announces entry to EOI-C-1 Alternate Level Control
		RPV water level CANNOT be determined – NO
		PC water level CANNOT be maintained below 105 feet - NO
		IF RPV water level can be restored and maintained above -162 inches - NO
		Inhibit ADS
	ATC/BOP	Inhibits ADS
	SRO	Restore and maintain RPV water level above -162 inches using any of the following: **Condensate APPX 6A** **LPCI System I APPX 6B** **LPCI System II APPX 6C** **Core Spray System II APPX 6E**
	SRO	Directs 2 or more of the above systems lined up for injection
	ATC/BOP	Aligns the directed systems for Injection

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	ATC/BOP	Aligns CRD and SLC IAW **Appendix 5B and 7B**
	ATC	CRD **Appendix 5B**
		2. IF BOTH of the following exist: • 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: a. IF CRD Pump 2A is available, THEN **VERIFY RUNNING** CRD Pump 2A. b. IF CRD Pump 1B is available, THEN **PERFORM** the following: 1) **NOTIFY** Unit 1 Operator to verify closed 1-FCV-85-8, CRD PUMP B DISCHARGE VALVE (Unit 1, Panel 9-5). 2) **START** CRD Pump 1B. 3) **OPEN** 2-FCV-85-8, CRD PUMP 1B DISCH TO U2.
		c. **OPEN** the following valves to increase CRD flow to the RPV: • 2-PCV-85-23, CRD DRIVE WATER PRESS CONTROL VLV • 2-PCV-85-27, CRD CLG WATER PRESS CONTROL VLV • 2-FCV-85-50, CRD EXH RTN LINE SHUTOFF VALVE.
		d. **ADJUST** 2-FIC-85-11, CRD SYSTEM FLOW CONTROL, on Panel 9-5 to control injection WHILE maintaining 2-PI-85-13A, CRD ACCUM CHG WTR HDR PRESS, above 1450 psig, if possible.
		e. IF Additional flow is necessary to prevent or mitigate core damage, THEN **DISPATCH** personnel to fully open the following valves as required: • 2-THV-085-0527, PUMP DISCH THROTTLING (RB NE, el 565') • 2-BYV-085-0551, PUMP TEST BYPASS (RB NE, el 565').
	Driver	When called as unit one operator FCV-85-8, CRD PUMP B DISCHARGE VALVE is closed

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	ATC/BOP	Aligns CRD and SLC IAW Appendix 5B and 7B
	ATC	SLC **Appendix 7B**
		2. IF RPV injection is needed immediately ONLY to prevent or mitigate fuel damage, THEN **CONTINUE** at Step 10 to inject SLC Boron Tank to RPV.
		10. **UNLOCK** and **PLACE** 2-HS-63-6A, SLC PUMP 2A/2B, 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 (2-XA-55-5B, Window 20). • 2-PI-63-7A, SLC PUMP DISCH PRESS, indicates above RPV pressure. • System flow, as indicated by 2-IL-63-11, SLC FLOW, red light illuminated, • SLC INJECTION FLOW TO REACTOR Annunciator in alarm (2-XA-55-5B, Window 14). 12. IF Proper system operation CANNOT be verified, THEN **RETURN** to Step 10 and **START** other SLC pump.

