Facility: **Browns Ferry NPP** Scenario No.: **NRC - 1** Op-Test No.: **1108**

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

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: SLC pump 2B and EECW Pump A3 out of service. HPCI surveillance testing has just been completed and Torus cooling is to be secured. Reactor Power is 76%.

Turnover: Secure RHR Pump 2A from Torus cooling. Commence a power increase to 100%.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Secure Torus Cooling lineup IAW 2-OI-74 Section 8.6
2	SW3j	C-BOP TS-SRO	RHR/SW pump C3 trip
3		R-ATC R-SRO	Commence a power increase with rods
4	fic-85-11 0-100(L)	C-ATC C-SRO	CRD Controller Failure
5	Batch file	C-BOP C-SRO	Steam Packing Exhauster failure
6	Batch file	I-ATC I-SRO	Loss of Feedwater Flow Signal inputs
7	PC14	M-ALL TS-SRO	Non-isolable leak on torus
8	IOR	C	HPCI minimum flow valve will not open
9	IOR	C	All SRVs except 3 fail to open for Emergency Depressurization

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

Neil 6/14/11

Critical Tasks - Two

CT#1-When Suppression Pool level cannot be maintained above 11.5 feet the US determines that Emergency Depressurization is required; RO initiates Emergency Depressurization as directed by US.

1. Safety Significance:
   Precludes failure of Containment

2. Cues:
   Procedural compliance
   Suppression Pool level trend

3. Measured by:
   Observation - US determines (indicated by announcement or observable transition to C-2) that Emergency Depressurization is required before Suppression Pool level drops below 11.5 feet.
   AND
   Observation - RO opens at least 6 SRV's during performance of Emergency Depressurization actions.

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

CT#2-When Suppression Pool Level cannot be maintained above 12.75 feet HPCI secured to prevent damage.

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

2. Cues:
   Procedural compliance
   Suppression Pool Level indication

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

4. Feedback:
   HPCI does not Auto initiate
   No RPM indication on HPCI

Events

1. BOP shutdowns RHR Loop 1 from suppression pool cooling, IAW 2-OI-74 RHR System section 8.6

2. EECW Pump C3 trip, BOP will align RHRSW Pump C1 for EECW and start C1 Pump to restore EECW flow to the south header, IAW ARPs and 0-OI-67 EECW System section 8.3. The SRO will evaluate Technical Specification 3.7.2 and Condition A. When the C1 RHRSW Pump is aligned for EECW, then evaluate Technical Specification 3.7.1 and Condition A.

3. ATC will commence to raise power with control rods

4. CRD Controller fails, ATC takes manual control of controller and restores CRD parameters

5. Steam Packing Exhauster will trip and the STBY Exhauster will Start but the discharge damper will fail to open. The BOP will open the Steam Packing Exhauster discharge damper and restore Steam Packing Exhauster operation IAW with ARPs.

6. Feedwater Flow Transmitters will fail the crew will respond IAW ARPs and 2-AOI-3-1 Loss of Reactor Feedwater. The ATC will report that Feedwater Level Control failed to transfer to single element and will transfer to single element. Reactor Level will stabilize after the initial transient.

7. An unisolable Torus leak will commence. Suppression Pool level will start to lower and continue to lower. The SRO will enter EOI-3 on flood alarms and eventually EOI-2 on Suppression Pool Level. The crew will place HPCI in pull to lock prior to Torus level lowering to less than 12.75 feet.
   The SRO will determine that Suppression Pool level cannot be maintained above 11.5 feet and enter EOI-1 to scram the reactor and then transition to Emergency Depressurize. SRO will evaluate Technical Specification 3.6.2.2 Condition A

8. 2-FCV-73-30, HPCI MIN FLOW VALVE will fail to open. The crew will open the RCIC CST SUCTION VALVE and RCIC PUMP MIN FLOW VALVE to establish makeup to the Torus.

9. 11 SRVs fail on ED, with less than 4 MSRVs open the crew will try to rapidly depressurize the RPV with systems listed in C2-12 of 2-EOI-2-C-2, Emergency RPV Depressurization.

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

Control Rods are inserted

Emergency Depressurization complete

Reactor Level is restored and maintained

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 1

7 Total Malfunctions Inserted: List (4-8)

2 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)

75 Validation Time (minutes)

2 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Shutdown Suppression Pool Cooling			
RO U-92B-NO-05	219000A4.01	3.8	3.7
EECW Pump Trip			
RO U-067-NO-12	400000A2.01	3.3	3.4
Raise Power with Control Rods			
RO U-085-NO-07 SRO S-000-AD-31	2.2.2	4.6	4.1
CRD Controller Failure			
RO U-085-AB-03	201001A3.01	3.0	3.0
Steam Packing Exhauster Trip			
RO U-47C-AL-2 SRO S-047-AB-3	271000A1.01	3.3	3.2
Feedwater Flow Transmitter Failure			
RO U-003-NO-12 SRO S-003-AB-01	259002A2.02	3.3	3.4
Torus Leak			
RO U-000-EM-7 RO U-000-EM-17 RO U-000-EM-83 SRO S-000-EM-07 SRO S-000-EM-15	295030EA2.01	4.1	4.2

Procedures Used/Referenced:

Procedure Number	Procedure Title	Procedure Revision
2-OI-74	Residual Heat Removal System	Rev 156
2-ARP-9-20A, W35	EECW South HDR DG Section Pressure Low	Rev 25
0-OI-67	Emergency Equipment Cooling Water System	Rev 91
TS 3.7.2	Emergency Equipment Cooling Water (EECW) System and Ultimate Heat Sink (UHS)	Amd 254
TS 3.7.1	Residual Heat Removal Service Water (RHRSW) System and Ultimate Heat Sink (UHS)	Amd 254
2-GOI-100-12	Power Maneuvering	Rev 12
2-OI-85	Control Rod Drive System	Rev 128
2-ARP-9-5A, W10	CRD Accumulator Charging Water Header Pressure Hi	Rev 48
2-ARP-9-7A, W12	Steam Packing Exhauster Vacuum Low	Rev 27
2-OI-47C	Seal Steam System	Rev 24
2-ARP-9-6C, W14	RFWCS Input Failure	Rev 19
2-AOI-3-1	Loss of Reactor Feedwater or Reactor Water Level High/Low	Rev 20
2-ARP-9-3B, W15	Suppression Chamber Water Level Abnormal	Rev 28
2-EOI-3	Secondary Containment Control	Rev 12
2-EOI-2	Primary Containment Control	Rev 12
2-EOI-App-18	Suppression Pool Water Inventory Removal and Makeup	Rev 8
2-EOI-1	RPV Control Flowchart	Rev 12
2-AOI-100-1	Reactor Scram	Rev 95
2-EOI-App-5A	Injection Systems Lineup Condensate/Feedwater	Rev 9
2-EOI-App-6A	Injection Subsystems Lineup Condensate	Rev 4
2-EOI-2-C-2	Emergency RPV Depressurization	Revision 6
2-EOI-App-11H	Alternate RPV Pressure Control Systems Main Condenser	Rev 6
EPIP-1	Emergency Classification Procedure	Revision 46
EPIP-4	Site Area Emergency	Revision 32

Console Operator Instructions

A. Scenario File Summary

110801 Preference File
F3 bat NRC/110801
F4 imf sw03j
F5 mrf sw06 close
F6 trg! E11
F7 bat NRC/110202-1
F8 imf pc14 100 360 10

110801 Batch File

10 SRV overrides
Trg e3 NRC/singleelement
Trg e3 = bat NRC/110202-4
Ior zdihs7330a close
Oir ypobkrrhrswpa3 fail_ccoil
Ior zlohs2385a[1] off
ior zlohs6635a[1] on
ior ypomtrspea (e11 0) fail_control_power
ior ypovfcv6635 (e11 0) fail_power_now
trg 10 NRC/spe
trg 10 = bat NRC/110801-1

#Steam packing blower trip 110801-1
Dor ior ypovfcv6635
Dor ior zlohs6635a

TRG SPE
Zdihs6635a[3]. Eq. 1

Scenario 1

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 90
Simulator Setup	**Load Batch**	RestorePref NRC/110801
Simulator Setup	manual	F3
Simulator Setup	manual	Tag SLC pump B and EECW pump A3
Simulator Setup		Verify file loaded

RCP required (76% - 100% with control rods and flow) and RCP for Urgent Load Reduction
Provide marked up copy of 2-GOI-100-12

Simulator Event Guide:

Event 1 Normal: Secure Torus Cooling lineup

	SRO	Directs securing Torus cooling lineup IAW 2-OI-74, section 8.6
	BOP	Secures Torus cooling lineup
		8.6 Shutdown of Loop I(II) Suppression Pool Cooling **NOTE** 1) All operations are performed at Panel 2-9-3 unless otherwise noted. 2) RHR flow should be monitored while in operation with multiple flow paths (e.g., LPCI and Suppression Pool Cooling together, etc.). During any evolution, total system flow as indicated on RHR SYSTEM I(II) FLOW, 2-FI-74-50(64), should remain between 7,000 to 10,000 gpm for 1 pump operation or between 10,000 and 20,000 gpm for 2-pump operation. [1] **VERIFY** Suppression Pool Cooling in operation. **REFER TO** Section 8.5. [2] **REVIEW** the precautions and limitations in Section 3.0. [3] **NOTIFY** Radiation Protection of Suppression Pool Cooling loop removed from service. **RECORD** name and time of Radiation Protection representative notified in NOMS narrative log.
	Driver	As Radiation Protection, acknowledge removing Suppression Pool Cooling from service
	BOP	**CAUTIONS** 1) To prevent draining an RHR Loop, at least one of the RHR System test valves must be closed before stopping RHR Pumps in the associated loop. 2) To prevent excessive vibration, RHR pumps should not be allowed to operate for more than 3 minutes at minimum flow. 3) When closing throttle valve RHR SYS I(II) SUPPR POOL CLG/TEST VLV, 2-FCV-74-59 and 2-FCV-74-73 from the control room, the handswitch should be held in the close position for approximately 6 seconds after the red light extinguishes. Failure to completely close these valves could provide a leak path to the suppression pool from the RHR discharge piping. [4] **IF** both RHR Pumps in Loop I(II) are in operation **AND** one pump is to be removed from service due to reduced heat load, **THEN**: [4.1] **THROTTLE** RHR SYS I(II) SUPPR POOL CLG/TEST VLV, 2-FCV-74-59(73), to obtain a flow of between 7,000 to 10,000 gpm and Blue light illuminated as indicated on RHR SYS I(II) FLOW, 2-FI-74-50(64). [4.2] **STOP** RHR PUMP 2A(2B) or 2C(2D) using 2-HS-74-5A(28A) or 16A(39A).

Simulator Event Guide:

Event 1 Normal: Secure Torus Cooling lineup

	BOP	[4.3] **CLOSE** associated RHR HX 2A(2B) or 2C(2D) RHRSW OUTLET VALVE, 2-FCV-23-34(46) or 40(52). [4.4] **IF** RHRSW for the Heat Exchanger removed from service is not required to support other unit operations, **THEN STOP** RHRSW pump for the Heat Exchanger removed from service.
	Driver	When contacted as other unit, RHRSW HX is not required
	BOP	[5] **CLOSE** RHR SYS I(II) SUPPR POOL CLG/TEST VLV, 2-FCV-74-59(73). [6] **WHEN** RHR SYS I(II) SUPPR POOL CLG/TEST VLV, 2-FCV-74-59(73) is CLOSED, **THEN STOP** RHR PUMPS 2A(2B) or 2C(2D) using 2-HS-74-5A(28A) and/or 16A(39A). [7] **CLOSE** RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV, 2-FCV-74-57(71). [8] **CLOSE** RHR HX(s) 2A(2B) and 2C(2D) RHRSW OUTLET VLV(s), 2-FCV-23-34(46) and 40(52). [9] **IF** RHRSW for RHR Heat Exchanger(s) A(B) and C(D) is not required to support other unit operations, **THEN STOP** RHRSW Pump(s) for the Heat Exchanger(s) removed from service. [10] **CHECK** RHR System discharge header pressure is greater than TRM 3.5.4 limit as indicated on 2-PI-74-51(65), RHR SYS I(II) DISCH PRESS.
	Driver	When contacted as other unit, RHRSW HX is not required
	Driver	At NRC direction, insert F4 (imf sw03j), EECW pump C3 trip

Simulator Event Guide:

Event 2 Component: EECW pump C3 trip

	BOP	Respond to alarm 20A-35.
		20A-35 EECW SOUTH HDR DG SECTION PRESS LOW B. **CHECK** Panel 2-9-3 for status of North header pump(s) breaker lights and pump motor amps normal. C. **NOTIFY** UNIT SUPERVISOR, Unit 1 and Unit 3. D. **START** standby EECW Pump for affected header, if available. H. **IF** pump failure is cause of alarm, **THEN REFER TO** Tech Spec 3.7.2.
	Driver	If contacted, as Unit 3 Operator, inform that 4KV SD BD 3EB received a Motor Overload or Trip alarm If contacted as Unit 1 operator, you did not secure the C3 EECW Pump
		8.3 Operation of RHRSW Pump C1 (for EECW in place of C3) **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 C1 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 C1 must be aligned to EECW, the pump started, and should remain running. RHRSW Pump C1 does **NOT** have the same auto start signals as RHRSW Pump C3. 3) The RHRSW pump control switches and amp meters are located at Control Room Panel 9-3, Unit 1, 2, and 3. 4) When RHRSW Pump C1 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. [1] To line up RHRSW Pump C1 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 C1 is in standby readiness in accordance with 0-OI-23.

Simulator Event Guide:

Event 2 Component: EECW pump C3 trip

		8.3 Operation of RHRSW Pump C1 (for EECW in place of C3) (contd) [1.4] **VERIFY** RHRSW Pump C1 upper and lower motor bearing oil level is in the normal operating range. [1.5] **UNLOCK** and **CLOSE** RHRSW PMP C1 & C2 CROSSTIE, 0-23-544 at RHRSW C Room. [1.6] **OPEN** RHRSW PMP C1 CROSSTIE TO EECW, 0-FCV-67-49 using one of the following: • RHRSW PMP C1 CROSSTIE TO EECW, 0-HS-67-49A/1 on Unit 1 • RHRSW PUMP C1 SUPPLY TO EECW, 0-HS-67-49A/2 on Unit 2 • RHRSW PUMP C1 SUPPLY TO EECW, 0-HS-67-49A/3 on Unit 3 [1.7] **REQUEST** a caution order be issued to tag RHRSW Pump C1 and its associated crosstie valves to inform Operations personnel that it is aligned for EECW system operation and that the C1 pump should remain running to be operable for EECW. [2] To start RHRSW (EECW) Pump C1, **PERFORM** the following: [2.1] **START** RHRSW Pump C1 using one of the following: • RHRSW PUMP C1, 0-HS-23-8A/1 on Unit 1 • RHRSW PUMP C1, 0-HS-23-8A/2 on Unit 2 • RHRSW PUMP C1, 0-HS-23-8A/3 on Unit 3 [2.2] **VERIFY** RHRSW Pump C1 running current is less than 53 amps using one the following: • RHRSW PUMP C1 AMPS, 0-EI-23-8/1 on Unit 1 • RHRSW PUMP C1 AMPS, 0-EI-23-8/2 on Unit 2 • RHRSW PUMP C1 AMPS, 0-EI-23-8/3 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 C3 EECW pump breaker, report breaker tripped on overload and breaker smells burnt but no visible smoke or flames (3EB 4kv SD BD)

Simulator Event Guide:

Event 2 Component: EECW pump C3 trip

		8.3 Operation of RHRSW Pump C1 (for EECW in place of C3) (contd) [2.5] **NOTIFY** Chemistry of running RHRSW (EECW) pump(s). [2.6] **VERIFY** a caution order has been issued to tag RHRSW Pump C1 and its associated crosstie valves to inform Operations personnel that it is aligned for EECW system operation and that the C1 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 0-23-544 valve wait 2 minutes and insert F5 (mrf sw06 close), then report oil levels are normal and the 0-23-544 valve is closed When contacted to check breaker charging spring recharged for the C1 EECW pump, wait 2 minutes and inform amber breaker spring charged light is on and closing spring target indicates charged. When contacted as Intake AUO for second Oil Level check, report Oil Levels are normal
	SRO	Evaluate Technical Specification 3.7.2 before the C1 EECW Pump is aligned
		Condition A: One required EECW pump inoperable. Required Action A.1: Restore the required EECW pump to OPERABLE status. Completion Time: 7 days
	SRO	Evaluate Technical Specification 3.7.1 after the C1 EECW Pump is aligned
		Condition A: One required RHRSW pump inoperable Required Action A.1: Restore required RHRSW pump to OPERABLE status. Completion Time: 30 days

Simulator Event Guide:

Event 3 Reactivity: Raise Power with Control Rods

	SRO	Notify ODS of power increase.
		Direct Power increase using control rods per 2-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** 2-SR-3.3.5(A) and 2-OI-68. • **MONITOR** Core thermal limits using ICS, and/or 0-TI-248
	ATC	Raise Power with Control Rods per 2-OI-85, section 6.6. Control Rods 30-23, 38-31, 30-39, 22-31 from 00 to 12 22-39, 38-39, 38-23, and 22-23 from 00 to 16 30-31 from 00 to 48 14-31, 30-47, 46-31, and 30-15 from 00 to 16.
		6.6.1 Initial Conditions Prior to Withdrawing Control Rods [2] **VERIFY** the following prior to control rod movement: • CRD POWER, 2-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** [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 2-9-5 and **PERFORM** Step 6.6.2[6]. [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, 2-HS-85-46 in the OFF position to deselect the Control Rod. [6.2] **PLACE** CRD POWER, 2-HS-85-46, in the ON position.

Simulator Event Guide:

Event 3 Reactivity: Raise Power with Control Rods

	ATC	**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 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, 2-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, Manually enter CRDH controller failure fic-85-11 0-100(L)

Simulator Event Guide:

Event 3 Reactivity: Raise Power with Control Rods

	ATC	**6.6.4 Continuous Rod Withdrawal** [1] **SELECT** desired Control Rod by depressing appropriate CRD ROD SELECT, 2-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: (Otherwise N/A) [5.1] **PLACE AND HOLD** CRD NOTCH OVERRIDE, 2-HS-85-47, in NOTCH OVERRRIDE. [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** 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**.
	Driver	At NRC direction, Manually enter CRDH controller failure fic-85-11 0-100(L)

Simulator Event Guide:

Event 3 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, 2-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) [6.1] **PLACE** and **HOLD** CRD NOTCH OVERRIDE, 2-HS-85-47, in NOTCH OVERRRIDE. [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 the full core display digital readout and background light 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.
	Driver	At NRC direction, Manually enter CRDH controller failure fic-85-11 0-100(L)

Simulator Event Guide:

Event 3 Reactivity: Raise Power with Control Rods

	ATC	[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.
	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, 2-HS-85-46, in OFF. [1.2] **PLACE** CRD POWER, 2-HS-85-46, in ON.
	Driver	At NRC direction, Manually enter CRDH controller failure fic-85-11 0-100(L)

Simulator Event Guide:

Event 4 Component: CRDH Controller Failure

	ATC	Report Alarm 5A-10 CRD ACCUM CHG WTR HDR PRESS HIGH
		A. **VERIFY** pressure high on CRD ACCUM CHG WTR HDR 2-PI-85-13A, B. **CHECK** 2-FCV-85-11A (B) in service. C. **IF** in-service controller has failed, **THEN REFER TO** 2-OI-85. D. **IF** pressure is still greater than 1510 psig after verifying proper controller operation, **THEN THROTTLE** PUMP DISCH THROTTLING, 2-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
	ATC	Continues to withdraw control rods
	Driver	At NRC direction, insert F6 (trigger 11) to enter Steam Packing Exhauster Failure

Simulator Event Guide:

Event 5 Component: Steam Packing Exhauster failure

	BOP	Responds to Alarm 7A-12, Steam Packing Exhauster Vacuum Low.
		7A-12, Steam Packing Exhauster Vacuum Low Automatic Action: Alternate SPE fan starts and discharge damper opens, and the running fans trips.
		A. **CHECKS** the following: 1. Alternate STEAM PACKING EXHR BLOWER 2B, 2-HS-66-51A started. 2. 2B DISCHARGE VLV, 2-HS-66-35A opens.
	BOP	Determines that Alternate Blower started, but discharge damper fails to open.
		Opens 2B DISCHARGE VLV, 2-HS-66-35A to restore SPE Vacuum.
	NRC	NOTE: SPE B Blower indication will have "Red and Green" lights. In order for "Red" light only indication, the crew would have to stop the A SPE. IAW 2-OI-47C
	Driver	When dispatched, wait 5 minutes and report no obvious problems at SPE or Breaker.
	NRC	When ready, Loss of Feedwater Flow Signal Inputs
	Driver	Upon Lead examiner direction, insert F7 (bat NRC/110202-1) to enter Loss of Feedwater Flow Signal Inputs

Simulator Event Guide:

Event 6 Instrument: Loss of Feedwater Flow Signal Inputs

	ATC	Respond to alarm 6C-14 RFWCS INPUT FAILURE. A. **VERIFY** RFWCS continues to maintain Reactor Water level. B. **IDENTIFY** bad/invalid signal by checking Control Room instrumentation and/or ICS. **REFER TO** ATTACHMENT 1, on next page, for list of RFWCS instrumentation. **REFER TO** ICS RX FW LVL CONTROL SYS display (FWLCS). C. **REQUEST** assistance from Site Engineering. D. **BYPASS** the bad/invalid signal with Unit Supervisor approval.
	ATC	Report Feedwater Flow signal has failed **LOW** for FW Line A.
	ATC	Report FW Line B Feedwater Flow signal failing **HIGH**.
	SRO	Enter 2-AOI-3-1, "Loss of Feedwater or Reactor Water Level High/Low".
		4.1 Immediate Actions None **4.2 Subsequent Actions** [2] **IF** Feedwater Flow signal fails (FI-3-78A, FI-3-78B), **THEN PERFORM** the following: A. With SRO's permission, **REFER TO** 2-OI-3 and **BYPASS** failed Feedwater Flow Instrument in Unit 1&2 Computer Room; or Unit 2 Aux Instrument Room. [2.1] **IF** both Feedwater Flow Instruments fail, **THEN VERIFY** level control transfers to SINGLE ELEMENT.
	ATC	Verifies Reactor Level control in single element, level control failed to transfer to single element; Operator depresses single element pushbutton to transfer.
		[6] **IF** Reactor Water Level continues to rise, **THEN TRIP** RFP, as necessary. [7] **IF** RFPs in automatic control, **THEN VERIFY** 2-LIC-46-5 lowers flow of operating RFPs.
	ATC	Verifies RFPTs maintain water level.
	Driver	If crew inserts manual Reactor Scram on rising Reactor Water Level then obtain NRC concurrence and enter F8 (imf pc14 100 360 10) to enter non-isolable leak on torus
	Driver	When directed by NRC, insert F8 (imf pc14 100 360 10) to enter non-isolable leak on torus

Simulator Event Guide:

Event 7 Major: Non-Isolable Leak on Torus

	ATC/BOP	Respond to alarm multiple Pump Room Flood Level alarms and **SUPPR CHAMBER WATER LEVEL ABNORMAL**
	ATC/BOP	Reports lowering suppression pool water level. 9-3B W15
		A. **CHECK** level using multiple indications. B. **IF** level is low, **THEN DISPATCH** personnel to check for leaks. C. **IF** level is high, **THEN** D. **REFER TO** 2-OI-74, Sections 8.2, 8.3, and 8.4. E. **REFER TO** Tech Spec Section 3.6.2.2. F. **IF** level is above (-) 1" or below (-) 6.25 inches, **THEN ENTER** 2-EOI-2 Flowchart.
	Driver	When dispatched, wait 4 minutes and report, "Water level is 4 inches and rising in the Southeast Quad. Water is flowing in from the Torus Area. Unable to determine source of the leak."
	SRO	Enters EOI-3 on Flood Alarms
		EOI-3 Secondary Containment Temp Monitor and Control Secondary CNTMT Temp Answers **No** to Is Any Area Temp Above Max Normal **EOI-3 Secondary Containment Radiation** Monitor and Control Secondary CNTMT Radiation Levels Answers **No** to Is Any Area Radiation Level Above Max Normal

Simulator Event Guide:

Event 8 Major: Non-Isolable leak on Torus

	SRO	**Enters EOI-3 on Flood Alarms** **EOI-3 Secondary Containment Level** Monitor and Control Secondary CNTMT Water Level Answers **Yes** to Is Any Floor Drain Sump Above 66 inches Answers **Yes** to Is Any Area Water Level Above 2 inches Restore and Maintain Water Levels using all available sump pumps Answers **No** to Can All Water Levels be Restore and Maintained Below Isolate all systems that are discharging into the area except systems required to: • Be operated by EOIs OR • Suppress a Fire Answers **No** to Will Emergency Depressurization Reduce Discharge Into Secondary Containment.
	SRO	Enters EOI-2 on Low Suppression Pool Level
	SRO	**Enter EOI-2 on Low Suppression Pool Level** Monitor and Control Suppression Pool Level Between (-) 1 inch and (-) 6 inches. (Appendix 18) Answers **NO** to: Can Suppression Pool Level Be Maintained Above (-) 6 inches? Answers **YES** to: Can Suppression Pool Level Be Maintained Below (-) 1 inch?
CT #2	SRO	Sets a Value for HPCI to place in Pull to Lock, prior to 12.75 feet.
CT #2	ATC/BOP	Places HPCI in Pull to Lock, before Suppression Level lowers to 12.75 feet.

Simulator Event Guide:

Event 8 Major: Non-Isolable leak on Torus

	SRO	Directs Appendix 18
	BOP	**Appendix 18** 6. IF Directed by SRO to add water to suppression pool, THEN **MAKEUP** water to Suppression Pool as follows: a. **VERIFY OPEN** 2-FCV-73-40, HPCI CST SUCTION VALVE. b. **OPEN** 2-FCV-73-30, HPCI PUMP MIN FLOW VALVE c. IF HPCI is NOT available for Suppression Pool makeup, THEN **MAKEUP** water to Suppression Pool using RCIC as follows: 1) **VERIFY OPEN** 2-FCV-71-19, RCIC CST SUCTION VALVE. 2) **OPEN** 2-FCV-71-34, RCIC PUMP MIN FLOW VALVE.
	BOP	Attempts to makeup water to the Suppression Pool using HPCI; 2-FCV-73-30 will not open. Utilizes RCIC to makeup water to the Suppression Pool and dispatches personnel to investigate 2-FCV-73-30.
	Driver	2-FCV-73-30 fails closed when the Torus leak is inserted, crew will dispatch personnel to investigate. Acknowledge investigation and provide no further information.
CT #1	SRO	Determines a trigger value for inserting a Reactor Scram on lowering Suppression Pool Water Level and enters EOI-1, Scrams Reactor before Suppression Pool level reaches 11.5 feet.
	SRO	Determines that Emergency Makeup to the Suppression Pool using Standby Coolant is required and directs BOP to line up Standby Coolant to the Suppression Pool per Appendix 18.
	BOP	**Appendix 18** 5. IF Directed by SRO to Emergency Makeup to the Suppression Pool from Standby Coolant, THEN **CONTINUE** in this procedure at Step 9. 9. IF Directed by SRO to Emergency Makeup to the Suppression Pool using Standby Coolant Supply, THEN **MAKEUP** water to the Suppression Pool as follows: a. **VERIFY CLOSED** the following valves: • 2-FCV-74-61, RHR SYS I DW SPRAY INBD VALVE • 2-FCV-74-60, RHR SYS I DW SPRAY OUTBD VALVE • 2-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE • 2-FCV-74-52, RHR SYS I LPCI OUTBD INJ VALVE • 2-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VALVE • 2-FCV-23-52, RHR HX 2D RHRSW OUTLET VALVE

Simulator Event Guide:

Event 8 Major: Non-Isolable leak on Torus

	BOP	**Appendix 18 (continued)** b. **PLACE VERIFY** RHR Pumps 2A and 2C are NOT running. c. **START** RHRSW Pumps D1 and D2. NOTE: 2-BKR-074-0100, RHR SYS I U-1 DISCH XTIE Breaker compartment is maintained in the OPEN position as an Appendix R requirement d. **NOTIFY** Unit 1 Operator to perform the following 1) **VERIFY CLOSED** 1-FCV-23-52, RHR HEAT EXCHANGER D COOL WATER OUTLET VLV (Unit 1, Panel 1-9-3). 2) **OPEN** 1-FCV-23-57, STANDBY COOLANT VALVE FROM RHRSW (Unit 1, Panel 1-9-3). 3) **DISPATCH** personnel to place 2-BKR-074-0100, RHR SYS I U-1 DIXCH XTIE in ON (480V RMOV BD 1B, Compartment 19A).
	Driver	When personnel dispatched to close 2-BKR-074-0100, wait 6 minutes then close breaker and report, delete override for breaker control power. When requested 1-FCV-23-52 is closed. When requested to open 1-FCV-23-57 insert remote function **sw09 open** and report
	BOP	**Appendix 18 (continued)** e. **NOTIFY** Unit 3 Operator to **VERIFY CLOSED** 3-FCV-23-52, RHR HX 3D RHRSW OUTLET VLV (Unit 3, Panel 3-9-3).
	Driver	When requested 3-FCV-23-52 is closed

Simulator Event Guide:

Event 8 Major: Non-Isolable leak on Torus

	BOP	**Appendix 18 (continued)** f. **INJECT** Standby Coolant into the Suppression Pool as follows: 1) **OPEN** 2-FCV-74-100, RHR SYS I U-1 DISCH XTIE. 2) **OPEN** 2-FCV-74-57, RHR SYS I SUPPR CHMBR/POOL ISOL VLV. 3) **THROTTLE OPEN** 2-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV to control injection.
CT #1	SRO	Enters EOI-1 at pre-determined trigger value and directs Core Flow Runback and Reactor Scram based on EOI-2 step SP/L-7.
	SRO	**Enters EOI-1 from EOI-2 step SP/L-7** Verify Reactor Scram **EOI-1 RC/L** Monitor and Control RPV Water Level Verify as Required: • PCIS Isolations (Groups 1,2 and 3) • ECCS • RCIC Restore and maintain RPV water level +2 to +51 inches using Condensate and Feedwater in accordance with App 5A **EOI-1 RC/Q** Monitor and Control Reactor Power • Crew will exit RC/Q and enter 2-AOI-100-1 based on RC/Q-2.
	SRO	May Anticipate Emergency Depressurization and Rapidly Depressurize using Bypass valves based on EOI-1 step RC/P-3
	BOP	Verifies and reports PCIS isolations and, if directed, opens all Bypass Valves to Rapidly Depressurize RPV irrespective of cooldown rate. Maintains Reactor Water Level +2 to +51 inches using Condensate and Feedwater per App 5A
	ATC	Initiates Core Flow Runback and Manual Reactor Scram and performs Immediate Actions of 2-AOI-100-1
	SRO	**EOI-1 RC/P** Monitor and Control RPV pressure When Emergency Depressurization is required Exits RC/P and enters C-2, Emergency RPV Depressurization, based on Override step RC/P-4.

Simulator Event Guide:

Event 8 Major: Non-Isolable leak on Torus

	ATC	**2-AOI-100-1 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 PAUSE in START & HOT STBY mode for approximately 5 seconds before going to REFUEL. (Otherwise N/A) [3] REFUEL MODE ONE ROD PERMISSIVE light check: [3.1] PLACE REACTOR MODE SWITCH, 2-HS-99-5A-S1, in REFUEL. [3.2] CHECK REFUEL MODE ONE ROD PERMISSIVE light, 2-XI-85-46, illuminates. [3.3] IF REFUEL MODE ONE ROD PERMISSIVE light, 2-XI-85-46, is not illuminated, THEN CHECK all control rod positions at Full-In Overtravel, or Full-In. (Otherwise N/A) [4] PLACE REACTOR MODE SWITCH, 2-HS-99-5A-S1, in SHUTDOWN position. [5] IF all control rods CAN NOT be verified fully inserted, THEN INITIATE ARI by Arming and Depressing, (Otherwise N/A) • ARI Manual Initiate, 2-HS-68-119A OR • ARI Manual Initiate, 2-HS-68-119B [6] 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 [7] US REPEAT back status to UO, eye contact is not necessary.
	BOP	Performs necessary actions of 2-EOI-App-5A to maintain RPV water level in band
		2-EOI-App-5A 13. **ADJUST** RFPT speed as necessary to control injection using the methods of step 12. 14. WHEN RPV level is approximately equal to desired level AND automatic level control is desired, THEN **PLACE** 2-LIC-46-5, REACTOR WATER LEVEL CONTROL, in AUTO with individual 2-SIC-46-8(9)(10), RFPT 2A(2B)(2C) SPEED CONTROL in AUTO.

Simulator Event Guide:

Event 8 Major: Non-Isolable leak on Torus

	SRO	When RPV pressure has decreased to approximately Condensate Injection Pressure directs ATC to maintain RPV Water Level +2 to +51 inches per App 6A
	ATC	Maintains RPV Water Level in band with 2-EOI-App-6A
		2-EOI-App-6A 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. 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.

Simulator Event Guide:

Event 8 Major: Non-Isolable leak on Torus

	SRO	When Emergency Depressurization is required exits RC/P and enters C-2, Emergency RPV Depressurization
		Determines Emergency Depressurization is required and enters C-2 Answers **Yes** to will the reactor remain subcritical under all conditions. Answers **No** to is DW pressure above 2.4 psig Answers **Yes** to is Suppression Pool Level above 5.5 ft Directs All ADS Valves opened Answers **No** to can Six ADS Valves be opened Directs BOP to open additional MSRVs as necessary to establish 6 MSRVs open Answers **No** to are at least 4 MSRVs open Answers **Yes** to is RPV pressure 80 psi or more above Suppression Chamber Pressure **Directs** BOP to Rapidly Depressurize the RPV to less than 80 psi above Suppression Chamber pressure with one or more of the systems listed on C2-12

Simulator Event Guide:

Event 8 Major: Non-Isolable leak on Torus

	SRO	**Directs** BOP to Rapidly Depressurize the RPV to less than 80 psi above Suppression Chamber pressure utilizing App 11H
	BOP	**2-EOI-App-11H** 2. **VERIFY** Main Condenser Off-Gas is aligned to the stack as follows: b. **VERIFY OPEN** 2-FCV-66-28, OFFGAS SYSTEM ISOLATION VALVE (Panel 9-53). 3. **VERIFY** SJAE 2A or 2B in service and aligned to Main Condenser (Panel 9-7). 5. IF ANY Main Steam Line is NOT isolated, THEN **CONTINUE** in this procedure at Step 12. **CAUTION** Offsite release rate limits may be exceeded. 12. **OPEN** Turbine Bypass valves as necessary to rapidly depressurize RPV.
	SRO	Classify the Event
		Event Classification is 2.1-S

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

SLC pump 2B and EECW pump A3 out of service.

Operations/Maintenance for the Shift:

HPCI surveillance testing has just been completed and Torus cooling is to be secured. Reactor Power is 76%. Secure RHR Loop II from Torus cooling. Commence a power increase to 100%.

Units 1 and 3 are at 100% power

Unusual Conditions/Problem Areas:

None

Facility: **Browns Ferry NPP** Scenario No.: **NRC – 2** Op-Test No.: **1108**

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

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 86% power, CCW pump 3A is ready to return to service.

Turnover: Return to service Condenser Circulating Water pump 3A per 3-OI-27 section 8.2. Raise power to 100%

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Returning to service Condenser Circulating Water Pump 3A, IAW 3-OI-27 section 8.2
2		R-ATC R-SRO	Commence power increase with flow
3	RC02	C-BOP TS-SRO	Inadvertent start of RCIC
4	RD01a	C-ATC C-SRO	CRD Pump 3A trip
5	RD07 46-19	C-ATC TS-SRO	Control Rod 46-19 drifts in to position 40
6	RC10	C-BOP TS-SRO	Steam leak in the RCIC room RCIC Steam line isolation valves 3-FCV-71-2 and 3 will not auto isolate.
7	MS06A MS06B TH35A	M-ALL	MSL A Break in Reactor BLDG with MSL A valves failing to close
8	RP07	I	RPS Fails to de-energize, ARI inserts all Rods
9	HP015	C	HPCI flow controller failure in Auto to 10%

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

may not clear

Rec'd 6/10/11

Critical Tasks - Four

CT#1-With reactor at power and with a primary system discharging into the secondary containment, manually scram the reactor before any area exceeds the maximum safe operating level.

1. Safety Significance:
   Scram reduces the decay heat energy that the RPV may be discharging into the secondary containment

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

3. Measured by:
   Observation - With a primary system discharging into secondary containment, a reactor scram is initiated before a maximum safe condition is reached.
   OR
   Observation - With a primary system discharging into secondary containment, US transitions to EOI-1 and RO initiates scram upon report that a maximum safe condition has been reached.

4. Feedback:
   Control rod positions
   Reactor power decrease

CT#2-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.

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

CT#3-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.

4. Feedback:
   Valve position indication
   In field reports

CT#4-With a reactor scram required and the reactor not shutdown, take action to reduce power by initiating ARI to cause control rod insertion.

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

2. Cues:
   Reactor power indication
   Procedural compliance

3. Measured by:
   Observation - ARI pushbuttons armed and depressed to cause control rod insertion.

4. Feedback:
   Reactor power trend
   Rod status indication

Events

1. BOP returns the Condenser Circulating Water Pump 3A to service IAW 3-OI-27 Condenser Circulating Water System, section 8.2

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

3. Inadvertent start of RCIC. BOP will attempt to trip RCIC, RCIC trip pushbutton fails BOP will close FCV-71-9 Valve and SRO will determine RCIC System inoperable, Technical Specification 3.5.3 Condition A

4. CRDH pump 3A trips ATC will perform 3-AOI-85-3 actions to start the Standby CRD Pump and restore CRD parameters.

5. When CRD Pump 3B is started Control rod 46-19 will drift in to position 40. ATC will respond IAW 3-AOI-85-5 Control Rod Drift In. ATC will fully insert Control Rod 46-19. SRO will determine Control Rod 46-19 is Inoperable Technical Specification 3.1.3 Condition C.

6. A RCIC Steam Leak will result in high Room temperature with a failure of RCIC to Isolate. The BOP will isolate RCIC. The SRO will determine RCIC Isolation Valves inoperable Technical Specification 3.6.1.3 Condition A.

7. MSL break in Reactor Building with MSL A valves failing to close, with small fuel failure on scram. SRO will enter EOI-3 and transition to EOI-1 and Scram the Reactor Crew will monitor secondary containment radiation levels. Eventually the SRO will determine that ED on Radiation Levels is required.

8. On the Scram RPS will fail to de-energize, ATC will initiate ARI to insert control rods

9. RFPTs will trip on the scram, HPCI is available for level control but the HPCI flow controller will fail in Auto at 10%. Crew will take manual control to restore and maintain reactor level.

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

Control Rods are inserted

Emergency Depressurization complete

Reactor Level is restored and maintained

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 2

9	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)
1	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
Condenser Circ Water Pump Start			
RO U-027-NO-5	400000A4.01	3.1	3.0
Raise Power with Recirc Flow			
RO U-068-NO-17 SRO S-000-NO-138	2.1.23	4.3	4.4
RCIC Inadvertent Start			
RO U-071-NO-5	217000A2.01	3.8	3.7
RCIC Steam Leak			
RO U-071-AL-20 SRO S-000-EM-12	217000A2.15	3.8	3.8
CRD Pump Trip			
RO U-085-AL-07 SRO S-085-AB-03	201001A2.01	3.2	3.3
Control Rod Drift			
RO U-085-AL-12 SRO S-085-AB-5	201003A2.03	3.4	3.7
Secondary Containment High Radiation			
RO U-090-AL-4 SRO S-000-EM-15 SRO S-000-EM-10	295033EA2.01	3.8	3.9

Procedures Used/Referenced:

Procedure Number	Procedure Title	Procedure Revision
3-OI-27	Condenser Circulating Water System	Rev 58
3-GOI-100-12	Power Maneuvering	Rev 35
3-OI-68	Reactor Recirculation System	Rev 80
3-ARP-9-3B, W27	RCIC Gland Seal Vacuum Tank Pressure High	Rev 20
TS 3.5.3	RCIC System	Amd 244
3-AOI-85-3	CRD System Failure	Rev 10
3-AOI-85-5	Rod Drift In	Rev 10
TS 3.1.3	Control Rod Operability	Amd 212
3-ARP-9-3A, W22	Reactor Building Area Radiation High	Rev 43
3-ARP-9-3D, W10	RCIC Steam Line Leak Detection Temperature High	Rev 28
3-EOI-3	Secondary Containment Control	Rev 10
TS 3.6.1.3	Primary Containment Isolation Valves	Amd 212
3-ARP-9-3D, W24	Main Steam Line Leak Detection Temperature High	Rev 28
3-AOI-100-1	Reactor Scram	Rev 53
3-EOI-1	RPV Control	Rev 8
3-EOI-Appendix-8F	Restoring Refuel Zone and Reactor Zone Ventilation Fans Following Group 6 Isolation	Rev 2
3-EOI-Appendix-8E	Bypassing Group 6 Low RPV level and High Drywell Pressure Isolation Interlocks	Rev 1
3-EOI-Appendix-11A	Alternate Pressure Control Systems MSRVs	Rev 2
3-EOI-Appendix-5D	Injection System Lineup HPCI	Rev 5
3-EOI-3-C-2	Emergency RPV Depressurization	Rev 8
3-EOI-Appendix-6A	Injection Subsystems Lineup Condensate	Rev 2
3-EOI-2	Primary Containment Control	Rev 8
3-EOI-Appendix-17A	RHR System Operation Suppression Pool Cooling	Rev 5
EPIP-1	Emergency Classification	Rev 46

Simulator Instructor - IC-199

#RCIC inadvertent start
imf rc02 (e5 0)
ior zdihs719a[1] null

#RCIC steam leak
imf rc10
ior zdihs712a[2] auto
imf rc09 (e6 0) 50 120 10
ior zdihs719a[1] null

#CR 46-19 drift in
imf rd01a (e10 0)
imf rd07r4619 (e12 0)