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	ATC	Aligns Condensate IAW **Appendix 6A**
	ATC ATC/BOP	1. **VERIFY CLOSED** the following feedwater heater return valves: • 2-FCV-3-71, HP HTR 2A1 LONG CYCLE TO CNDR • 2-FCV-3-72, HP HTR 2B1 LONG CYCLE TO CNDR • 2-FCV-3-73, HP HTR 2C1 LONG CYCLE TO CNDR. 2. **VERIFY CLOSED** the following RFP discharge valves: • 2-FCV-3-19, RFP 2A DISCHARGE VALVE • 2-FCV-3-12, RFP 2B DISCHARGE VALVE • 2-FCV-3-5, RFP 2C DISCHARGE VALVE. Close RFPT Discharge Valve to prevent from overfilling RPV
		3. **VERIFY OPEN** the following drain cooler inlet valves: • 2-FCV-2-72, DRAIN COOLER 2A5 CNDS INLET ISOL VLV • 2-FCV-2-84, DRAIN COOLER 2B5 CNDS INLET ISOL VLV • 2-FCV-2-96, DRAIN COOLER 2C5 CNDS INLET ISOL VLV. 4. **VERIFY OPEN** the following heater outlet valves: • 2-FCV-2-124, LP HEATER 2A3 CNDS OUTL ISOL VLV • 2-FCV-2-125, LP HEATER 2B3 CNDS OUTL ISOL VLV • 2-FCV-2-126, LP HEATER 2C3 CNDS OUTL ISOL VLV.
		5. **VERIFY OPEN** the following heater isolation valves: • 2-FCV-3-38, HP HTR 2A2 FW INLET ISOL VLV • 2-FCV-3-31, HP HTR 2B2 FW INLET ISOL VLV • 2-FCV-3-24, HP HTR 2C2 FW INLET ISOL VLV • 2-FCV-3-75, HP HTR 2A1 FW OUTLET ISOL VLV • 2-FCV-3-76, HP HTR 2B1 FW OUTLET ISOL VLV • 2-FCV-3-77, HP HTR 2C1 FW OUTLET ISOL VLV.
		6. **VERIFY OPEN** the following RFP suction valves: • 2-FCV-2-83, RFP 2A SUCTION VALVE • 2-FCV-2-95, RFP 2B SUCTION VALVE • 2-FCV-2-108, RFP 2C SUCTION VALVE.
		7. **VERIFY** at least one condensate pump running.
		8. **VERIFY** at least one condensate booster pump running.
		9. **ADJUST** 2-LIC-3-53, RFW START-UP LEVEL CONTROL, to control injection (Panel 2-9-5). 10. **VERIFY** RFW flow to RPV.

NRC Scenario 5

Simulator Event Guide:

Event 8 Component: Loss 480V SD BD 2A and LOCA

	SRO	EOI-C-1 Alternate Level Control
	SRO	Can 2 or more Condensate, LPCI or Core Spray injection subsystems be lined up - YES
		When RPV Water level drops to -162 inches – Proceeds at TAF or -162 inches
		Is any Condensate, LPCI or Core Spray injection subsystems 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 inches CONTINUE - Continues
		Emergency Depressurization is required
		Inject into the RPV with any available sources
	SRO	Enters EOI-C-2 Emergency Depressurization
		Will the reactor remain subcritical without boron under all conditions – YES
		Is DW pressure above 2.4 psig – YES
		Prevent injection from only those Core Spray and LPCI pumps not required – NO
		Is suppression pool level above 5.5 feet – YES
		Open all ADS Valves – Directs ADS valves open
	ATC/BOP	Opens all 6 ADS valves, reports all ADS valves open
	SRO	When pressure is below the shutoff head of the available injection systems direct injection to restore level to +2 to +51 inches
	ATC/BOP	Injects with available systems to restore level
	ATC/BOP	LPCI injection is maintained, once RPV level is rising RHR Loop 1 Pumps are secured since simultaneous torus cooling and LPCI Injection is not allowed.
	SRO	Emergency Classification EPIP-1 1.1-S1 Reactor water level can NOT be maintained above -162 inches. (TAF)

Simulator Event Guide:

Event 9 Component: RHR and Core Spray Division Injection Valves will not Auto open

	BOP	Aligns injection systems LPCI Loop I and II if directed and Core Spray Loop I, IAW Appendix 6B, 6C and 6E
	NOTE	Although most valve power is lost for RHR Loop I, injection is still available, the pumps have power, the Outboard Injection Valve does not have power but is normally open and the only valve with power is the Inboard Injection Valve which can be opened. If RHR Loop I is used the only to control injection is to turn pumps on and off. In addition if it was aligned for Pool Cooling those valves will still be open, so the injection pressure to the vessel will be much lower.
	BOP	**Appendix 6B**
		1. IF Adequate core cooling is assured, **AND** It becomes necessary to bypass the LPCI injection valve auto open signal to control injection, THEN**PLACE** 2-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS.**
		2. **VERIFY OPEN** 2-FCV-74-1, RHR PUMP 2A SUPPR POOL SUCT VLV.
		3. **VERIFY OPEN** 2-FCV-74-12, RHR PUMP 2C SUPPR POOL SUCT VLV.
		4. **VERIFY CLOSED** the following valves: • 2-FCV-74-61, RHR SYS I DW SPRAY INBD VLV • 2-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV • 2-FCV-74-57, RHR SYS I SUPPR CHBR/POOL ISOL VLV • 2-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE • 2-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV
		5. **VERIFY** RHR Pump 2A and/or 2C running.
		6. WHEN RPV pressure is below 450 psig, THEN **VERIFY OPEN** 2-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE.
		7. IF RPV pressure is below 230 psig, THEN **VERIFY CLOSED** 2-FCV-68-79, RECIRC PUMP 2B DISCHARGE VALVE.
		8. **THROTTLE** 2-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, as necessary to control injection.
	BOP	Can inject but cannot throttle 2-FCV-74-52 and will have to open 2-FCV-74-53 with the handswitch