#MSL A break inside containment
imf th35a (e15 0) 3 600 0
imf ms06a
imf ms06b
imf hp03 (e15 0) 10
ior xa557c[8] alarm_off
imf rp07

#Fuel failure
imf th23 (e20 120) 4 600 1
ior zdihs03125[1] (e20 10) trip
ior zdihs03151[1] (e20 10) trip
ior zdihs03176[1] (e20 10) trip

Scenario 2

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 199
Simulator Setup	**Load Batch**	bat nrc1108-2
Simulator Setup	manual	
Simulator Setup		Verify file loaded
Simulator Setup		

RCP required (86% - 100% 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: Returning to service Condenser Circulating Water Pump 3A

	SRO	Directs CCW Pump 3A returned to service IAW 3-OI-27, section 8.2
	BOP	**8.2 Returning a CCW Pump to Service** [1] **COLLECT** the Amertap system balls. REFER TO 3-OI-27B. [2] **SECURE** the Radwaste Discharge. REFER TO 0-OI-77B. [3] **CHECK** the CCW Pump to be started for operational readiness as follows: [3.1] **CHECK** for visible oil level in the CCW pump motor upper and lower bearing reservoir level indicators. [3.2] **VERIFY** motor cooling water flow for CCW Pump 3A (3B) (3C) by ensuring that pressure is greater than 20 psig, as indicated by local gauges, 3-PI-025-0012(0013)(0014). **NOTE** Normal bearing cooling water differential pressure is 8 psid. [3.3] **VERIFY** bearing cooling water flow for CCW Pump 3A(3B)(3C) by ensuring that pressure is greater than 5 psid and less than 11 psid, as indicated by CCW PMP 3A(3B)(3C) BRG LUBE WTR FLOW DP HI/LOW, 3-PDIS-025-0004(0006)(0008), on 3-LPNL-925-0134C.
	Driver	When contacted report: there is visible oil in the upper and lower bearing reservoir level indicators, motor cooling water flow pressure is greater than 20 psig, and bearing cooling water pressure is 8 psid

Simulator Event Guide:

Event 1 Normal: Returning to service Condenser Circulating Water Pump 3A

	BOP	[4] **VERIFY CLOSED** the CCW PUMP 3A(3B)(3C) DISCH ISOL VALVE, 3-FCV-27-13(21)(29), on Panel 3-9-20. **CAUTIONS** 1) Capacitor bank fuses are subject to clearing when the unit boards are being supplied from the 161kV source and large pumps are started. Unit Supervisors should evaluate placing the Capacitor Banks in Manual prior to starting RHR, CS or CCW pumps. 2) When returning a pump to service with at least one pump already in operation, the pump being placed in service may experience perturbations in flow and motor amps. It may be necessary to throttle Condenser Water Box Discharge Valves as stated in Section 6.1 to stabilize pump. [6] **START** CCW PUMP 3A(3B)(3C) using 3-HS-27-10A(18A)(26A) on Panel 3-9-20 and **VERIFY** the respective CCW PUMP 3A(3B)(3C) DISCH ISOL VALVE, 3-FCV-27-13(21)(29), automatically travels to the full open position.
	BOP	Verifies CCW Pump 3A Discharge valve closed and starts CCW Pump 3A, verifies CCW Pump 3A discharge valve automatically travels open

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. [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
		[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	When satisfied with Reactivity Manipulation, Inadvertent start of RCIC
	Driver	When directed by NRC, Trigger 5 Inadvertent start of RCIC

Simulator Event Guide:

Event 3 Component: Inadvertent start of RCIC

	BOP	Responds to alarm 9-3B, Window 27, RCIC Gland Seal Vacuum Tank Pressure High
		A. **VERIFY** RCIC VACUUM PUMP, 3-HS-71-31A, running. B. **VERIFY** RCIC VACUUM TANK CONDENSATE PUMP, 3-HS-71-29A, running. C. **VERIFY** the following valves open: • RCIC LUBE OIL COOLING WTR VLV, 3-FCV-71-25A • RCIC VACUUM PUMP DISCHARGE VLV, 3-HCV-71-32
	BOP	While responding to alarm determines RCIC is running and reports to SRO
		Verifies by multiple indications that initiation signal is not valid and reports it to SRO
	SRO	Directs BOP to trip RCIC
	BOP	Attempts to trip RCIC, recognizes RCIC failed to trip with the Trip Pushbutton. Operator performs actions that should have automatically occurred when tripped
		Operator shuts the 71-9 and 71-34. Operator recognizes turbine is now shutting down, however, the RCIC Min Flow Valve will not remain shut because an inadvertent initiation signal is sealed in, BOP reports this to SRO
	SRO	Directs BOP to close RCIC Min Flow Valve and have operator in field open breaker
	ATC	Reports power/level/pressure stable after RCIC secured
	BOP	Dispatches personnel to RCIC Min flow valve breaker at 250V RMOV BD 3B, Compt 5D to open breaker when valve is closed
	BOP	Dispatches Instrument Mechanics to investigate inadvertent initiation signal
	Driver	Acknowledge dispatch to breaker, wait 3 minutes and report on station at 250V RMOV BD 3B, Compt 5D, when directed insert override to open breaker for 71-34 valve: **ior ypovfcv7134 fail_power_now** Acknowledge dispatch as Instrument Mechanic
	BOP	Reports to SRO that 71-34 valve is closed and breaker is open
	SRO	Evaluates Technical Specification 3.5.3 Condition A: RCIC system inoperable Required Action A.1: Verify by administrative means HPCI system is operable Required Action A.2: Restore RCIC system to operable status Completion Time A.1: Immediately Completion Time A.2: 14 days
	NRC	When ready, CRD Pump 3A trip
	Driver	When directed by NRC, insert trigger 10 for CRD Pump 3A trip

Simulator Event Guide:

Event 4 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.
	NRC	When ATC begins to restore CRD parameters, Control Rod 46-19 drifts in to position 40
	Driver	When directed by NRC, insert trigger 12, Control Rod 46-19 drifts in. **When rod gets to position 42 on Full Core Display delete the rod drift.**

Simulator Event Guide:

Event 5 Component: Control Rod 46-19 drifts in to position 40

	ATC	Report Control Rod Drift Alarm 5A-28, reports Control Rod 46-19 drifting in.
	SRO	Enter 3-AOI-85-5 Rod Drift In.
	ATC	**4.1 Immediate Actions** [1] **IF** multiple rods are drifting into core, **THEN MANUALLY SCRAM** Reactor. Refer to 3-AOI-100-1.
	SRO	**4.2 Subsequent Actions** [1] **IF** a Control Rod is moving from its intended position without operator actions, **THEN INSERT** the Control Rod to position 00 using CONTINUOUS IN. [2] **NOTIFY** the Reactor Engineer to Evaluate Core Thermal Limits and Preconditioning Limits for the current Control Rod pattern. [3] **IF** another Control Rod Drift occurs before Reactor Engineering completes the evaluation, **THEN MANUALLY SCRAM** Reactor and enter 3-AOI-100-1.
	ATC	Reports rod 46-19 stopped drifting at position 40
	ATC	Inserts Control Rod 46-19 to position 00.
		[4] **CHECK** Thermal Limits on ICS (RUN OFFICIAL 3D).
		[5] **ADJUST** control rod pattern as directed by Reactor Engineer and **CHECK** Thermal Limits on ICS (RUN OFFICIAL 3D).
	Crew	Dispatch AUO to check scram valves.
	Driver	As Reactor engineer acknowledge rod drift, if asked for rod pattern adjustment, inform crew that you are working on it As AUO after dispatched report scram valves are normal.
	SRO	Evaluate Tech Spec 3.1.3
		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 Completion Time — 3 Hours **AND** Required Action C.2 — Disarm the associated CRD Completion Time — 4 Hours
	NRC	When ready, Steam leak in the RCIC room RCIC Steam line isolation valves 3-FCV-71-2 and 3 will not auto isolate
	Driver	When directed by NRC, insert trigger 6 for RCIC room steam leak

Simulator Event Guide:

Event 6 Component: Steam leak in the RCIC room
RCIC Steam line isolation valves 3-FCV-71-2 and 3 will not auto isolate

	BOP	Respond to Annunciator RX BLDG AREA RADIATION HIGH A. **DETERMINE** area with high radiation level on Panel 3-9-11. (Alarm on Panel 3-9-11 will automatically reset if radiation level lowers below setpoint.) C. **NOTIFY** RADCON. D. **IF** the TSC is **NOT** manned and a "VALID" radiological condition exists, **THEN USE** public address system to evacuate area where high airborne conditions exist.
	BOP	Determine RCIC Area Radiation Monitor is in Alarm and report, Evacuate affected area and notify radiation protection.
	BOP	Respond to annunciator RCIC STEAM LINE LEAK DETECTION TEMP HIGH If temperature continues to rise it will cause isolation of the following valves at steam line space temperature of 165°F Torus Area or 165°F RCIC Pump Room. • RCIC STEAM LINE INBD ISOLATION VLV, 3-FCV-71-2 • RCIC STEAM LINE OUTBD ISOLATION VLV, 3-FCV-71-3 A. **CHECK** RCIC temperature switches on LEAK DETECTION SYSTEM TEMPERATURE indicator, 3-TI-69-29 on Panel 3-9-21. B. **IF** RCIC is **NOT** in service **AND** 3-FI-71-1A(B), RCIC STEAM FLOW indicates flow, **THEN ISOLATE** RCIC and **VERIFY** temperatures lowering. C. **IF** high temperature is confirmed, **THEN ENTER** 3-EOI-3 Flowchart. D. **CHECK** CS/RCIC ROOM El 519 RX BLDG radiation indicator, 3-RI-90-26A on Panel 3-9-11 and **NOTIFY** RADCON if rising radiation levels are observed. E. **DISPATCH** personnel to investigate.

Simulator Event Guide:

Event 6 Component: Steam leak in the RCIC room
RCIC Steam line isolation valves 3-FCV-71-2 and 3 will not auto isolate

	BOP	Reports rising temperature in RCIC, reports RCIC failed to auto isolate and isolates RCIC Steam Line
	BOP	Reports 3-FCV-71-2 failed to close manually, 3-FCV-71-3 is closed
	SRO	Enter EOI-3 on Secondary Containment Area Radiation
	Driver	If dispatched to RCIC area report after 5 minutes that cannot access area at this time.
	SRO	If Reactor Zone or Refuel Zone Exhaust Radiation Level is above 72 mr/hr. Then verify isolation of Reactor Zone or Refuel Zone and verify SGTS initiates
		If above 72 mr/hr direct Operator to verify isolation of ventilation system and SGTS initiated
	ATC/BOP	Verifies Reactor Zone and Refuel Zone Ventilation Systems isolated and SGTS initiated
	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 per Appendix 8F
		If ventilation isolated and below 72 mr/hr directs Operator to perform Appendix 8F
CT#3	SRO	**Enters EOI-3 on High Secondary Containment Temperature** **Secondary Containment Temperature** Monitor and Control Secondary Containment Temperature Operate available ventilation per Appendix 8F Is Any Area Temp 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
CT#3	BOP	Isolates RCIC Steam Lines and reports Temperatures and Radiation Levels lowering
	SRO	Evaluates Technical Specification 3.6.1.3 Condition B Condition B — One or more penetration flow paths with two PCIVs inoperable except due to MSIV leakage not within limits. Required Action B.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 — 1 Hour

Simulator Event Guide:

Event 6 Component: Steam leak in the RCIC room
RCIC Steam line isolation valves 3-FCV-71-2 and 3 will not auto isolate

	SRO	**Enters EOI-3 on High Secondary Containment Temperature (continued)** **Secondary Containment Radiation** Monitor and Control Secondary Containment Radiation Levels Is Any Area Radiation Level Max Normal - **NO** Isolate all systems that are discharging into the area except systems required to: • Be operated by EOIs OR • Suppress a Fire
		Ensures no systems are still discharging to Secondary Containment, remains in EOI-3 until entry conditions are cleared.
	SRO	**Enters EOI-3 on High Secondary Containment Temperature (continued)** **Secondary Containment Level** Monitor and Control Secondary Containment Water Levels Is Any Floor Drain Sump Above 66 inches - **NO** AND Is Any Area Water Level Above 2 inches - **NO**
	NRC	When ready, MSL A Break in Reactor BLDG with MSL A valves failing to close
	Driver	When directed by NRC, insert trigger 15 for MSL A Break in Rx Building

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	BOP	Respond to Rx Building Area Radiation High Alarm, 3A-22
		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.) 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 airborne conditions exist. G. **MONITOR** other parameters providing input to this annunciator frequently as these parameters will be masked from alarming while this alarm is sealed in. J. For all radiation indicators except FUEL STORAGE POOL radiation indicator, 2-RI-90-30, **ENTER** 2-EOI-3 Flowchart.
	BOP	Determines Suppression Pool Area ARM, 90-29A, is in alarm and several other ARMs on Panel 9-11 are showing elevated radiation Uses Public Address System to evacuate the affected area(s) Reports to SRO the current Radiological conditions and trends and reports EOI-3 entry conditions
	SRO	Enters **EOI-3** on Secondary Containment Radiation
	BOP	Responds to Main Steam Line Leak Detection Temperature High alarm, 3D-24
		A. **CHECK** the following temperature indications: • MN STEAM TUNNEL TEMP temperature indicator, 3-TIS-1-60A on Panel 3-9-3.
	BOP	Determines Main Steam Tunnel Temperature on 3-TIS-1-60A is rising and reports to SRO
CT #1	SRO	Determines leak is in the Main Steam Tunnel from a MSL and determines a trigger value for Rx Scram and MSIV isolation before Main Steam Tunnel temperature reaches 189F
	Driver	When ATC arms and depresses ARI, insert trigger 20 for RFPT trips and Fuel Failure

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	Driver	After ATC has armed and depressed ARI, insert trigger 20 for RFPT trips and Fuel Failure
CT #1	SRO	Directs ATC to insert manual Rx Scram prior to MSIV isolation at a Steam Tunnel Temperature of 189F. Directs BOP to shut MSIVs after Scram and prior to MSIV isolation at a Steam Tunnel Temperature of 189F
CT #1	ATC	Inserts Manual Rx Scram and performs immediate actions of 3-AOI-100-1, Reactor Scram
		[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 PAUSE** in START & HOT STBY mode for approximately 5 seconds before going to REFUEL. (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** REFUEL MODE ONE ROD PERMISSIVE light, 3-XI-85-46, illuminates. [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 the SHUTDOWN position. [5] **IF** all control rods **CAN NOT** be verified fully inserted, **THEN INITIATE** ARI by Arming and Depressing: (Otherwise N/A) • ARI Manual Initiate, 3-HS-68-119A **OR** • ARI Manual Initiate, 3-HS-68-119B [6] **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 [7] US **REPEAT** back status to UO, eye contact is not necessary.
CT #4 **#4**	ATC	Depresses Reactor Scram A and B pushbuttons, places the Mode Switch in Shutdown, and reports "No Rod Motion." Initiates ARI by Arming and Depressing one of the ARI Manual Initiate collars and pushbuttons then reports "I have rod motion." Verifies all rods insert and makes Scram Report to the SRO

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	SRO	Provides repeat back of Scram Report with All Rods Inserted and enters **EOI-1** on Low Reactor Water Level after Scram
	BOP	After Reactor Scram and Turbine Trip, Shuts all MSIVs to isolate the leak Reports to the SRO that the A MSL MSIVs failed to isolate manually or automatically
	SRO	**Enters EOI-3 on High Secondary Containment Temperature or Radiation**
	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, per Appendix 8F. Defeat isolation interlocks if necessary, Appendix 8E.
		If ventilation isolated and below 72 mr/hr, directs Operator to perform Appendix 8F.
	ATC/BOP	3-EOI Appendix 8F 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
CT #3	BOP	Dispatches personnel to investigate A MSIVs and manually close Outboard MSIVs
	Driver	If requested, wait 3 minutes and report Appendix 8E complete, **enter** bat app08e If dispatched for A MSIVs, acknowledge dispatch

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	SRO	Monitor and Control Secondary Containment Temperature.
		Operate available ventilation, per Appendix 8F.
		Is Any Area Temp 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
CT #2		Will Emergency Depressurization Reduce Discharge Into Secondary Containment? - **YES**
		Proceeds to the STOP sign Before any area temp rises to Max Safe (table 5) Continue:
CT #1		**Enters** EOI-1 RPV Control **and** directs Reactor Scram **before** any temperature exceeds MAX Safe. (Reactor Scram already conducted to prevent automatic Scram from occurring when MSIVs isolated on High Temperature)
CT #2		Stops at Stop sign When temperatures in two or more areas are above Max Safe, Then Emergency Depressurization is required.
	Crew	Monitors for Max Safe Temperatures
	SRO	EOI-3 Secondary Containment (Level)
		Monitor and Control Secondary Containment Water Levels.
		Is Any Floor Drain Sump Above 66 inches?– **NO** Is Any Area Water Level Above 2 inches? - **NO**

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	SRO	EOI-3 Secondary Containment (Radiation)
		Monitor and Control Secondary Containment Radiation Levels.
		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 (MSIVs have already been shut to prevent automatic isolation, however MSL A MSIVs did not shut)
		Will Emergency Depressurization Reduce Discharge Into Secondary Containment? - **YES**
		Before any area radiation rises to Max Safe (table 4) Continue and enter EOI-1 (EOI-1 has already been entered after Reactor Scram)
CT #2		Stops at Stop sign When radiation levels in two or more areas are above Max Safe, Then Emergency Depressurization is required.
	Crew	Monitors for Max Safe Radiation and reports (Suppression Pool Area, 90-29A, and CRD West, 90-20A, will be the first two Max Safe Radiation Areas in that order)
	ATC	Reports that RFPTs tripped after Reactor Scram and Reactor Water Level and pressure are lowering

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	SRO	Enters **EOI-1** on Low Reactor Water Level after Scram
	SRO	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. May Answer **YES**; during Scenario and direct Bypass Valves opened to Depressurize through the open MSIVs on the A MSL.
		IF Emergency Depressurization is required, **THEN** exit RC/P and enter C2 Emergency Depressurization. Answers **YES**; when two area radiation levels have reached MAX Safe.
		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, however, Reactor Pressure will be slowly lowering due to leak on the A MSL. If ED is not anticipated directs Reactor Pressure controlled using SRVs, if necessary, using 3-EOI-Appendix-11A
	ATC/BOP	Controls Reactor Pressure as directed and if ED anticipated opens Bypass Valves to Rapidly Depressurize the RPV irrespective of cooldown rate.
	Driver	If ED anticipated, Fuel Failure may have to be increased to force crew to ED on two Max Safe Rad Levels

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	BOP	**Maintains prescribed pressure band per 3-EOI-Appendix-11A, if necessary** 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.
	SRO	Reactor Level
		Monitor and Control Reactor Level
		Verify as required PCIS isolations
	SRO	IF It has not been determined that the reactor will remain subcritical? - **NO**
		IF RPV water level cannot be determined? - **NO**
		IF PC water level cannot maintained below 105 feet? - **NO**
		Restores and Maintains RPV Water Level between +2 and +51 inches, with one of the following injection sources: Directs a Level Band of (+) 2 to (+) 51 inches with HPCI, 3-EOI-Appendix-5D.

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	BOP	**Maintains the prescribed level band, per 3-EOI-Appendix-5D.** 1. IF Suppression Pool level drops below 12.75 ft during HPCI operation, THEN **TRIP** HPCI and **CONTROL** injection using other options. 2. IF Suppression Pool level CANNOT be maintained below 5.25 in., THEN **EXECUTE** EOI Appendix 16E concurrently with this procedure to bypass HPCI High Suppression Pool Water Level Suction Transfer Interlock. 3. IF BOTH of the following exist: • High temperature exists in the HPCI area, **AND** • SRO directs bypass of HPCI High Temperature Isolation interlocks, THEN **PERFORM** the following: a. **EXECUTE** EOI Appendix 16L concurrently with this procedure. b. **RESET** auto isolation logic using 3-XS-73-58A(B) HPCI AUTO-ISOL LOGIC A(B) RESET pushbuttons. **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. NOTE HPCI Auxiliary Oil Pump will NOT start UNTIL 3-FCV-73-16, HPCI TURBINE STEAM SUPPLY VLV, starts to open.

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	BOP	**Maintains the prescribed level band, per 3-EOI-Appendix-5D (cont'd).** 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.
	BOP	Reports to SRO that HPCI Flow Control Valve has failed in automatic control
		Takes manual control of HPCI Flow Control Valve and controls injection to maintain prescribed level band

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	SRO	Reactor Power
		Monitor and control Reactor Power
		If the Reactor is Subcritical and no Boron has been injected then exit RC/Q and enter 3-AOI-100-1, Reactor Scram - **YES**
	ATC	When time permits performs subsequent actions of 3-AOI-100-1
CT #2	SRO	Enters 3-C-2, "Emergency Depressurization" when two Max Safe Rad levels are reached
		Will the Reactor Remain Subcritical Without Boron Under All Conditions ?- **YES**
		Is Drywell Pressure Above 2.4 psig? - **NO**
		Is Suppression Pool Level Above 5.5 feet? - **YES**
		Directs All ADS Valves Open.
CT #2	ATC/BOP	Opens 6 ADS Valves.
	SRO	Can 6 ADS Valves Be Opened? - **YES**
	SRO	Directs Level Control transitioned to Condensate per 3-EOI-Appendix-6A
	ATC	**Maintains prescribed level band per 3-EOI-Appendix-6A** 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

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	ATC	**Maintains prescribed level band per 3-EOI-Appendix-6A (cont'd)** 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 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). 10. VERIFY RFW flow to RPV.
	ATC	Verifies RFP discharge valves are closed prior to Reactor Pressure dropping below condensate system discharge pressure to prevent overfeeding the Reactor

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	SRO	Enters EOI-2 on High Suppression Pool Temperature
		EOI-2 (Drywell Temperature)
	SRO	Monitor and Control DW Temp Below 160°F, using available DW Cooling.
		Can Drywell Temp Be Maintained Below 160°F? - **YES**
	SRO	Verify H2O2 Analyzers placed in service, Appendix 19.
	BOP	Places H2O2 analyzers in service, IAW Appendix 19.
	SRO	EOI-2 Primary Containment (Pressure)
		Monitor and Control PC Pressure Below 2.4 psig, Using the Vent System As Necessary. (Appendix 12)
		Can Primary Containment pressure be maintained below 2.4 psig? - **YES**
	SRO	EOI-2 Suppression Pool (Temperature)
		Monitor and Control Suppression Pool Temperature Below 95°F, Using Available Suppression Pool Cooling As Necessary. (Appendix 17A)
		Can Suppression Pool Temperature Be Maintained Below 95°F? - NO
		Operate all available suppression pool cooling, using only RHR Pumps not required to assure adequate core cooling by continuous injection. (Appendix 17A)
	BOP/ATC	Places RHR in Suppression Pool Cooling, (IAW Appendix 17A)

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	SRO	EOI-2 Suppression Pool Level
		Monitor and Control Suppression Pool Level between -1 inch and -6inch, (Appendix 18).
		Can Suppression Pool Level be maintained above -6 inches - **Yes**
		Can Suppression Pool Level be maintained below -1 inches - **Yes**
	BOP	**Places RHR in Suppression Pool Cooling IAW 3-EOI-Appendix-17A** 1. IF Adequate core cooling is assured, **OR** Directed to cool the Suppression Pool 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**. 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.

Simulator Event Guide:

Event 7 Major: MSL A Break in Reactor BLDG with MSL A valves failing to close

	BOP	**Places RHR in Suppression Pool Cooling IAW 3-EOI-Appendix-17A (cont'd)** **CAUTION** RHR System flows below 7000 gpm or above 10000 gpm for one-pump operation may result in excessive vibration and equipment damage. i. **THROTTLE** 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.
	SRO	Emergency Plan Classification 3.2-S

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

None

Operations/Maintenance for the Shift:

Return Condenser Circulating Water Pump 3A to service, IAW 3-OI-27 section 8.2. All Amertap balls have been collected IAW 3-OI-27B, Radwaste discharge is not in progress, and Cooling Towers are not in service.

Commence a power increase to 100%

Unit 1 and 2 are at 100% Power

Unusual Conditions/Problem Areas:

None

Facility: **Browns Ferry NPP** Scenario No.: **NRC – 4** Op-Test No.: **1108**

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

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 100% power. HPCI is out of service.

Turnover: Transfer 4kV Unit board 3A from USST to Start Bus 1A 0-OI-57A section 8.15.1. Lower reactor power to 90% using recirc for surveillance testing

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Transfer 4KV UB-3A from USST 3B to Start Bus 1A IAW 0-OI-57A section 8.15.1
2		R-ATC R-SRO	Power decrease with flow
3	Batch File	TS-SRO	Core Spray Loop 1 Inoperable failed FCV-75-25
4	EG02	C-BOP C-SRO	Stator Water Cooling Pump Trip
5	EG03	C-BOP C-SRO	Turbine Generator Voltage Regulator Failure
6	TH10/11b	C-ATC R-ATC TS-SRO	LOCA - Recirculation Pump B Inboard and Outboard seal failure
7	TC10b	C-BOP C-SRO	EHC Pressure Transducer Failure
8		M-ALL	ATWS, without MSIVs
9	RC08	C	RCIC steam supply valve fails to auto open
10	IOR	C	CRD Controller Fails Low (FIC-85-11)

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

Rec'd 6/10/11

CRITICAL TASKS - Three

CT#1-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 Appendices.

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

CT#2 – RPV Level maintained above -162 inches, RCIC has been manually initiated.

1. Safety Significance:
   Maintaining adequate core cooling

2. Cues:
   RPV level indication

3. Measured by:
   RCIC injecting at 600 gpm

4. Feedback:
   RPV level trend
   RCIC injection valve open

CT#3 - 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 annunciator status

Events

1. BOP Transfers 4KV Unit Board - 3A from USST 3B to Start Bus 1A IAW 0-OI-57A section 8.15.1

2. ATC lowers power with flow

3. Core Spray Loop #1 – FCV-75-25 Loss of Power in Close position. SRO will determine Technical Specification 3.5.1 Condition A and D is applicable 72 hours to restore HPCI or Core Spray Loop 1 to Operable.

4. Stator Water Cooling Pump trip, BOP operator starts standby pump and restores stator water cooling prior to a turbine trip.

5. Turbine Generator Voltage Regulator will fail high in automatic and not transfer to manual. BOP will respond according to ARPs and transfer the voltage regulator to manual and restore Generator MVAR loading to normal.

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 B RR Pump IAW with 3-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 with 24 hours to establish single loop conditions. Can follow up with RCS Operational Leakage Technical Specification prior to RR Loop isolation, Technical Specification 3.4.4 Condition A.

7. EHC Pressure Transducer Failure – non-operating pressure regulator takes control. This results in slowly decreasing reactor pressure. ATC inserts a scram and the BOP operator closes the MSIVs prior to reactor pressure lowering to less than 900 psig IAW 3-AOI-47-2.

8. ATWS exists on the scram the crew will enter EOI-1, EOI-2 and EOI-C-5. Crew will insert control rods, control reactor pressure on SRVs, initiate SLC.

9. RCIC steam supply valve will not auto-open on initiation signal, level will degrade until RCIC is manually started. Once started RCIC will maintain level above TAF.

10. CRD Controller will fail low ATC takes manual control of controller and restores CRD parameters

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

Control Rods are being inserted

Reactor Level is being maintained

Reactor Pressure Controlled on SRVs

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 4

7 Total Malfunctions Inserted: List (4-8)

2 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)

1 EOI Contingencies used: List (0-3)

75 Validation Time (minutes)

3 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Transfer 4KV Unit Board			
RO U-57A-NO-1 SRO S-57A-NO-4	262001A4.05	3.3	3.3
Lower Power with Recirc Flow			
RO U-068-NO-17 SRO S-000-NO-138	2.1.23	4.3	4.4
Stator Water Cooling Pump Trip			
RO U-35A-AL-2 SRO S-070-AB-1	245000A4.03	2.7	2.8
Turbine Generator Voltage Regulator Failure			
RO U-47-AL-20 SRO S-57A-AB-4	262001A2.09	3.1	3.4
RR Pump Seal Failure			
RO U-068-AL-9 SRO S-068-AB-1	203000A4.02	4.1	4.1
EHC Pressure Transducer Failure			
RO U-047-AB-2 SRO S-047-AB-2	241000A2.03	4.1	4.2
ATWS			
RO U-000-EM-35 SRO S-000-EM-1 SRO S-000-EM-2 SRO S-000-EM-3	295015AA2.01	4.1	4.3

Procedures Used/Referenced:

Procedure Number	Procedure Title	Procedure Revision
0-OI-57A	Switchyard and 4160V AC Electrical System	Rev.141
3-GOI-100-12	Power Maneuvering	Rev. 35
3-OI-68	Reactor Recirculation System	Rev. 80
3-ARP-9-3C	Alarm Response Procedure	Rev. 26
3-TSR	BFN-UNIT 3 Tech Spec 3.5-1	Amend No. 244 December 1, 2003
3-ARP-9-7A	Alarm Response Procedure	Rev. 22
3-ARP-9-8A	Alarm Response Procedure	Rev. 34
3-ARP-9-4B	Alarm Response Procedure	Rev. 42
3-AOI-64-1	Drywell Pressure and/or Temperature High, or Excessive Leakage Into Drywell	Rev. 3
3-AOI-68-1A	Recirc Pump Trip/Core Flow Decrease OPRMs Operable	Rev. 6
3-AOI-47-2	Turbine EHC Control System Malfunctions	Rev. 6
3-EOI-1	RPV CONTROL FLOWCHART	Rev. 8
3-EOI APPENDIX-1D	INSERT CONTROL RODS USING REACTOR MANUAL CONTROL SYSTEM	Rev. 2
3-EOI-2	PRIMARY CONTAINMENT CONTROL FLOWCHART	Rev.7
3-EOI APPENDIX-5C	INJECTION SYSTEM LINEUP RCIC	Rev. 3
3-EOI APPENDIX-1F	MANUAL SCRAM	Rev. 2
3-EOI APPENDIX-2	DEFEATING ARI LOGIC TRIPS	Rev. 4
3-EOI-C-5	LEVEL-POWER CONTROL FLOWCHART	Rev. 9

Simulator Instructor - **IC-204**

#HPCI tagout
bat nrchpcito

#Tech Spec call SRO Core Spray System #1
ior ypovfcv7525 (e1 0) fail_now
ior xa553c[27] (e1 0) crywolf

#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

#Turbine Generator Voltage Regulator failure
imf eg03 (e10 0)

#B Recirc pump seal failures
imf th12b (e15 0)
imf th10b (e15 0) 100
imf th11b (e15 180) 100 60 0

#B EHC Pressure transducer failure
bat atws70
ior zdihs0116[1] (e20 0) select
ior zdihs47204[1] (e20 0) null
ior zlohs0116[1] off
ior zlohs47204[1] on
imf tc10b (e20 0) 86 1200 79

#RCIC steam supply valve fails to auto open
imf rc08
trg 25 = bat sdv
trg 26 = bat atws-1
trg 27 = bat app01f
trg 28 = bat app02
trg 29 = bat app08ae

#After Scram manually insert under DI Overide
#3-FIC-85-11 0-100(L)

Scenario 4

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 204
Simulator Setup	**Load Batch**	bat nrc1108-4
Simulator Setup	manual	Verify file loaded
Simulator Setup	Manual	Hang clearance on HPCI

Simulator Event Guide:

Event 1 Normal: Transfer 4KV UB-3A from USST 3B to Start Bus 1A

	SRO	Directs Transfer 4KV UB-3A from USST 3B to Start Bus 1A per 0-OI-57A section 8.15.1
	BOP	**8.15.1 Transfer 4kV Unit Board 3A from USST to Start Bus** [1] **REVIEW** all Precautions and Limitations in Section 3.0.
		CAUTIONS 1) This board transfer can cause a power interruption causing a loss of Computer Rooms and Communication Battery Board ACU, Computer UPS ACU, and Communication rooms ACU. 2) Capacitor bank fuses are subject to clearing when Unit Boards are supplied from the 161 source and large pumps are started. Unit Supervisors should evaluate placing the Capacitor Banks in Manual prior to starting Condensate, CBP, RHR, CS or CCW pumps. 3) If 4kV Unit Board 3A is fed from the Alternate Power Supply (Start Bus), then Auto transfer must be blocked for: • 4kV UNIT BD 1A, 1B, 1C, 2A, 2B, and 2C. (Ref. 3-45E721 OPL) • 4kV COM BD A and B. (3-45E721 OPL) 4) If either 4kV UNIT BD 1A, 1B, 2A or 2B is aligned to a Start Bus, prior to aligning UNIT BD 3A to the Start Bus, check Technical Specifications 3.8.1.a and 3.8.2.a to determine operability of qualified AC circuits between the offsite transmission network and the onsite Class 1E Electrical Power Distribution System.
		NOTES 1) All procedural steps are performed from Control Room Panel 3-9-8, unless specified. 2) This procedure section contains actions ensure electrical load restrictions are not exceeded when 4kV UNIT BD 3A is placed on Alternate Supply (Start Bus).
		[2] Ensure the 4kV Start Busses are aligned Normal. [2.1] On Panel 9-23-2, **VERIFY** 4kV Start Bus 1A ALT FDR BKR 1518 OPEN. [2.2] On Panel 9-23-2, **VERIFY** 4kV Start Bus 1B ALT FDR BKR 1414 OPEN.
		[3] **RE-ALIGN** 4kV Auto Transfers to met Load Restrictions [3.1] On Panel 1-9-8, **PLACE** 1-XS-57-4, 4kV UNIT BD 1A MAN/AUTO SELECT switch to MAN. [3.2] On Panel 1-9-8, **PLACE** 1-XS-57-7, 4kV UNIT BD 1B MAN/AUTO SELECT switch to MAN.

Simulator Event Guide:

Event 1 Normal: Transfer 4KV UB-3A from USST 3B to Start Bus 1A

		[3.3] On Panel 1-9-8, **PLACE** 1-XS-57-10, 4kV UNIT BD 1C MAN/AUTO SELECT switch to MAN. [3.4] On Panel 3-9-8, **PLACE** 3-XS-57-4, 4kV UNIT BD 2A MAN/AUTO SELECT switch to MAN. [3.5] On Panel 3-9-8, **PLACE** 3-XS-57-7, 4kV UNIT BD 2B MAN/AUTO SELECT switch to MAN. [3.6] On Panel 3-9-8, **PLACE** 3-XS-57-10, 4kV UNIT BD 2C MAN/AUTO SELECT switch to MAN. [3.7] On Panel 0-9-23-3, **PLACE** 0-43-203-A, 4kV COM BD A MAN/AUTO SELECT switch to MAN. [3.8] On Panel 0-9-23-4, **PLACE** 0-43-203-B, 4kV COM BD B MAN/AUTO SELECT switch to MAN.
IVER	DRIVER	When requested to **RE-ALIGN** 4kV UNIT BD Auto Transfer Scheme. Report switches for 4 KV **Unit** Boards 1A, 1B, 1C, 2A, 2B, 2C, AND **Common** Boards A and B have been place in **MANUAL**.
		[4] **TRANSFER** 4kv UNIT BD 3A to the ALT FD [4.1] **PLACE** 3-XS-57-4, 4kV UNIT BD 3A MAN/AUTO SELECT switch to MAN. [4.2] **PLACE** 3-XS-202-1, 4kV BD/BUS/XFMR VOLTAGE SELECT switch to START BUS 1A. [4.3] **CHECK** START BUS 1A Voltage on 3-EI-57-28 is between 3950 and 4400 Volts. [4.4] **PLACE** and **HOLD** 3-HS-57-5, 4kV UNIT BD 3A ALT FDR BKR 1432 switch to CLOSE. [4.5] **PLACE** 3-HS-57-3, 4kV UNIT BD 3A NORM FDR BKR 1312 switch to TRIP. [4.6] **CHECK CLOSED** the 4kV UNIT BD 3A, ALT FDR BREAKER 1432.

Simulator Event Guide:

Event 1 Normal: Transfer 4KV UB-3A from USST 3B to Start Bus 1A (continued)

		[4.7] **CHECK OPEN** the 4kV UNIT BD 3A, NORM FDR BREAKER 1312. [4.8] **RELEASE** BKRs 1432 and 1312 control switches. [4.9] **PLACE** 3-XS-202-1, 4kV BD/BUS/XFMR VOLTAGE SELECT SWITCH TO UNIT BD 3A. [4.10] **CHECK** 4kV UNIT BD 3A voltage is between 3950 and 4400 Volts. [4.11] **VERIFY LOCALLY** 4kV BKR 1432 closing spring target indicates charged and the amber breaker spring charged light is on. [4.12] As directed by the Unit Supervisor, **PLACE** a Caution Order on the Condensate, CBP, CS, RHR or CCW Pump stating, "Evaluate the need to place CAP Banks in Manual prior to starting Pump." [4.13] **RETURN** the Computer Rooms, Communication Battery Board, Computer UPS, and Communication rooms ACUs to service per 0-OI-31.
DRIVER	DRIVER	When requested, acknowledge that a Caution Order will need to be placed on the Condensate, CBP, CS, RHR or CCW Pump stating, "Evaluate the need to place CAP Banks in Manual prior to starting Pump."
DRIVER	DRIVER	When requested, acknowledge that the Computer Rooms, Communication Battery Board, Computer UPS, and Communication rooms ACUs are to be returned to service per 0-OI-31. There are no simulator actions required to complete this step.

Simulator Event Guide:

Event 2 Reactivity: Lower Reactor Power with Recirc Flow

	SRO	Notify ODS of power decrease
		Direct Power Reduction using Recirc Flow per 3-GOI-100-12: [9] **REDUCE** reactor power by a combination of control rod insertions and core flow changes, as recommended by Reactor Engineer. **REFER TO** 3-SR-3.1.3.5(A) and 3-OI-68. (N/A if entering 3-GOI-100-12 to recover from Recirc Pump Trip)
	ATC	Lowers Power w/Recirc using 3-OI-68, section 6.2
		[1] **IF** desired to control Recirc Pumps 3A and/or 3B speed with Recirc Individual Control, **THEN** **PERFORM** the following; (Otherwise N/A) • Raise Recirc Pump 3A using, RAISE SLOW (MEDIUM), 3-HS-96-15A(15B). (Otherwise N/A) • Lower Recirc Pump 3A using SLOW (MEDIUM) (FAST), 3-HS-96-17A(17B)(17C). (Otherwise N/A) AND/OR • Raise Recirc Pump 3B using, RAISE SLOW (MEDIUM), 3-HS-96-16A(16B). (Otherwise N/A) • Lower Recirc Pump 3B using SLOW (MEDIUM) (FAST), 3-HS-96-18A(18B)(18C). (Otherwise N/A)
		[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 **LOWER** SLOW, 3-HS-96-33 **LOWER** MEDIUM, 3-HS-96-34 **LOWER** FAST, 3-HS-96-35

Simulator Event Guide:

Event 3: Core Spray Loop 1 Inoperable failed FCV-75-25

NRC	NRC	When satisfied with Reactivity manipulation- Move on to Core Spray Loop 1 Inoperable failed FCV-75-25
DRIVER	DRIVER	Insert TRIGGER 1 to cause a loss of power on 3-FCV-25-75
	BOP	Responds to annunciator on panel 3-9-3 Window 27
		Recognizes 3-FCV-25-75, CORE SPRAY SYS I INBD INJECT VALVE, does not have indication.
DRIVER	DRIVER	When dispatched to check the breaker for 3-FCV-25-75, CORE SPRAY SYS I INBD INJECT VALVE, report that the control power fuse is blown and there is some charred wiring in the breaker.
	SRO	References Tech Spec 3.5.1 and enters Conditions A and D.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

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.

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable to HPCI.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable. OR One low pressure coolant injection (LPCI) pump in both LPCI subsystems inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	7 days
D. HPCI System inoperable. AND Condition A entered.	D.1 Restore HPCI System to OPERABLE status. OR D.2 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours 72 hours

Simulator Event Guide:

Event 4 Component: Stator Water Cooling Pump Trip

DRIVER	DRIVER	At NRC direction Insert **TRIGGER 5** to cause a trip of the B stator water cooling pump and insert **TRIGGER 10** to cause the Turbine Generator Voltage Regulator to fail high in automatic (This failure will take approximately 9 minutes before the first annunciator is received).
	BOP	Responds to annunciator 3-9-7A window 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.
	BOP	Operator starts the standby Stator Water Cooling Pump and restores Stator Water Cooling .
DRIVER	DRIVER	When/If dispatched to investigate the B Stator Water Cooling Pump, wait 5 minutes and report unable to determine cause of trip

Simulator Event Guide:

Event 5 Component: Turbine Generator Voltage Regulator Failure

DRIVER	DRIVER	**TRIGGER 10** that causes the Turbine Generator Voltage Regulator to fail high in automatic is already in progress.
	NRC	This failure will take approximately 9 minutes before the first annunciator is received.
	BOP	Reports the following alarms: GENERATOR EXCTR PWR RECTIFIER TEMP HIGH GEN VOLTS PER CYCLE HIGH GEN HYDROGEN SYSTEM ABNORMAL
	BOP	**GEN VOLTS PER CYCLE HIGH, 3-9-8A window 9** A. **VERIFY** VOLTAGE REG TRANSFER switch in MANUAL. B. At Panel 3-9-8, **ADJUST** EXCITER FIELD VOLTAGE 70P MANUAL (3-HS-57-25) to maintain the following: 1. GENERATOR VOLTS, 3-EI-57-39, between 20,900V and 23,100V. 2. GENERATOR MVARS, 3-EI-57-51, within the generator capability curve. **REFER TO** 3-OI-47, Illustration 6. C. **IF** Turbine/Generator trips and power is less than ~30%, **THEN** **VERIFY** Bypass Valves Controlling Reactor Pressure. **REFER TO** 3-AOI-47-1. D. **IF** Reactor scrams, **THEN** **REFER TO** 3-AOI-100-1.
	BOP	Takes Voltage Regulator to Manual
	Crew	Make notifications, Must notify Load Dispatch when voltage regulator not in Auto
Driver	Driver	Acknowledge notifications
Driver	Driver	At NRC direction initiate trigger 15 for Reactor Recirc Pump B Seal Failure

Simulator Event Guide:

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

DRIVER	DRIVER	At NRC direction, insert **TRIGGER 15** to cause the B Recirc pump seals to fail.
	ATC	Reports failure of the #1 Reactor Recirc Pump B Seal
		RECIRC PUMP B NO. 1 SEAL LEAKAGE ABN, 3-9-4B Window 25: A. **DETERMINE** initiating cause by comparing No. 1 and 2 seal cavity pressure indicators on Panel 3-9-4 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.
		NOTE 1) Possible indications of dual seal failure include: • Window 18 on this panel alarming in conjunction with this window. • Rising drywell pressure and/or temperature. • Increased leakage into the drywell sump. • Increased vibration of the recirc pump.
	ATC	Identifies that the #2 seal is also failed/failing.
		D. **IF** dual seal failure is indicated, **THEN** 1. SHUTDOWN Recirc Pump 3B by DEPRESSING RECIRC DRIVE 3B SHUTDOWN, 3-HS-96-20. 2. **VERIFY TRIPPED**, RECIRC DRIVE 3B NORMAL FEEDER, 3-HS-57-14.