Simulator Event Guide:

Event 9 Component: RHR and Core Spray Division Injection Valves will not Auto open

	BOP	Aligns injection systems LPCI Loop I and II if directed and Core Spray Loop I, IAW Appendix 6B, 6C and 6E
	BOP	**Appendix 6C**
		1. IF Adequate core cooling is assured, **AND** It becomes necessary to bypass the LPCI injection valve auto open signal to control injection, THEN**PLACE** 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.**
		2. **VERIFY OPEN** 2-FCV-74-24, RHR PUMP 2B SUPPR POOL SUCT VLV.
		3. **VERIFY OPEN** 2-FCV-74-35, RHR PUMP 2D SUPPR POOL SUCT VLV.
		4. **VERIFY CLOSED** the following valves: • 2-FCV-74-75, RHR SYS II DW SPRAY INBD VLV • 2-FCV-74-74, RHR SYS II DW SPRAY OUTBD VLV • 2-FCV-74-71, RHR SYS II SUPPR CHBR/POOL ISOL VLV • 2-FCV-74-72, RHR SYS II SUPPR CHBR SPRAY VALVE • 2-FCV-74-73, RHR SYS II SUPPR POOL CLG/TEST VLV
		5. **VERIFY** RHR Pump 2B and/or 2D running.
		6. WHEN RPV pressure is below 450 psig, THEN **VERIFY OPEN** 2-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE.
		7. IF RPV pressure is below 230 psig, THEN **VERIFY CLOSED** 2-FCV-68-3, RECIRC PUMP 2B DISCHARGE VALVE.
		8. **THROTTLE** 2-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE, as necessary to control injection.
	BOP	Will have to open 2-FCV-74-67 with the handswitch

NRC Scenario 5

Simulator Event Guide:

Event 9 Component: RHR and Core Spray Division Injection Valves will not Auto open

	BOP	Aligns injection systems LPCI Loop I and II if directed and Core Spray Loop I, IAW Appendix 6B, 6C and 6E
	BOP	**Appendix 6E**
		1. **VERIFY OPEN** the following valves: • 2-FCV-75-30, CORE SPRAY PUMP 2B SUPPR POOL SUCT VLV • 2-FCV-75-39, CORE SPRAY PUMP 2D SUPPR POOL SUCT VLV • 2-FCV-75-51, CORE SPRAY SYS II OUTBD INJECT VALVE.
		2. **VERIFY CLOSED** 2-FCV-75-50, CORE SPRAY SYS II TEST VALVE.
		3. **VERIFY** CS Pump 2B and/or 2D running.
		4. WHEN RPV pressure is below 450 psig, THEN **THROTTLE** 2-FCV-75-53, CORE SPRAY SYS II INBD INJECT VALVE, as necessary to control injection at or below 4000 gpm per pump.
	BOP/ATC	Coordinate RPV Level Control to restore and maintain Level +2 to +51 inches. Condensate and Core Spray will restore and maintain level. When RPV pressure is low enough Condensate System will maintain directed level band.
	BOP	Will have to open 2-FCV-75-53 with the handswitch

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

100% power, DG D and RBCCW 2B Pump are tagged out. Spare RBCCW Pump is aligned for operation.

Temporary DGs are NOT provided.

Operations/Maintenance for the Shift:

Return LPRM 8-49B to Operate from a Bypassed Condition IAW 2-OI-92B.

Lower Power with flow to 91% for Main Turbine Valve Testing.

Unit 1 and 3 are at 100% Power

Unusual Conditions/Problem Areas:

Severe Thunderstorms are forecast for today, currently no watches or warnings are in effect.