Simulator Event Guide:

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

		3. **VERIFY TRIPPED**, RECIRC DRIVE 3B ALTERNATE FEEDER, 3-HS-57-12. 4. **CLOSE** Recirculation Pump 3B suction valve. 5. **CLOSE** Recirculation Pump 3B discharge valve. 6. **REFER TO** 3-AOI-68-1A or 3-AOI-68-1B AND 3-OI-68. 7. **DISPATCH** personnel to SECURE Recirculation Pump 3B seal Water
	SRO	Enters: 3-AOI-68-1A, Recirc Pump Trip/Core Flow Decrease OPRMs Operable, 3-AOI-64-1, Drywell Pressure and/or Temperature High, or Excessive Leakage Into Drywell.
		3-AOI-68-1A, Recirc Pump Trip/Core Flow Decrease OPRMs Operable [2] **IF** a single Recirc Pump tripped, **THEN** **CLOSE** tripped Recirc Pump discharge valve. [3] **IF** Region I or II of the Power to Flow Map is entered, **THEN** (Otherwise N/A) **IMMEDIATELY** take actions to INSERT control rods to less than 95.2% loadline. **REFER TO** 0-TI-464, Reactivity Control Plan Development and Implementation. [4] **RAISE** core flow to greater than 45%. **REFER TO** 3-OI-68. [5] **INSERT** control rods to exit regions if not already exited. Refer to 0-TI-464, Reactivity Control Plan Development and Implementation. **NOTE** The remaining subsequent action steps apply to a single Reactor Recirc Pump trip. [6] **MAINTAIN** operating Recirc pump flow less than 46,600 gpm. **REFER** to 3-OI-68. [7] **WHEN** plant conditions allow, **THEN**, (Otherwise N/A) **MAINTAIN** operating jet pump loop flow greater than 41 x 106 lbm/hr (3-FI-68-46 or 3-FI-68-48).

Simulator Event Guide:

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

	ATC	Inserts Rods per Emergency shove sheet to get below 95% loadline
		When less than 95% load line raises core flow
	SRO	AOI-64-1 Directs BOP to Vent the Drywell
	BOP	**3-AOI-64-1 Drywell Pressure and/or Temperature High, or Excessive Leakage Into Drywell** [3] **VENT** Drywell as follows: [3.1] **CLOSE** SUPPR CHBR INBD ISOLATION VLV 3-FCV-64-34 (Panel 3-9-3). [3.2] **VERIFY OPEN**, DRYWELL INBD ISOLATION VLV, 3-FCV-64-31 (Panel 3-9-3). [3.3] **VERIFY** 3-FIC-84-20 is in AUTO and SET at 100 scfm (Panel 3-9-55). [3.4] **VERIFY** Running, required Standby Gas Treatment Fan(s) SGTS Train(s) A, B, C (Panel 3-9-25). [3.5] **IF** required, **THEN** **REQUEST** Unit 1 Operator to START Standby Gas Treatment Fan(s) SGTS Train(s) A, B. (Otherwise **N/A)**
DRIVER	DRIVER	When requested to start a standby gas fan remote function pc01a or b or c

Simulator Event Guide:

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

<table>
<tr><td></td><td>SRO</td><td>Evaluates Tech Spec 3.4.1 and enters Condition A</td></tr>
<tr><td></td><td></td><td>3.4.1 Recirculation Loops Operating

LCO 3.4.1Two recirculation loops with matched flows shall be in operation

<u>OR</u>

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.</td></tr>
<tr><td></td><td></td><td>
<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 Satisfy the requirements of the LCO.</td><td>24 hours</td></tr>
<tr><td>B. Required Action and associated Completion Time of Condition A not met.

<u>OR</u>

No recirculation loops in operation.</td><td>B.1 Be in MODE 3.</td><td>12 hours</td></tr>
</table>
</td></tr>
</table>

Simulator Event Guide:

Event 7 Component: EHC Pressure Transducer Failure

DRIVER	DRIVER	At NRC direction, insert **TRIGGER 20** to cause the B EHC Pressure transducer to fail. **Verify tc10b initial setpoint prior to inserting trigger**
	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 [1] **IF** Reactor Pressure lowers to or below 900 psig, **THEN MANUALLY SCRAM** the Reactor and **CLOSE** the MSIVs.
	SRO	Directs manual scram, closing of the MSIV's, and entry into 3-AOI-100-1.
	ATC	Manually scrams the reactor.
DRIVER	DRIVER	After Scram manually insert under **DI Override 3-FIC-85-11 0-100(L)** and insert **TRIGGER 25** to enter bat SDV
	BOP	Closes the MSIV's.
	SRO	Enter 3-EOI-1, "RPV Control".
	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 required THEN exit RC/P and enter C2 Emergency Depressurization? - NO
		IF RPV water level cannot be determined? - NO
		Is any MSRV Cycling? - YES
		IF Steam cooling is required? - NO
		IF Suppression Pool level and temperature cannot be maintained in the safe area of Curve 3? - NO

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

	SRO	3-EOI-1 (Reactor Pressure)
		IF Suppression Pool level cannot be maintained in the safe area of Curve 4? - NO
		IF Drywell Control air becomes unavailable? – NO. **THEN** crosstie CAD to Drywell Control Air, Appendix 8G.
		IF Boron injection is required? - NO
	SRO	Direct a Pressure Band of 800 to 1000 psig, Appendix 11A.
	ATC/BOP	Maintain directed pressure band, IAW Appendix 11A.
	SRO	EOI-1 RPV Pressure – Augment RPV Pressure control as necessary with one or more of the following depressurization systems: HPCI Appendix 11C, RCIC Appendix 11B, RFPTs on minimum flow Appendix 11F, Main Steam System Drains Appendix 11D, Steam Seals Appendix 11G, SJAEs Appendix 11G, Off Gas Preheater Appendix 11G, RWCU Appendix 11E.
	ATC/BOP	Pressure Control IAW Appendix11A, RPV Pressure Control SRVs
		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. 3-PCV-1-179 MN STM LINE A RELIEF VALVE
		b. 3-PCV-1-180 MN STM LINE D RELIEF VALVE.
		c. 3-PCV-1-4 MN STM LINE A RELIEF VALVE
		d. 3-PCV-1-31 MN STM LINE C RELIEF VALVE
		e. 3-PCV-1-23 MN STM LINE B RELIEF VALVE
		f. 3-PCV-1-42 MN STM LINE D RELIEF VALVE
		g. 3-PCV-1-30 MN STM LINE C RELIEF VALVE

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

	ATC/BOP	Pressure Control IAW Appendix11A, RPV Pressure Control SRVs (continued)
		h. 3-PCV-1-19 MN STM LINE B RELIEF VALVE.
		i. 3-PCV-1-5 MN STM LINE A RELIEF VALVE.
		j. 3-PCV-1-41 MN STM LINE D RELIEF VALVE
		k. 3-PCV-1-22 MN STM LINE B RELIEF VALVE
		l. 3-PCV-1-18 MN STM LINE B RELIEF VALVE
		m. 3-PCV-1-34 MN STM LINE C RELIEF VALVE
	SRO	EOI-1 (Reactor Level)
		Monitor and Control Reactor Level.
		Verify as required PCIS isolations group (1,2 and 3), ECCS and RCIC, Directs group 2 and 3 verified.
	ATC/BOP	Verifies Group 2 and 3 isolation.
	SRO	IF it has not been determined that the reactor will remain subcritical, **THEN** Exit RC/L; **ENTER** C5 Level / Power Control.
		If Emergency Depressurization is required? - NO
		RPV Water level cannot be determined? – NO
		The reactor will remain subcritical without Boron under all conditions? - NO
		PC water level cannot be maintained below 105 feet **OR** Suppression Chamber pressure cannot be maintained below 55 psig? - NO
CT#3	SRO	Directs ADS Inhibited.
CT#3	ATC/BOP	Inhibits ADS.
	SRO	Is any Main Steam Line Open?- NO

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

	SRO	C5 Level / Power Control
		IF Suppression Pool Temperature is above 110°F **AND** Reactor Power is above 5% **AND** a MSRV is open or cycling **OR** drywell pressure is above 2.4 psig **AND** RPV water level is above -162 inches? – NO
		Is Reactor Power above 5% ?- YES
		Stop and Prevent all injection into the RPV except from RCIC, CRD, and SLC (Appendix 4). **WHEN** RPV Level drops below -50 inches; **THEN** Continue:
	SRO	Direct Terminate and Prevent IAW Appendix 4.
		IF Suppression Pool Temperature is above 110°F **AND** Reactor Power is above 5% **AND** a MSRV is open or cycling **OR** drywell pressure is above 2.4 psig **AND** RPV water level is above -162 inches – IF YES?
		Stop and Prevent all injection into the RPV except from RCIC, CRD, and SLC; irrespective of any consequent reactor power or reactor water level oscillations.
		WHEN RPV Level drops below -50 inches and any of the following exist: • Power drops below 5% **OR** • All MSRVs remain closed and DW pressure remains below 2.4 psig **OR** • Water level reaches -162 inches **THEN** Continue:
	ATC/BOP	Terminate and Prevent IAW Appendix 4
	BOP/ATC	**Appendix 4** 1. **PREVENT** injection from HPCI by performing the following: a. IF HPCI Turbine is **NOT** at zero speed, **THEN PRESS** and **HOLD** 3-HS-73-18A, HPCI TURBINE TRIP push-button. b. **WHEN** HPCI Turbine is at zero speed, **THEN PLACE** 3-HS-73-47A, HPCI AUXILIARY OIL PUMP control switch in PULL TO LOCK and **RELEASE** 3-HS-73-18A, HPCI TURBINE TRIP push-button. 3. **PREVENT** injection from CORE SPRAY following an initiation signal by **PLACING** ALL Core Spray pump control switches in STOP.

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

		4. **PREVENT** injection from LPCI SYSTEM I by performing the following: **NOTE** Injection may be prevented by performing EITHER step 4.a or step 4.b. a. Following automatic pump start, PLACE RHR SYSTEM I pump control switches in STOP. **OR** b. BEFORE RPV pressure drops below 450 psig, 1) PLACE 3-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in BYPASS. **AND** 2) VERIFY CLOSED 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE.
		5. **PREVENT** injection from LPCI SYSTEM II by performing the following:
		NOTE Injection may be prevented by performing EITHER step 5.a or step 5.b. a. Following automatic pump start, PLACE RHR SYSTEM II pump control switches in STOP. **OR** b. BEFORE RPV pressure drops below 450 psig, 1) PLACE 3-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in BYPASS. **AND** 2) VERIFY CLOSED 3-FCV-74-66, RHR SYS II LPCI OUTBD INJECT VALVE
		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.

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

		Appendix 4 (continued) c. **CLOSE** the following valves BEFORE RPV pressure drops below 500 psig: • 3-FCV-3-19, RFP 2A DISCHARGE VALVE • 3-FCV-3-12, RFP 2B DISCHARGE VALVE • 3-FCV-3-5, RFP 2C DISCHARGE VALVE • 3-LCV-3-53, RFW START-UP LEVEL CONTROL
		d. **TRIP** RFPTs as necessary to prevent injection by **DEPRESSING** the following push-buttons: • 3-HS-3-125A, RFPT 3A TRIP • 3-HS-3-151A, RFPT 3B TRIP • 3-HS-3-176A, RFPT 3C TRIP.
CT#2	SRO	**WHEN** RPV Level drops below -50 inches **THEN** Continue: **OR** **WHEN** RPV Level has dropped below -50 inches **AND** Power is below 5% **OR** Reactor Level reaches -162 inches, **THEN** Continue: Directs a Level Band with RCIC.

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs (continued)

	SRO	EOI-1 (Power Control)
		Monitor and Control Reactor Power.
		Will the reactor will remain sub subcritical without boron under all conditions? - NO
		If the reactor subcritical and No boron has been injected?- NO
		Verify Reactor Mode Switch in Shutdown.
		Initiate ARI.
	ATC	Initiates ARI.
	SRO	Verify Recirc Runback (pump speed 480 rpm).
	ATC	Verifies Recirc Runback.
	SRO	Is Power above 5%? - YES
		Directs tripping Recirc Pumps.
	ATC	Trips Recirc Pumps.
CT#1	SRO	Before Suppression Pool temperature rises to 110°F, continue:
		Insert Control Rods Using **one or more** of the following methods: • Appendix 1F • Appendix 1D
	DRIVER	**WHEN** directed to perform Appendix 1F and Appendix 2, wait 4 minutes and insert **TRIGGER 27** and **TRIGGER 28 THEN** report appendix 2 complete and field action for appendix 1F complete. **WHEN** the Scram has been reset **THEN** insert **TRIGGER 26** to enter bat ATWS-1
CT#1	ATC	Inserts Control Rods, IAW Appendix 1D and 1F.

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

	ATC	Insert Control Rods, IAW 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 SHUTOFF. 6. **WHEN** CRD Accumulators are recharged, **THEN INITIATE** manual Reactor Scram and ARI. 7. **CONTINUE** to perform Steps 1 through 6, **UNTIL ANY** of the following exists: • ALL control rods are fully inserted, **OR** • NO inward movement of control rods is observed, **OR** • SRO directs otherwise.

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

CT#1	BOP/ATC	Initiate SLC IAW Appendix 3A
		1. **UNLOCK** and **PLACE** 3-HS-63-6A, SLC PUMP 2A/2B, control switch in START-A or START-B position. 2. **CHECK** SLC System for 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 on Panel 3-9-5 (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 on Panel 3-9-5. • SLC INJECTION FLOW TO REACTOR Annunciator in alarm on Panel 3-9-5 (3-XA-55-5B, Window 14).
		3. IF Proper system operation CANNOT be verified, THEN **RETURN** to Step 1 and **START** other SLC pump. 4. **VERIFY** RWCU isolation by observing the following: • RWCU Pumps 2A and 2B tripped. • 3-FCV-69-1, RWCU INBD SUCT ISOLATION VALVE closed. • 3-FCV-69-2, RWCU OUTBD SUCT ISOLATION VALVE closed. • 3-FCV-69-12, RWCU RETURN ISOLATION VALVE closed. 5. **VERIFY** ADS inhibited. 6. **MONITOR** reactor power for downward trend. 7. **MONITOR** 3-LI-63-1A, SLC STORAGE TANK LEVEL, and **CHECK** that level is dropping approximately 1% per minute.

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

	SRO	**ENTER** 3-EOI-2, "Primary Containment Control"
		EOI-2 (Drywell Temperature)
	SRO	Monitor and Control DW Temp Below 160°F using available DW Cooling.
		Can Drywell Temp Be Maintained Below 160°F? - YES
	SRO	EOI-2 (Primary Containment Hydrogen)
		If PCIS Group 6 isolation exists? – YES **THEN DIRECTS**: 1. Place analyzer isolation bypass keylock switches to bypass. 2. Select Drywell or suppression chamber and momentarily pull out select switch handle to start sample pumps.
	BOP	1. Place analyzer isolation bypass keylock switches to bypass. 2. Select Drywell or suppression chamber and momentarily pull out select switch handle to start sample pumps.
	SRO	EOI-2 (Suppression Pool Temperature)
		Monitor and Control Suppression Pool Temperature Below 95°F, Using Available Suppression Pool Cooling As Necessary (Appendix 17A)
		Can Suppression Pool Temperature Be Maintained Below 95°F? – NO
		Operate all available Suppression pool cooling, using only RHR Pumps not required to assure adequate core cooling by continuous injection, Appendix 17A.
	ATC/BOP	Place an RHR System in Pool Cooling, when directed IAW Appendix 17A.
	SRO	Before Suppression Pool Temperature rises to 110°F Continue in EOI-1 RPV Control
		Can Suppression Pool temperature and level be maintained within a safe area of curve 3? - YES
	SRO	EOI-2 (Suppression Pool Level)
		Monitor and Control Suppression Pool Level between -1 inch and -6 inches, (Appendix 18).
		Can Suppression Pool Level be maintained above -6 inches? – YES
		Can Suppression Pool Level be maintained below -1 inch? – YES

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

	SRO	EOI-2 (Primary Containment Pressure)
		Monitor and Control PC Pressure Below 2.4 psig, Using the Vent System As Necessary, (Appendix 12)
	SRO	Can Primary Containment pressure be maintained below 2.4 psig? – YES
	ATC	Place Suppression Pool Cooling in service, IAW Appendix 17A.
		1. **IF** Adequate core cooling is assured, **OR** Directed to cool the Suppression Pool irrespective of adequate core cooling, **THEN BYPASS** LPCI injection valve open interlock AS NECESSARY: • **PLACE** 3-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in BYPASS. • **PLACE** 3-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in BYPASS.
		2. **PLACE** RHR SYSTEM I(II) in Suppression Pool Cooling as follows: a. **VERIFY** at least one RHRSW pump supplying each EECW header. b. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger(s). c. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1350 and 4500 gpm RHRSW flow: • 3-FCV-23-34, RHR HX 2A RHRSW OUTLET VLV • 3-FCV-23-46, RHR HX 2B RHRSW OUTLET VLV • 3-FCV-23-40, RHR HX 2C RHRSW OUTLET VLV • 3-FCV-23-52, RHR HX 2D RHRSW OUTLET VLV. d. **IF** Directed by SRO, **THEN PLACE** 3-XS-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD in MANUAL 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.

Simulator Event Guide:

Event 8 Major: ATWS, without MSIVs

		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.
		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.

Simulator Event Guide:

Event 9 Component: RCIC steam supply valve fails to auto open

CT#2	ATC/BOP	Recognize that 3-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV fails to open on a RCIC automatic initiation signal. Manually starts RCIC.
	ATC/BOP	Maintain Directed Level Band with RCIC, Appendix 5C..
		3. **VERIFY RESET** and **OPEN** 3-FCV-71-9, RCIC TURB TRIP/THROT VALVE RESET.
		4. **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 10 Component: CRD Controller Fails Low (FIC-85-11)

	ATC	Recognizes CRD flow controller 3-FIC-85-11 has failed to control in automatic.
		Takes manual control of 3-FIC-85-11 and restores CRD flow.
CT#1	ATC	Insert Control Rods IAW 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 SHUTOFF (RB NE, El 565). 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. 6. **WHEN** NO further control rod movement is possible or desired, **THEN DISPATCH** personnel to **VERIFY OPEN** 3-SHV-085-0586, CHARGING WATER SHUTOFF (RB NE, El 565 ft).
	DRIVER	**WHEN** dispatched to close Charging Water Shutoff, wait 2 minutes and report 3-SHV-085-0586 closed. (mrf rd06 close) **WHEN** asked to open Charging Water Shutoff, wait 2 minutes and report 3-SHV-085-0586 open. (mrf rd06 open).
		REP classification is 1.2-S

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

Control Rods are being inserted

Reactor Level is being maintained

Reactor Pressure Controlled on SRVs

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

None

Operations/Maintenance for the Shift:

100% power. HPCI is out of service.

Transfer 4kV Unit board 3A from USST to Start Bus 1A 0-OI-57A section 8.15.1. Lower reactor power to 90% using recirc for surveillance testing

Unit 1 and 2 at 100% Power

Unusual Conditions/Problem Areas:

None

ıcility: **Browns Ferry NPP** Scenario No.: **NRC - 6** Op-Test No.: **1108**

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

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 80% power. RCIC is out of service and Breaker 1624 Alternate Feed to SD BD C.

Turnover: Place RFPT A in service from 600 RPM in accordance with 2-OI-3section 5.7 and then raise power to 100%

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Place RFPT A in service from 600 RPM in accordance with 2-OI-3section 5.7
2		R-ATC R-SRO	Raise Power with Control Rods
3	RD06r3016	C-ATC C-SRO	CR 30-15 Difficult to withdraw at position 00
4	OG04a	C-BOP C-SRO	Loss of SJAE A
5	DG01c ED09c	C-BOP TS-SRO	C Shutdown Board Supply Breaker trips DG C fails to auto start
6	Batch file	C-ATC TS-SRO	RBCCW pump B trips, RBCCW sectionalizing valve fails to auto close
7	OG05a OG01	M-ALL	Explosion in Off-gas system, Loss of condenser vacuum
8	TH21	C	LOCA, Loss of SD BD C
9	IOR	I TS-SRO	RHR Sys 1 Containment Spray Valve select switch failure

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

Rec'd 6/10/11

Critical Tasks - Two

CT#1 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

CT#1 - 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

CT#2 - Terminate Drywell/Suppression Chamber Sprays before Drywell/Suppression Chamber pressure drops below 0 psig.

1. Safety Significance:
   Precludes failure of containment

2. Cues:
   Procedural compliance.
   Drywell Pressure at or below 1.0 psig

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

4. Feedback:
   RHR flow to containment lowering
   RHR Sprays Valves closed

REP Classification is an Alert. EAL 2.1-A

Events

1. BOP places RFPT A in service from 600 RPM in accordance with 2-OI-3section 5.7

2. ATC increases power with Control Rods

3. Control Rod 30-19 difficult to withdraw. ATC refers to 2-OI-85 CRD System section and determines double clutching is to be used initially. Double clutching will work to withdraw rod 30-19.

4. Loss of SJAE A, BOP operator swaps to B SJAE IAW 2-AOI-47-3 Loss of Condenser Vacuum.

5. Maintenance work in the area of Shutdown Board C will cause the Normal Supply Breaker to trip. Diesel Generator C will fail to automatically start and tie to the shutdown board. The BOP will respond and start DG C and tie to the shutdown board. The SRO will evaluate Technical Specifications and determine TS 3.8.1 Condition B is entered. Since the Alternate Feeder Breaker is also out of service for SD BD C, Condition G is also entered and Shutdown Board C is declared Inoperable. The SRO will then evaluate Technical Specification 3.8.7 and Condition A is entered.

6. RBCCW Pump will trip and the sectionalizing valve will fail to close automatically. ATC will take actions IAW 2-AOI-70-1 and trip RWCU Pumps and close the sectionalizing valve for RBCCW. SRO to evaluate TRM 3.4.1 and inform Chemistry that Reactor Coolant Sampling will for conductivity will have to be performed every 4 hours.

7. Explosion in Off Gas due to high hydrogen – Loss of condenser Vacuum. Crew scrams the reactor and Enter EOI-1. Bypass valves are unavailable for pressure control and HPCI is the only high pressure system available for level control.

8. LOCA will develop and crew enters EOI-2 to control degrading Containment parameters. Loss of SD BD C occurs.

9. RHR System 1 Containment Spray/Cooling Valve Select will fail. RHR Loop 2 is available for Drywell Spray. The drywell will be sprayed and drywell sprays will be secured when drywell pressure lowers to 1.0 psig. SRO to evaluate Technical Specification for RHR System 1 Select Logic Failure, Technical Specification 3.6.2.5 Condition B.

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

Control Rods are inserted

Drywell has been sprayed

Reactor Level is restored and maintained

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 6

8 Total Malfunctions Inserted: List (4-8)

2 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 Run Time (minutes)

2 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Place RFPT A in Service			
RO U-003-NO-4	259002A4.03	3.8	3.6
Raise Power with Control Rods			
RO U-085-NO-7 SRO S-000-AD-31	2.2.2	4.6	4.1
Control Rod Difficult to Withdraw			
RO U-085-NO-19	201003A2.01	3.4	3.6
Loss of SJAE A			
RO U-066-NO-7 SRO S-047-AB-3	295002AA2.01	2.9	3.1
DG C Auto Start Failure			
RO U-082-AL-7 SRO S-000-AD-27	264000A4.04	3.7	3.7
Loss of RBCCW			
RO U-070-AL-3 SRO S-070-AB-1	206000A2.17	3.9	4.3
LOCA			
RO U-000-EM-1 RO U-000-EM-5 SRO S-000-EM-1 SRO S-000-EM-2 SRO S-000-EM-5	295024EA1.11	4.2	4.2

Procedures Used/Referenced:

Procedure Number	Procedure Title	Procedure Revision
2-OI-3	Reactor Feedwater System	Revision 136
2-GOI-100-12	Power Maneuvering	Revision 40
2-OI-85	Control Rod Drive System	Revision 128
2-OI-3	Reactor Feedwater System	Revision 136
2-ARP-9-5A	Alarm Response Procedure Panel 2-9-5A	Revision 48
2-AOI-47-3	Loss of Condenser Vacuum	Revision 19
2-ARP-9-53	Alarm Response Procedure Panel 2-9-53	Revision 36
ODCM	Offsite Dose Calculation Manual	Revision 20
TS 3.8.1	AC Sources - Operating	Amendment 269
TS 3.8.7	AC Distribution	Amendment 269
2-AOI-66-1	Off-Gas H2 High	Revision 19
2-AOI-100-1	Reactor Scram	Revision 95
2-EOI-1	RPV Control Flowchart	Revision 12
2-EOI-2	Primary Containment Control Flowchart	Revision 12
2-EOI-2-C-1	Alternate Level Control Flowchart	Revision 9
2-EOI-2-C-2	Emergency RPV Depressurization	Revision 6
2-EOI Appendix-6D	Injection Subsystems Lineup Core Spray System I	Revision 7
2-EOI-APPENDIX-17A	RHR System Operation Suppression Pool Cooling	Revision 12
2-EOI Appendix-5C	Injection System Lineup RCIC	Revision 5
2-EOI Appendix-7B	Alternate RPV Injection System Lineup SLC System	Revision 6

Procedures Used/Referenced Continued:

Procedure Number	Procedure Title	Procedure Revision
2-EOI Appendix-11A	Alternate RPV Pressure Control Systems MSRVs	Revision 4
2-EOI Appendix-12	Primary Containment Venting	Revision 4
2-EOI Appendix-5B	Injection System Lineup CRD	Revision 3
2-EOI Appendix-6B	Injection Subsystems Lineup RHR System I LPCI Mode	Revision 8
2-EOI Appendix-17C	RHR System Operation Suppression Chamber Sprays	Revision 11
EPIP-1	Emergency Classification Procedure	Revision 46
EPIP-5	General Emergency	Revision 41

Console Operator Instructions

A. Scenario File Summary

Batch File 1108-6

Imf dg01c
Imf dg03c
Trg e4 NRC/dgstart
Trg e4 = dmf ed09c
Ior zdi0hs2110c02a[1] trip
Ior zlo0hs2110c02a[1] off
Ior zlo0hs2110c02a[2] on
Ior zlohs7048a[2] on
Ior zlohs7048a[1] off
Ior xa554c19 alarm_off
Trg e1 7048-1
Trg e1 = bat NRC/110806-1
Ior zlohs661a[1] on
Ior zlohs661a[2] off
Ior zdixs74121[1] reset
Trg e2 modesw
Imf th21 (e2 180) 0.5 600 0.1
Imf dg03c (e2 0)

Pref File 110806

F3 bat NRC/1108rcicto
F4
F5 bat NRC/110806
F6 imf rd06r3015
F7 dmf rd06r3015
F8 imf og04a
F9 imf ed09c
F10 imf sw02b
F11 mrf sw02 align
F12 imf og01
S1 imf og05a 80 1200 100
S2 ior zdihs661a open

Scenario 6

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 92
Simulator Setup	Load Batch	RestorePref NRC/110806
Simulator Setup	manual	F3 and F5
Simulator Setup		Verify file loaded

Simulator Event Guide:

Event 1 Normal: Place RFPT A in service from 600 RPM in accordance with 2-OI-3 section 5.7

	SRO	Directs Placing RFPT A in service from 600 rpm.
	BOP	Places RFPT A in service from 600 rpm.
		2-OI-3 section 5.7 Placing the Second and Third RFP/RFPT In Service **CAUTIONS** 1) FAILURE to monitor SJAE/OG CNDR CNDS FLOW, 2-FI-2-42, on Panel 2-9-6 for proper flow (between 2 x 10^6 and 3 x 10^6 lbm/hr) may result in SJAE isolation. 2) Changes in Condensate System flow may require adjustment to SPE CNDS BYPASS, 2-FCV-002-0190. **NOTE** Placing RFP 2A(2B)(2C) MIN FLOW VALVE, 2-HS-3-20(13)(6) in OPEN position will lock it open, preventing minimum flow valve oscillations at low flow. [1] **NOTIFY** Radiation Protection that an RPHP is in effect for the impending action to place RFPT 2A(2B)(2C) in service. **RECORD** time Radiation Protection notified in NOMS Narrative Log. [1.1] **VERIFY** appropriate data and signatures recorded on Appendix A per Appendix A instructions [3] **VERIFY** RFP 2A MIN FLOW VALVE, 2-HS-3-20, in OPEN position. • **CHECK** OPEN MIN FLOW VALVE, 2-FCV-3-20. [4] **SLOWLY RAISE** speed of RFPT, using RFPT 2A SPEED CONT RAISE/LOWER, 2-HS-46-8A, to establish flow to vessel and maintain level. [5] **IF** discharge valve was not opened in Step 5.6[2.2.8] **AND** RFPT discharge pressure is within 250 psig of Reactor pressure, **THEN** (Otherwise N/A) **OPEN** RFP 2A DISCHARGE VALVE, 2-FCV-3-19.
		[6] **SLOWLY RAISE** RFPT speed, using RFPT 2A SPEED CONT RAISE/LOWER switch, 2-HS-46-8A, to slowly raise RFP discharge pressure and flow on the following indications (Panel 2-9-6): • RFP Discharge Pressure - RFP 2A, 2-PI-3-16A. • RFP Discharge Flow - RFP 2A, 2-FI-3-20.
		[7] **WHEN** sufficient flow is established to maintain RFP 2A MIN FLOW VALVE, 2-FCV-3-20, in CLOSED position (≈ 2 x 106 lbm/hr), **THEN PLACE** RFP 2A MIN FLOW VALVE, 2-HS-3-20, in AUTO.

Simulator Event Guide:

Event 1 Normal: Place RFPT A in service from 600 RPM in accordance with 2-OI-3 section 5.7

	BOP	[8] **OBSERVE** lowering of speed and discharge flows on other operating RFPs. **NOTE** Steps 5.7[9] and 5.7[10] transfers control of RFPT from MANUAL GOVERNOR to individual RFPT Speed Control PDS. [9] **PULL** RFPT 2A SPEED CONT RAISE/LOWER switch, 2-HS-46-8A, to FEEDWATER CONTROL position. • **CHECK** amber light at switch extinguished.
		[10] **PERFORM** the following on RFPT 2A SPEED CONTROL (PDS), 2-SIC-46-8 (Panel 2-9-5): [10.1] **SELECT** Column 3. [10.2] **VERIFY** PDS in MANUAL. **NOTE** Performance of Steps 5.7[11] through 5.7[13] will transfer control of RFPT to REACTOR WATER LEVEL CONTROL PDS, 2-LIC-46-5. [11] **VERIFY** REACTOR WATER LEVEL CONTROL (PDS), 2-LIC-46-5 functioning properly and ready to control second or third RFP.□ [12] **SLOWLY RAISE** RFP speed. • **CHECK** discharge flow and discharge pressure rise. [13] **WHEN** RFP speed is approximately equal to operating RFP(s) speed, **THEN** on RFPT 2A SPEED CONTROL (PDS), 2-SIC-46-8: [13.1] **PLACE** PDS in AUTO. [13.2] **VERIFY** Column 3 selected.
		[14] **WHEN** RFP is in automatic mode on REACTOR WATER LEVEL CONTROL, (PDS) 2-LIC-46-5, **THEN CLOSE** the following valves: • RFPT 2A LP STOP VLV ABOVE SEAT DR, 2-FCV-6-120 • RFPT 2A LP STOP VLV BELOW SEAT DR, 2-FCV-6-121 • RFPT 2A HP STOP VLV ABOVE SEAT DR, 2-FCV-6-122 • RFPT 2A HP STOP VLV BELOW SEAT DR, 2-FCV-6-123 • RFPT 2A FIRST STAGE DRAIN VLV, 2-FCV-6-124 • RFPT A HP STEAM SHUTOFF ABOVE SEAT DRAIN, 2-FCV-6-153 (local control) • RFPT A(B)(C) LP STEAM SHUTOFF ABOVE SEAT DRAIN, 2-FCV-6-154 (local control)
	Driver	When called report 2-FCV-6-163 and 2-FCV-6-154 closed

Simulator Event Guide:

Event 1 Normal: Place RFPT A in service from 600 RPM in accordance with 2-OI-3 section 5.7

	BOP	[15] **VERIFY CLOSED** the following valves on first RFP started in Section 5.5: • RFPT (2B)(2C) LP STOP VLV ABOVE SEAT DR, 2-FCV-6-(125)(130) • RFPT (2B)(2C) LP STOP VLV BELOW SEAT DR, 2-FCV-6-(126)(131) • RFPT (B)(C) LP STEAM SHUTOFF ABOVE SEAT DR, 2-FCV-6-(156)(158) (local control) [16] **VERIFY** both RFPT Main Oil Pumps running.
	Driver	When called report 2-FVC-6-156/158 are closed
		[17] **IF** desired to stop Turning Gear for in service RFPT, **THEN PLACE** appropriate handswitch in **STOP** and **RETURN** to AUTO: • RFPT 2A TURNING GEAR MOTOR, 2-HS-3-101A [18] **GO TO** Section 6.0. [18.1] **CONTROL** and **MONITOR** RFW System operation.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

	SRO	Direct Power Increase IAW RCP
	SRO	Notify ODS of power increase
		Direct Power increase using Recirc Flow per 2-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 5850 RPM.
	ATC	Raise Power with Control Rods per 2-OI-85, section 6.6. Control Rods 14-31, 30-47, 46-31, and 30-15 from 00 to 24, 30-31 from 00 to 48
		6.6.1 Initial Conditions Prior to Withdrawing Control Rods [2] **VERIFY** the following prior to control rod movement: • CRD POWER, 2-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** [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 2-9-5 and **PERFORM** Step 6.6.2[6]. [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, 2-HS-85-46 in the OFF position to deselect the Control Rod. [6.2] **PLACE** CRD POWER, 2-HS-85-46, in the ON position.

Simulator Event Guide:

Event 2 Reactivity: Raise Power with Control Rods

Event 3	DRIVER	Insert Malfunction to F6 (imf RD06r3015) to stick rod 30-15
	ATC	Withdraw control rods IAW 2-OI-85
	ATC	Responds to annunciator 9-5A Window 7, CONTROL ROD WITHDRAWAL BLOCK. **Operator Action:** A. **DETERMINE** initiating condition from corresponding rod withdrawal block alarm(s) and **REFER TO** operator action for alarm(s). ☐
	ATC	Responds to annunciator 9-5A Window 24, RBM HIGH/INOP. **Operator Action:** A. **IF** moving control rods for start-up or power maneuvering, **THEN PERFORM** the following: (otherwise N/A) 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 (1-xa-55-5a, Window 12) and matrix light, Panel 1-9-5 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%. ☐

Simulator Event Guide:

Event 3 Component: Control Rod Difficult to Withdraw

NOTE		Control Rod 30-15 will fail to withdraw from position 00
	ATC	Report Control Rod 30-15 fail to withdraw from position 00
	SRO	Direct 2-OI-85 Section 8.15
	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 **CAUTION** [NER/C] Never pull control rods except in a deliberate, carefully controlled manner, while closely monitoring the Reactor's response. [INPO SOER-96-001] [3] [NRC/C] **IF** RWM is enforcing, **THEN** **VERIFY** RWM is operable and LATCHED in to the correct ROD GROUP. [NRC-IR 84-02] **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.

Simulator Event Guide:

Event 3 Component: Control Rod Difficult to Withdraw (continued)

	DRIVER	Delete malfunction F7 (dmf rd06r3015) when double clutch is used.
	ATC	[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.
	ATC	[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. [4.6] **IF** Desired, **THEN** **REPEAT** Steps 8.15[4.1] through 8.15[4.5] several times prior to raising drive water pressure in Step 8.15[5].

Simulator Event Guide:

Event 4 Component: Loss of SJAE A

Event 3	DRIVER	Insert Malfunction to F8 (imf OG04a) to cause a loss of SJAE A
	SRO	Enters AOI-47-3 Loss of Condenser Vacuum.
	BOP	Offgas Panel 9-53 Alarms: Window 4, OG HOLDUP LINE INLET FLOW LOW: Operator action: **VERIFY OPEN**, FCV-66-28, off-gas system isolation valve. **VERIFY** that SJAE auto isolation has **NOT** occurred. Window 10, H2 WATER CHEMISTRY ABNORMAL: Operator action: None at this time Window 20, H2 WATER CHEMISTRY SHUTDOWN: Operator action: None at this time
	BOP	Swaps to B SJAE IAW 2-AOI-47-3 Loss of Condenser Vacuum.
	BOP	**4.2 Subsequent Actions (continued)** [11] **IF** a failure of the in-service SJAE is indicated, **THEN** **PLACE** the standby SJAE in service as follows: **NOTES** 1) This section may be used to return either SJAE to service following a shutdown or an isolation. 2) Potential causes of PCV valve closure are: • Condensate pressure from SJAE A(B) less than 60 psig, 2-PI-2-34(40), Panel 25-105. • SJAE 2A(2B) CONDENSATE INLET VALVE closed at 2-HS-2-31A(36), Panel 2-9-6. • SJAE 2A(2B) CONDENSATE OUTLET VALVE closed at 2-HS-2-35A(41A), Panel 2-9-6. • STEAM TO SJAE A(B) STAGE I & II, 2-PI-1-150(152), Panel 25-105 is less than 155 psig. (disabled for the SJAE selected by 2-HS-001-0375) • Loss of I&C bus A(B), power is required to be restored to return the SJAE to service. 3) 2-HS-001-0375, SJAE TRAIN PERMISSIVE, should be placed in the position for the SJAE being placed in service. This switch will normally be in the position of the standby SJAE.

Simulator Event Guide:

Event 4 Component: Loss of SJAE A (continued)

	BOP	[11.1] **PLACE** SJAE TRAIN PERMISSIVE 2-HS-001-0375 in the position for the SJAE being placed in service. This switch will normally be in the position of the Standby SJAE. (Panel 925-105 on junction box 8595) (N/A if Placing the standby SJAE in service) [11.2] **VERIFY** off gas isolation is reset, using OG OUTLET/DRAIN ISOLATION VLVS, 2-HS-90-155, Panel 2-9-8. [11.3] **VERIFY** the following valves are OPEN: • SJAE 2A(2B) INLET VALVE, 2-HS-66-11(15), Panel 2-9-8 • STEAM TO SJAE 2A(2B), 2-HS-1-155A(156A), Panel 2-9-7
	BOP	[11.4] **VERIFY** SJAE 2A(2B) OG OUTLET VALVE, 2-HS-66-14(18), AUTO/OPEN (Panel 2-9-8) [11.5] **PLACE** SJAE 2A(2B) PRESS CONTROLLER 2-HS-1-150(152) in CLOSE and then in OPEN at Panel 2-9-7. [11.6] **VERIFY** the following valves OPEN (red lights illuminated) at Panel 2-9-7. • STEAM TO SJAE 2A(2B) STAGES 1,2, AND 3, 2-PCV-1-151/166 (153/167). • SJAE 2A(2B) INTMD CONDENSER DRAIN 2-FCV-1-150(152). [11.7] **MONITOR** hotwell pressure as indicated on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2 (Panel 2-9-6). [11.8] For the SJAE not being placed in service, • **VERIFY CLOSED** SJAE 2B(2A) OG OUTLET VALVE, 2-HS-66-18(14) (Panel 2-9-8). • **VERIFY CLOSED** SJAE 2B(2A) PRESSURE CONTROLLER, 2-HS-1-152(150) (Panel 2-9-7) [11.9] **VERIFY** SJAE TRAIN PERMISSIVE, 2-HS-001-0375, in the position for the SJAE selected for Standby operation SJAE A(SJAE B). (Panel 925-105 on junction box 8595)

Simulator Event Guide:

Event 5 Component: DG C Auto Start Failure

<table>
<tr><td></td><td>DRIVER</td><td>Insert malfunction F9 (imf ED09c) to cause a loss of Shutdown Board C, when operator start DG C ensure ED09C is deleted.</td></tr>
<tr><td></td><td>BOP</td><td>Recognizes Loss of Shutdown Board C failure of to DG C start, and Manually Starts DG C and close DG Supply Breaker</td></tr>
<tr><td></td><td>BOP</td><td>Reports Loss of Shutdown Board C, failure of DG C to start, and manual start of DG C to SRO.</td></tr>
<tr><td></td><td>DRIVER</td><td>When requested to investigate the shutdown board, report that while Maintenance was moving the Shutdown Board C Alternate breaker it bumped the racking tool shutter door for the Shutdown Board C Normal breaker. This caused the Normal breaker to open.</td></tr>
<tr><td></td><td>SRO</td><td>Evaluates Tech Specs 3.8.7 (condition A) and 3.8.1 (condition B)</td></tr>
<tr><td></td><td></td><td>TSR 3.8.7
ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. One Unit 1 and 2 4.16 kV Shutdown Board inoperable.</td><td>----------NOTE----------
Enter applicable Conditions and Required Actions of Condition B, C, D, and G when Condition A results in no power source to a required 480 volt board.

A.1 Restore the Unit 1 and 2 4.16 kV Shutdown Board to OPERABLE status.

AND

A.2 Declare associated diesel generator inoperable.</td><td>

5 days

AND

12 days from discovery of failure to meet LCO

Immediately</td></tr>
</table>
(continued)</td></tr>
</table>

Simulator Event Guide:

Event 5 Component: DG C Auto Start Failure

	SRO	TSR 3.8.1			
		B. One required Unit 1 and 2 DG inoperable.	B.1	Verify power availability from the offsite transmission network.	1 hour AND Once per 8 hours thereafter
			AND		
		B. (continued)	B.2	Declare required feature(s), supported by the inoperable Unit 1 and 2 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)
			AND		
			B.3.1	Determine OPERABLE Unit 1 and 2 DG(s) are not inoperable due to common cause failure.	24 hours
			OR		
			B.3.2	Perform SR 3.8.1.1 for OPERABLE Unit 1 and 2 DG(s).	24 hours
			AND		
			B.4	Restore Unit 1 and 2 DG to OPERABLE status.	7 days AND 14 days from discovery of failure to meet LCO

Simulator Event Guide:

Event 6 Component: Loss of RBCCW

	DRIVER	Insert malfunction F10 (sw02b) to cause a loss of RBCCW
	BOP/ATC	Responds to alarm 4C-12, RBCCW PUMP DISCH. HDR PRESS LOW Report Trip of RBCCW Pump 2B.
	BOP/ATC	Automatic Action: Closes 2-FCV-70-48, non-essential loop, closed cooling water sectionalizing MOV. A. **VERIFY** 2-FCV-70-48 CLOSING/CLOSED. B. **VERIFY** RBCCW pumps A and B in service. C. **VERIFY** RBCCW surge tank low level alarm is reset. D. **DISPATCH** personnel to check the following: • RBCCW surge tank level locally. • RBCCW pumps for proper operation. E. **REFER TO** 2-AOI-70-1, for RBCCW System failure and 2-OI-70, for starting spare pump.
	SRO	Enters 2-AOI-70-1.
	ATC	Closes 2-FCV-70-48 and report the sectionalizing valve failed to close automatically
	BOP	Dispatch Personnel to investigate RBCCW Pump 2B trip
	ATC	**2-AOI-70-1**
		4.1 Immediate Actions [1] **IF** RBCCW Pump(s) has tripped, **THEN** Perform the following • **SECURE** RWCU Pumps. • **VERIFY** RBCCW SECTIONALIZING VLV, 2-FCV-70-48 **CLOSED**.
	ATC	Secures RWCU Pumps and Closes 2-FCV-70-48.
	SRO	**4.2 Subsequent Actions** [1] **IF** Reactor is at power **AND** Drywell Cooling cannot be immediately restored, **AND** core flow is above 60%,**THEN:** (Otherwise N/A): [2] **IF** any EOI entry condition is met, **THEN ENTER** appropriate EOI(s) (Otherwise N/A).

Simulator Event Guide:

Event 6 Component: Loss of RBCCW (continued)

		Steps 1 and 2 are NA
		[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).
	DRIVER	When dispatched, report RBCCW Pump 2B breaker is tripped. There is also a smell of burnt wiring and charring on the breaker.
	SRO	[4] **IF** unable to restart a tripped pump, **THEN PLACE** Spare RBCCW Pump in service. REFER TO 2-OI-70. Direct Unit 1 to place Spare RBCCW Pump in service
	DRIVER	When called to place spare RBCCW Pump in service, wait 3 minutes (IRF SW02 align). **THEN** inform Unit 2 Operator that spare RBCCW Pump is in service.
	SRO	[5] **IF** RBCCW flow was restored to two pump operation by placing the Spare RBCCW pump in service in the preceding step, **THEN PERFORM** the following: [5.1] **REOPEN** RBCCW SECTIONALIZING VLV, 2-HS-70-48A. [5.2] **RESTORE** the RWCU system to operation. (REFER TO 2-OI-69) Directs ATC or BOP to Open Sectionalizing Valve and Restore RWCU.
	ATC	Opens Sectionalizing Valve, 2-FCV-70-48.

Simulator Event Guide:

Event 7 Major: Explosion in Off Gas due to high hydrogen – Loss of condenser Vacuum.

	DRIVER	Insert F12 (imf og01) and Shift F1, to cause High Offgas Hydrogen
	BOP	Responds to alarm the following alarms: HIGH OFFGAS % H2 TRAIN A (2-XA-55-53, Window 3) HIGH OFFGAS % H2 TRAIN B (2-XA-55-53, Window 13) OFFGAS MONITOR PANEL TROUBLE,(2-XA-55-589, Window 07)
	BOP	Reports a rise in hydrogen concentration on OFF GAS HYDROGEN ANALYZER (CH 1-Analyzer 2A, CH 2-Analyzer 2B) recorder, 2-H2R-66-96, Panel 9-53.
	SRO	Enters 2-AOI-66-1, Off-Gas H_2 High.
	DRIVER	Insert Shift F2 when many alarms are received on OFF GAS panel (ior zdihs661a open), opens condenser vacuum breaker
	BOP	Responds to alarm 9-53-Window 14 OG HOLDUP LINE INLET FLOW HIGH.
	ATC	Report degrading condenser Vacuum.
	ATC	Inserts Reactor Scram when directed; and places mode switch in shutdown.
	ATC	Recognizes reactor scram. Verifies rods inserted. Reports Scram announcement.
	SRO	Enters EOI-1 and EOI-2.
	SRO	EOI-1 (Reactor Pressure)
		Monitor and Control Reactor Pressure
		IF Drywell Pressure Above 2.4 psig? – YES, but action Not Required.
		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 required THEN exit RC/P and enter C2 Emergency Depressurization? - NO
		IF RPV water level cannot be determined? - NO
	SRO	Is any MSRV Cycling? – YES. Directs Manually open MSRVs until RPV Pressure drops to the pressure at which all turbine bypass valves are open. (Appendix 11A)
		IF Steam cooling is required? - NO
		IF Suppression Pool level and temperature cannot be maintained in the safe area of Curve 3?- NO

Simulator Event Guide:

Event 7 Major: Explosion in Off Gas due to high hydrogen – Loss of condenser Vacuum. (continued)

		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 Appendix 11A. Should begin to lower Reactor Pressure, not to exceed 100°F/hr cooldown.
	ATC	Control Reactor Pressure in assigned band, IAW Appendix 11A.
	ATC/BOP	Pressure Control IAW Appendix11A, "RPV Pressure Control SRVs".
	NA	1. **IF** Drywell Control Air is **NOT** available, **THEN EXECUTE** EOI Appendix 8G, CROSSTIE CAD TO DRYWELL CONTROL AIR, **CONCURRENTLY** with this procedure.
	NA	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. 2-PCV-1-179 MN STM LINE A RELIEF VALVE
		b. 2-PCV-1-180 MN STM LINE D RELIEF VALVE
		c. 2-PCV-1-4 MN STM LINE A RELIEF VALVE
		d. 2-PCV-1-31 MN STM LINE C RELIEF VALVE
		e. 2-PCV-1-23 MN STM LINE B RELIEF VALVE
		f. 2-PCV-1-42 MN STM LINE D RELIEF VALVE
		g. 2-PCV-1-30 MN STM LINE C RELIEF VALVE
		h. 2-PCV-1-19 MN STM LINE B RELIEF VALVE.
		i. 2-PCV-1-5 MN STM LINE A RELIEF VALVE.
		j. 2-PCV-1-41 MN STM LINE D RELIEF VALVE
		k. 2-PCV-1-22 MN STM LINE B RELIEF VALVE
		l. 2-PCV-1-18 MN STM LINE B RELIEF VALVE
		m. 2-PCV-1-34 MN STM LINE C RELIEF VALVE

Simulator Event Guide:

Event 7 Major: Explosion in Off Gas due to high hydrogen – Loss of condenser Vacuum. (continued)

	ATC/BOP	Pressure Control IAW Appendix11A RPV Pressure Control SRVs
	NA	4. **IF** Drywell Control Air header supplied from CAD System A, shows indications of being depressurized, as determined by Appendix 8G, **THEN OPEN** MSRVs supplied by CAD System B; using the following sequence to control RPV pressure; as directed by SRO:
	NA	5. **IF** Drywell Control Air header supplied from CAD System B, shows indications of being depressurized, as determined by Appendix 8G, **THEN OPEN** MSRVs supplied by CAD System A; using the following sequence to control RPV pressure; as directed by SRO:
	SRO	EOI-1 RPV Pressure – Augment RPV Pressure control, as necessary; with one or more of the following depressurization systems: • HPCI Appendix 11C • RCIC Appendix 11B • RFPTs on minimum flow Appendix 11F • Main Steam System Drains Appendix 11D • Steam Seals Appendix 11G • SJAEs Appendix 11G • Off Gas Preheater Appendix 11G • RWCU Appendix 11E.
	ATC/BOP	Augments RPV Pressure Control, if directed by SRO.
	SRO	EOI-1 (Reactor Level)
		Monitor and Control Reactor Water Level. Directs Verification of PCIS isolations.
	ATC/BOP	Verifies PCIS isolations.
	SRO	Restores and Maintains RPV Water Level between (+) 2 to (+) 51 inches with one or more of the following injection sources. (HPCI, Appendix 5D)
	ATC	Maintains the prescribed level band, IAW Appendix 5D.
		1. **IF** Suppression Pool level drops below 12.75 ft during HPCI operation, **THEN TRIP** HPCI and **CONTROL** injection using other options.
		2. **IF** Suppression Pool level CANNOT be maintained below 4.25 in., **THEN EXECUTE** EOI Appendix 16E concurrently with this procedure to bypass HPCI High Suppression Pool Water Level Suction Transfer Interlock.

Simulator Event Guide:

Event 7 Major: Explosion in Off Gas due to high hydrogen – Loss of condenser Vacuum.
(continued)

		3. IF ..... BOTH of the following exist: • High temperature exists in the HPCI area, **AND** • SRO directs bypass of HPCI High Temperature Isolation interlocks, THEN ..... **PERFORM** the following: a. **EXECUTE** EOI Appendix 16L concurrently with this procedure. b. **RESET** auto isolation logic using 2-XS-73-58A(B) HPCI AUTO-ISOL LOGIC A(B) RESET pushbuttons.
		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** 2-IL-73-18B, HPCI TURBINE TRIP RX LVL HIGH amber light extinguished. 5. **VERIFY** at least one SGTS train in operation.
		6. **VERIFY** 2-FIC-73-33, HPCI SYSTEM FLOW/CONTROL, controller in AUTO and set for 5300 gpm.
		NOTE HPCI Auxiliary Oil Pump will NOT start UNTIL 2-FCV-73-16, HPCI TURBINE STEAM SUPPLY VLV, starts to open.
		7. **PLACE** 2-HS-73-47A, HPCI AUXILIARY OIL PUMP, handswitch in START. 8. **PLACE** 2-HS-73-10A, HPCI STEAM PACKING EXHAUSTER, handswitch in START. 9. **OPEN** the following valves: • 2-FCV-73-30, HPCI PUMP MIN FLOW VALVE • 2-FCV-73-44, HPCI PUMP INJECTION VALVE. 10. **OPEN** 2-FCV-73-16, HPCI TURBINE STEAM SUPPLY VLV, to start HPCI Turbine.

Simulator Event Guide:

Event 7 Major: Explosion in Off Gas due to high hydrogen – Loss of condenser Vacuum.
(continued)

		11. **CHECK** proper HPCI operation by observing the following: a. HPCI Turbine speed accelerates above 2400 rpm. b. 2-FCV-73-45, HPCI TESTABLE CHECK VLV, opens by observing 2-ZI-73-45A, DISC POSITION, red light illuminated. c. HPCI flow to RPV stabilizes and is controlled automatically at 5300 gpm. d. 2-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** 2-HS-73-47A, HPCI AUXILIARY OIL PUMP, handswitch in AUTO.
		14. **ADJUST** 2-FIC-73-33, HPCI SYSTEM FLOW/CONTROL, controller as necessary to control injection.

Simulator Event Guide:

Event 8 Component: LOCA, Loss of SD BD C

	SRO	Enters EOI-2, all legs.
		EOI-2 (Drywell Temperature)
	SRO	Monitor and Control DW Temp Below 160°F, using available DW Cooling.
		Can Drywell Temp Be Maintained Below 160°F? - NO
	SRO	Directs H2O2 Analyzers placed in service, IAW Appendix 19.
	BOP	Places H2O2 analyzers in service, IAW Appendix 19.
	SRO	EOI-2 (Primary Containment Pressure) Monitor and Control PC Pressure Below 2.4 psig, Using the Vent System As Necessary. (Appendix 12)
	SRO	Directs venting of Primary Containment, per Appendix 12.
	BOP	Vents Primary Containment, IAW Appendix 12.
		1. **VERIFY** at least one SGTS train in service. 2. **VERIFY CLOSED** the following valves (Panel 2-9-3 or Panel 2-9-54): • 2-FCV-64-31, DRYWELL INBOARD ISOLATION VLV • 2-FCV-64-29, DRYWELL VENT INBD ISOL VALVE • 2-FCV-64-34, SUPPR CHBR INBOARD ISOLATION VLV • 2-FCV-64-32, SUPPR CHBR VENT INBD ISOL VALVE
		Steps 3, 4, 5 and 6 are If / Then steps that do not apply.
		7. **CONTINUE** in this procedure at: Step 8 to vent the Suppression Chamber through 2-FCV-84-19, **OR** Step 9 to vent the Suppression Chamber through 2-FCV-84-20.

Simulator Event Guide:

Event 9 Instrument: RHR Sys 1 Containment Spray Valve select switch failure

		8. **VENT** the Suppression Chamber using 2-FIC-84-19, PATH B VENT FLOW CONT, as follows: a. **PLACE** keylock switch 2-HS-84-35, DW/SUPPR CHBR VENT ISOL BYP SELECT, to SUPPR-CHBR position (Panel 2-9-54). b. **VERIFY OPEN** 2-FCV-64-32, SUPPR CHBR VENT INBD ISOL VALVE (Panel 2-9-54). c. **PLACE** 2-FIC-84-19, PATH B VENT FLOW CONT, in AUTO with setpoint at 100 scfm (Panel 2-9-55). d. **PLACE** keylock switch 2-HS-84-19, 2-FCV-84-19 CONTROL, in OPEN (Panel 2-9-55). e. **VERIFY** 2-FIC-84-19, PATH B VENT FLOW CONT, is indicating approximately 100 scfm. f. **CONTINUE** in this procedure at step 12.
	SRO	Can PC Pressure Be Maintained Below 2.4 psig? - NO
	SRO	Directs Suppression Chamber Sprays per Appendix 17C
	NOTE	Sprays are unavailable on Loop I of RHR due to failed Select Logic.
	ATC/BOP	Sprays the Suppression Chamber per Appendix 17C
		1. BEFORE Suppression Chamber pressure drops below 0 psig, **CONTINUE** in this procedure at Step 6.
		2. IF ..... Adequate core cooling is assured **OR** Directed to spray the Suppression Chamber irrespective of adequate core cooling, THEN ... **BYPASS** LPCI injection valve open interlock as necessary: • **PLACE** 2-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS**. • **PLACE** 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.**
		3. IF ..... Directed by SRO to spray the Suppression Chamber using Standby Coolant Supply, THEN ... **CONTINUE** in this procedure At Step 7 using RHR Loop I OR At Step 8 using RHR Loop II.

Simulator Event Guide:

Event 9 Instrument: RHR Sys 1 Containment Spray Valve select switch failure (continued)

		4. IF ..... Directed by SRO to spray the Suppression Chamber using Fire Protection, THEN ... **CONTINUE** in this procedure at Step 9.
		5. **INITIATE** Suppression Chamber Sprays as follows: a. **VERIFY** at least one RHRSW pump supplying each EECW header. b. IF.....EITHER of the following exists: • LPCI Initiation signal is NOT present, **OR** • Directed by SRO, THEN...**PLACE** keylock switch 2-XS-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE.
		c. **MOMENTARILY PLACE** 2-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT, switch in SELECT.
		d. IF.....2-FCV-74-53(67), RHR SYS I(II) INBD INJECT VALVE, is OPEN, THEN...**VERIFY CLOSED** 2-FCV-74-52(66), RHR SYS I(II) OUTBD INJECT VALVE.
		e. **VERIFY OPERATING** the desired RHR System I(II) pump(s) for Suppression Chamber Spray.
		f. **VERIFY OPEN** 2-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV.
		g. **OPEN** 2-FCV-74-58(72), RHR SYS I(II) SUPPR CHBR SPRAY VALVE.
		h. IF.....RHR System I(II) is operating ONLY in Suppression Chamber Spray mode, THEN...**CONTINUE** in this procedure at Step 5.k.
		i. **VERIFY CLOSED** 2-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: • 2-FCV-23-34, RHR HX 2A RHRSW OUTLET VLV • 2-FCV-23-46, RHR HX 2B RHRSW OUTLET VLV • 2-FCV-23-40, RHR HX 2C RHRSW OUTLET VLV • 2-FCV-23-52, RHR HX 2D RHRSW OUTLET VLV

Simulator Event Guide:

Event 9 Instrument: RHR Sys 1 Containment Spray Valve select switch failure (continued)

		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** 2-FCV-74-58(72), RHR SYS I(II) SUPPR CHBR SPRAY VALVE. b. **VERIFY CLOSED** the following valves: • 2-FCV-74-100, RHR SYS I U-1 DISCH XTIE • 2-FCV-74-101, RHR SYS II U-3 DISCH XTIE. c. IF.....RHR operation is desired in ANY other mode, THEN...**EXIT** this EOI Appendix. d. **STOP** RHR Pumps 2A and 2C (2B and 2D). e. **CLOSE** 2-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV.

Simulator Event Guide:

Event 9 Instrument: RHR Sys 1 Containment Spray Valve select switch failure (continued)

	SRO	EOI-2 (Suppression Pool Level)
		Monitor and Control Suppression Pool Level between (-) 1 inch and (-) 6 inches. (Appendix 18)
		Can Suppression Pool Level Be Maintained above (-) 6 inches? - YES
		Can Suppression Pool Level Be Maintained below (-) 1 inch? - YES
	BOP	Places H2O2 analyzers in service, IAW Appendix 19.
		1. IF.....A Group 6 PCIS signal exists, THEN.....**PLACE** 2-HS-76-69, H2/O2 ANALYZER ISOLATION BYPASS switch in BYPASS (Panel 2-9-54). 2. **DEPRESS** 2-HS-76-91, H2/O2 ANALYZER ISOLATION RESET. 3. IF..... H2/O2 Analyzer is to sample the Suppression Chamber, THEN..... **ALIGN** Analyzer as follows (Panel 2-9-54): a. **PLACE** 2-HS-76-110, H2/O2 ANALYZER DW/SUPPR CHBR SELECT in SUPPR CHBR position. b. **VERIFY** SUPPR CHBR SMPL VLVS 2-FSV-76-55/56 OPEN using 2-IL-76-49-1. c. **VERIFY** OPEN SMPL RTN VLVS 2-FSV-76-57/58 using 2-IL-76-49-3. 4. IF..... H2/O2 Analyzer is to sample the Drywell, THEN.....**ALIGN** Analyzer as follows (Panel 2-9-54): a. **PLACE** 2-HS-76-110, H2/O2 ANALYZER DW/SUPPR CHBR SELECT in DRYWELL position. b. **VERIFY OPEN** DRYWELL SMPL VLVS 2-FSV-76-49/50 using 2-IL-76-49-2. c. **VERIFY OPEN** SMPL RTN VLVS 2-FSV-76-57/58 using 2-IL-76-49-3.

Simulator Event Guide:

Event 9 Instrument: RHR Sys 1 Containment Spray Valve select switch failure (continued)

	BOP	Places H2O2 analyzers in service, IAW Appendix 19.
		5. **IF** H2/O2 Analyzer is in STANDBY at 2-MON-76-110 (Panel 2-9-55), **THEN PLACE** H2/O2 Analyzer in service at as follows: a. **TOUCH** 2-MON-76-110 display screen. b. **DEPRESS** Go To Panel PROCESS VALUES soft key. c. **DEPRESS** Go To Panel MAINT MENU soft key. d. **DEPRESS** LOG ON soft key. e. **ENTER** password 1915 on soft keypad. f. **DEPRESS** ENT soft key on keypad. g. **DEPRESS** STANDBY MODE ON soft key to enable sample pump operation. h. **VERIFY** soft key reads STANDBY MODE OFF. i. **DEPRESS** Go To Panel PROCESS VALUES soft key. j. **DEPRESS** Go To Panel MAIN soft key. k. **VERIFY** STANDBY MODE is NOT displayed.
		6. **VERIFY** H2/O2 ANALYZER SAMPLE PUMP running using 2-XI-76-110 (Panel 2-9-55). 7. **VERIFY** red LOW FLOW indicating light extinguished at 2-MON-76-110, H2/O2 ANALYZER (Panel 2-9-55).
		8. **WHEN** H2/O2 Analyzer has been aligned and sampling for 10 minutes or greater, **THEN OBTAIN** H2 and O2 readings from 2-XR-76-110 H2/O2 CONCENTRATION recorder (Panel 2-9-54).
	SRO	EOI-2 (Suppression Pool Temperature)
		Monitor and Control Suppression Pool Temperature Below 95°F, Using Available Suppression Pool Cooling As Necessary. (Appendix 17A)
		Can Suppression Pool Temperature Be Maintained Below 95°F? - NO
	ATC	Places Suppression Pool Cooling in service, IAW Appendix 17A using Loop I of Residual Heat Removal.

Simulator Event Guide:

Event 9 Instrument: RHR Sys 1 Containment Spray Valve select switch failure (continued)

	ATC/BOP	Places Suppression Pool Cooling in service, IAW Appendix 17A.
		1. **IF** Adequate core cooling is assured, **OR** Directed to cool the Suppression Pool 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**.
		2. **PLACE** RHR SYSTEM 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: • 2-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV • 2-FCV-23-52, RHR HX 3D RHRSW OUTLET VLV d. **IF** Directed by SRO, **THEN PLACE** 2-XS-74-130, RHR SYS II LPCI 2/3 CORE HEIGHT OVRD in MANUAL OVERRIDE. e. **IF** LPCI INITIATION Signal exists, **THEN** MOMENTARILY PLACE 2-XS-74-129, RHR SYS II CTMT SPRAY/CLG VLV SELECT in SELECT.
		f. **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. g. **OPEN** 2-FCV-74-71, RHR SYS II SUPPR CHBR/POOL ISOL VLV. h. **VERIFY** desired RHR pump(s) for Suppression Pool Cooling are operating.
		i. **THROTTLE** 2-FCV-74-73, RHR SYS II SUPPR POOL CLG/TEST VLV, to maintain **EITHER** of the following as indicated on 2-FI-74-64, RHR SYS II FLOW: • Between 7000 and 10000 gpm for one-pump operation. **OR** • At or below 13000 gpm for two-pump operation. j. **VERIFY CLOSED** 2-FCV-74-30, RHR SYSTEM II MIN FLOW VALVE. k. **MONITOR** RHR Pump NPSH using Attachment 1.

Simulator Event Guide:

Event 9 Instrument: RHR Sys 1 Containment Spray Valve select switch failure (continued)

	SRO	When Suppression Chamber Pressure exceeds 12 psig, determines that Drywell Sprays are required. Directs **Loop II** of RHR to be placed in Drywell Sprays per EOI Appendix 17B.
	ATC/BOP	**Drywell Sprays per appendix 17B** 1. IF.....Adequate core cooling is assured **OR** Directed to spray the Drywell irrespective of adequate core cooling, THEN..... **BYPASS** LPCI injection valve open interlock as necessary: • **PLACE** 1-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS**. • **PLACE** 1-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.**
		2. **VERIFY** Recirc Pumps and Drywell Blowers shutdown.
		3. IF ..... Directed by SRO to spray the Drywell using RHR System I(II), THEN.....**CONTINUE** in this procedure at Step 6 using RHR Loop I(II).
		NOTE Step 6 is performed ONLY if directed by Step 3 to spray the Drywell using RHR Loops I(II).
		6. **INITIATE** Drywell Sprays using RHR Loop I(II) as follows: a. BEFORE drywell pressure drops below 0 psig, **CONTINUE** in this procedure at Step 9. b. **VERIFY** at least one RHRSW pump supplying each EECW header.
		c. IF .....EITHER of the following exists: • LPCI Initiation signal is NOT present, **OR** • Directed by SRO, THEN.....**PLACE** keylock switch 1-XS-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE.

Simulator Event Guide:

Event 9 Instrument: RHR Sys 1 Containment Spray Valve select switch failure (continued)

		d. **MOMENTARILY PLACE** 1-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT, switch in SELECT.
		e. IF .....1-FCV-74-53(67), RHR SYS I(II) LPCI INBD INJECT VALVE, is OPEN, THEN.....**VERIFY CLOSED** 1-FCV-74-52(66), RHR SYS I(II) LPCI OUTBD INJECT VALVE.
		f. **VERIFY OPERATING** the desired System I(II) RHR pump(s) for Drywell Spray.
		g. **OPEN** the following valves: • 1-FCV-74-60(74), RHR SYS I(II) DW SPRAY OUTBD VLV • 1-FCV-74-61(75), RHR SYS I(II) DW SPRAY INBD VLV.
		h. **VERIFY CLOSED** 1-FCV-074-0007(0030), RHR SYSTEM I(II) MIN FLOW VALVE.
		i. IF .....Additional Drywell Spray flow is necessary, THEN.....**PLACE** the second System I(II) RHR Pump in service.
		j. **MONITOR** RHR Pump NPSH using Attachment 2.
		k. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger(s).
		l. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1,350 and 4,500 gpm RHRSW flow: • 1-FCV-23-34, RHR HX 1A RHRSW OUTLET VLV • 1-FCV-23-46, RHR HX 1B RHRSW OUTLET VLV • 1-FCV-23-40, RHR HX 1C RHRSW OUTLET VLV • 1-FCV-23-52, RHR HX 1D RHRSW OUTLET VLV.

Simulator Event Guide:

Event 9 Instrument: RHR Sys 1 Containment Spray Valve select switch failure (continued)

		9. 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: • 1-FCV-74-60(74), RHR SYS I(II) DW SPRAY OUTBD VLV • 1-FCV-74-61(75), RHR SYS I(II) DW SPRAY INBD VLV • 1-FCV-74-101, UNITS 1-2 DISCHARGE CROSSTIE b. IF .....RHR pumps are running THEN.....**VERIFY OPEN** 1-FCV-74-7(30), RHR SYS I(II) MIN FLOW VALVE.
	SRO	REP Classification is an Alert. EAL 2.1-A

SHIFT TURNOVER SHEET

The unit is at approximately 80% power.

Equipment Out of Service/LCO's:

RCIC is out of service.
Breaker 1624 Alternate Feed to SD BD C.

Operations/Maintenance for the Shift:

Place RFPT A in service from 600 RPM in accordance with 2-OI-3section 5.7 and then raise power to 100% in accordance with the RCP.

Units 1 and 3 are at 100% Power

Unusual Conditions/Problem Areas:

Facility: **Browns Ferry NPP** Scenario No.: **NRC - 7** Op-Test No.: **1108**

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

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 95% power. Loop 2 Core Spray is tagged out.

Turnover: Start SBGT Fan C and align to Reactor Bldg IAW 0-OI-65 section 5.2 and then raise reactor power to 100% with Recirculation.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP TS-SRO	Start SBGT Fan C and align to Reactor Bldg IAW 0-OI-65 section 5.2, Relative Humidity heater fails for TS action
2		R-ATC R-SRO	Raise Power with Flow
3	AD01a	R-ATC TS-SRO C-BOP	ADS SRV 1-5 fails open
4	TH18d	C-ATC C-SRO	VFD Cooling Water Pump 2B trips with failure of the standby pump to auto start
5	FW05b	R-ATC C-BOP C-SRO	Loss of FW Heating 2-FCV-5-21, HP HEATER 2B2 EXTR ISOL VLV Fail to isolate
6	FW30a	C-ATC C-SRO	RFPT A Flow Controller failure
7	Batch File	M-ALL	Earthquake, Loss of All High Pressure injection
8		C	Loss of LPCI MG sets
9		C	Loss of ALL Level Control Systems – Steam Cooling

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

Rev 8
6/10/11

Critical Tasks - Four

CT#1 - With NO injection system(s) operating and the reactor shutdown and at pressure, after RPV water level drops to -200 inches, initiate Emergency Depressurization.

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 must be opened when RPV level lowers to -200 inches.

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

OR

CT#1 - With an injection system(s) operating and the reactor shutdown and at pressure, after RPV water level drops to -162 inches, initiate 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 must be opened before RPV level lowers to -180 inches.

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

CT#2 - 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 TAF.

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 TAF.

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

CT#3-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.

CT#4 - With a SRV(s) open due to failure or incorrect automatic actuation, initiate action to close the SRV(s).

1. Safety Significance:
   Preclude exceeding Tech. Spec limit.
   Degradation of fission product barrier.

2. Cues:
   Procedural compliance.
   "SRV OPEN" annunciator status.

3. Measured by:
   Observation - SRV closed when the MSRV Inhibit Switch placed in OFF.

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

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 raises Power with flow

3. ADS SRV 1-5 will fail open. ATC will lower power to less than 90%. When power is below 90% the BOP operator will perform 2-AOI-1-1 actions to close SRV. SRO will refer to Tech Specs and determine TS 3.5.1 condition F

4. The VFD Cooling Water Pump for the B 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.

5. A tube leak on High Pressure Feedwater Heater B2 results in isolation of Extraction Steam to the heater. The crew will respond in accordance with 2-AOI-6-1A or 1C. The ATC will lower reactor power by 5%. The BOP Operators refers to 2-AOI-6-1A or 1C and determine that all automatic actions failed to occur and will isolate Heater B2.

6. RFPT A flow controller will slowly fail high, level will remain unchanged, RFPT A speed will continue to increase 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 A speed in manual. SRO should direct entry into 2-AOI-3-1.

7. Earthquake and Feedwater line Break – Loss of High Pressure Injection. On the scram, a feedwater line will break requiring the crew to isolate feedwater and HPCI. The crew will respond IAW EOI-1, EOI-2 and EOI-3.

8. Loss of LPCI MG Sets – Loss of RHR and Core Spray Pumps. Electrical faults will result in all injection to the core being lost. The SRO will transition to C-1, at -180 inches the SRO will transition to Steam Cooling. Once steam cooling is entered repairs will be completed to one electrical bus and an ECCS low pressure system will be restored for vessel injection. The SRO will transition to C-2, direct Emergency Depressurization and level restored to +2 to +51 inches.

9. Loss of All injection sources – When crew enters steam cooling, one LPCI MG set will be restore to service, Crew will ED and restore reactor level.

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

All Control Rods are inserted.

Emergency Depressurization is complete

Reactor Level is restored and maintained

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 7

10	Total Malfunctions Inserted: List (4-8)
6	Malfunctions that occur after EOI entry: List (1-4)
4	Abnormal Events: List (1-3)
2	Major Transients: List (1-2)
3	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
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 Recirc Flow			
RO U-068-NO-17 SRO S-000-NO-138	2.1.23	4.3	4.4
ADS SRV Fails Open			
RO U-001-AB-1 SRO S-0001-AB-1	239002A2.03	4.1	4.2
VFD Cooling Water Pump Failure			
RO U-068-AL-33 SRO S-068-AB-01	202001A2.22	3.1	3.2
Loss of Feedwater Heating			
RO U-006-AB-01 SRO S-006-AB-01	2.1.43	4.1	4.3
Reactor Feed Pump Turbine Governor Failure			
RO U-003-AL-9 SRO S-003-AB-1	259002A4.01	3.8	3.6
Steam Cooling			
RO U-000-EM-15 SRO S-000-EM-15 SRO T-000-EM-16	295031EA2.04	4.6	4.8

Procedures Used/Referenced:

Procedure Number	Procedure Title	Procedure Revision
0-OI-24	Standby Gas Treatment System	Revision 53
TS 3.6.4.3	Containment Systems	Amendment 290
2-GOI-100-12	Power Maneuvering	Revision 40
2-OI-68	Reactor Recirculation System	Revision 138
2-ARP-9-3C	Alarm Response Procedure Panel 2-9-3C	Revision 20
2-AOI-1-1	Relief Valve Stuck Open	Revision 26
2-OI-74	RHR System	Revision 157
2-ARP-9-4B	Alarm Response Procedure Panel 2-9-4B	Revision 39
2-ARP-9-4C	Alarm Response Procedure Panel 2-9-4C	Revision 30
2-ARP-9-7A	Alarm Response Procedure Panel 2-9-7A	Revision 27
2-ARP-9-6A	Alarm Response Procedure Panel 3-9-6A	Revision 28
2-AOI-6-1A	High Pressure Feedwater Heater String/Extraction Steam Isolation	Revision 17
2-AOI-6-1C	High and Low Pressure Feedwater Heater String/Extraction Steam Isolation	Revision 14
2-OI-6	Feedwater Heating and Misc Drains System	Revision 84
2-ARP-9-5A	Alarm Response Procedure Panel 3-9-5A	Revision 48
2-ARP-9-6C	Alarm Response Procedure Panel 3-9-6C	Revision 19
TS 3.5.1	ECCS - Operating	Amendment 269
2-AOI-3-1	Loss of Reactor Feedwater or Reactor Water Level High/Low	Revision 20
0-AOI-100-5	Earthquake	Revision 33
2-AOI-100-1	Reactor Scram	Revision 95
2-EOI-1	RPV Control Flowchart	Revision 12
2-EOI-2	Primary Containment Control Flowchart	Revision 12
2-EOI-2-C-1	Alternate Level Control Flowchart	Revision 9
2-EOI-2-C-2	Emergency RPV Depressurization	Revision 6
2-EOI Appendix-6D	Injection Subsystems Lineup Core Spray System I	Revision 7
2-EOI-APPENDIX-17A	RHR System Operation Suppression Pool Cooling	Revision 12
2-EOI Appendix-5C	Injection System Lineup RCIC	Revision 5

Procedure Number	Procedure Title	Procedure Revision
2-EOI Appendix-5B	Injection System Lineup CRD	Revision 3
2-EOI Appendix-6B	Injection Subsystems Lineup RHR System I LPCI Mode	Revision 0
2-EOI Appendix-7B	Alternate RPV Injection System Lineup SLC System	Revision 6
2-EOI Appendix-11A	Alternate RPV Pressure Control Systems MSRVs	Revision 4
2-EOI Appendix-12	Primary Containment Venting	Revision 4
2-EOI Appendix-17C	RHR System Operation Suppression Chamber Sprays	Revision 0
EPIP-1	Emergency Classification Procedure	Revision 46
EPIP-5	General Emergency	Revision 41

Console Operator Instructions

Batch 1108-7
Trg 11 NRC/msrvinhibit
Trg 11 = dmf ad01a
Ior zlohs682b2a[1] on
Ior zlohs682b2a[2] off
Mrf th18d trip
Trg 15 NRC/bvfd
Trg 15 = bat NRC/110807-1
Trg 1 modesw
Trg 1 = bat NRC/110807-4
Ior zdihs858a[1] close
Trg 17 NRC/rcic
Imf rc09 (e17 1:00) 100 1:00
Trg 10 NRC/rfptamaual
Trg 10 = dmf fw30a
Ior ypovfcv0521 fail_power_now
Ior zlohs0521a[2] on
Trg 5NRC/fwheating
Trg 5 = bat NRC/110807-2
Ior ypomtrsbgtrrh fail_control_power

Preference File 110807
F3 bat NRC/110807
F4 bat csloop2to
F5 imf ado1a 70
F6 ior zdihs682b1a[1] off
F7 imf fw05b 100 300 75
F8
F9 th22 100 5:00 50
F10 dmf ed12a
F11 mrf ed09 norm
F12 mrf rp02 reset
S1 mrf sl01 align
S2 imf ad01a 100

zdihs0521a[1].eq.1

Batch 110807-4
Imf sl01a and sl01b
Imf ed11a and ed11b (e1 4:00)
Imf ed12a and ed13a (e1 1:00)
Imf ed11c and ed11d (e1 5:00)
Imf fw19 (e1 0) 100 3:00
Imf th21 (e1 8:00) .25 1200
Imf rd01a (e1 3:00)

Batch 110807-2
Ior ypovfcv0521 fail_power_now
Ior zlohs0521a[2] on

Batch 110807-2
mrf th18d close
dor zlohs682b2a[1]
dor zlohs682b2a[2]

Manually Enter FW30A

Scenario 7

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 93
Simulator Setup	**Load Batch**	RestorePref NRC/110807
Simulator Setup	manual	Tag out Core Spray Loop 2
Simulator Setup	manual	F3 and F4
Simulator Setup		Verify file loaded

RCP required (95% - 100% with flow) and RCP for Urgent Load Reduction
Provide marked up copy of 2-GOI-100-12

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 based on?

Simulator Event Guide:

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

	SRO	SRO Evaluate Technical Specification 3.6.4.3
		LCO 3.6.4.3 Three SGT subsystems shall be OPERABLE.
		Condition A One SGT subsystem inoperable Required Action A.1 Restore SGT subsystem to OPERABLE status Completion Time 7 Days

Simulator Event Guide:

Event 2 Reactivity: Raise Reactor Power with flow

	SRO	Direct Power Increase IAW RCP
	SRO	Notify ODS of power increase
		Direct Power increase using Recirc Flow per 2-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** 2-SR-3.3.5(A) and 2-OI-68.
	ATC	Raise Power w/Recirc IAW 2-OI-68, section 6.2
		[1] **IF** desired to control Recirc Pumps 3A and/or 3B speed with Recirc Individual Control, **THEN PERFORM** the following; • Raise Recirc Pump 2A using, RAISE SLOW (MEDIUM), 2-HS-96-15A(15B). AND/OR • Raise Recirc Pump 2B using, RAISE SLOW (MEDIUM), 2-HS-96-16A(16B).
		[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 push buttons as required: RAISE SLOW, 2-HS-96-31 RAISE MEDIUM, 2-HS-96-32
NRC	NRC	When satisfied with Reactivity Manipulation ADS SRV Fails Open requiring power to be lowered to less than 90%
Driver	Driver	At lead floor instructor direction F5, for failure of ADS SRV 1-5

Simulator Event Guide:

Event 3 Component: ADS SRVs Fail Open

	BOP	Report alarm MAIN STEAM RELIEF VALVE OPEN (2-9-3C Window 25)
		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.
	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.
	BOP	Identifies ADS SRV 1-5 open
	ATC	[2] **IF** relief valve transient occurred while operating above 90% power, **THEN PERFORM** the following (Otherwise N/A): [2.1] **INITIATE** a load reduction to ≤90% power with recirc flow.
	ATC	Lowers reactor power to ≤90% 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
		4.2 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. (Otherwise N/A) [4] **PLACE** MSRV AUTO ACTUATION LOGIC INHIBIT, 2-XS-1-202 in INHIBIT:
CT#4		Observe and report when 2-XS-1-202 is placed in Inhibit, ADS SRV 1-5 closes.

Simulator Event Guide:

Event 3 Component: ADS SRVs Fail Open

	BOP	[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. Operator Does NOT perform step 6 until Breaker opened or fuses pulled
Driver	Driver	If MSRV AUTO Actuation Logic Inhibit Switch is returned to Auto prior to pulling fuses insert imf ad01a (shift F2)
	SRO	Evaluate Tech Spec 3.5.1
		Condition E One ADS valve inoperable Required Action E.1 Restore ADS Valve to OPERABLE status Completion Time 14 Days **AND** Condition F One ADS valve inoperable AND Condition A entered Required Action F.1 Restore ADS Valve to OPERABLE status Completion Time 72 Hours OR Required Action F.2 Restore low pressure ECCS spray subsystem to OPERABLE status Completion Time 72 Hours
	BOP	Directs AUO to Remove Power from SRV 1-5 **REMOVE** the power from 2-PCV-1-5 by performing one of the following: A. **OPEN** the following breakers (Preferred method) • 2C 250V RMOV, compartment 8A • Battery Board 1, breaker 727 OR B. In Panel 2-25-32 **PULL** the following fuses as necessary • Fuse 2E-F6B (Block AA, F14) • Fuse 2E-F4B (Block AA, F6)

Simulator Event Guide:

Event 3 Component: ADS SRVs Fail Open

<table>
<tr><td>Driver</td><td>Driver</td><td>When directed to remove power from SRV 1-5, insert irf ad01a OUT in two minutes</td></tr>
<tr><td></td><td>SRO</td><td>May direct Suppression Pool Cooling placed in service IAW 2-OI-74</td></tr>
<tr><td></td><td>BOP</td><td>If Directed places Suppression Pool Cooling in Service Loop 1</td></tr>
<tr><td></td><td></td><td>[6] VERIFY at least one RHRSW Pump is operating on each EECW Header.</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).</td></tr>
<tr><td></td><td></td><td>[7.2] ESTABLISH RHRSW flow by performing one the following:

[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.

[7.4] VERIFY CLOSED RHR SYS I SUPPR POOL CLG/TEST VLV, 2-FCV-74-59.</td></tr>
<tr><td></td><td></td><td>[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>[7.9] 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><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>[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.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
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</table>

Simulator Event Guide:

Event 3 Component: ADS SRVs Fail Open

<table>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>If Directed places Suppression Pool Cooling in Service Loop 2</td></tr>
<tr><td></td><td></td><td>[10] PLACE RHR Pump and Heat Exchanger B(D) in service as follows:

[10.1] START an RHRSW Pump to supply RHR Heat Exchanger B(D).</td></tr>
<tr><td></td><td></td><td>[10.2] ESTABLISH RHRSW flow by performing one the following:

[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 HTX 2B(2D) RHRSW FLOW.

[10.3] VERIFY CLOSED RHR SYS II LPCI INBD INJECT VALVE, 2-FCV-74-67.

[10.4] VERIFY CLOSED RHR SYS II SUPPR POOL CLG/TEST VLV, 2-FCV-74-73.</td></tr>
<tr><td></td><td></td><td>[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.</td></tr>
<tr><td></td><td></td><td>[10.9] START RHR PUMP B(D) 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 SPRAY 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>[10.11] 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 by REPERFORMING Step 8.5[10] for the second pump.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Driver</td><td>Driver</td><td>At lead floor instructor direction F6, for trip of 2-B-1 VFD Cooling Pump</td></tr>
</table>

Simulator Event Guide:

Event 4 Component: VFD Cooling Water Pump 2-B-1 Failure

	ATC	Reports the following annunciators 4B-12, 28 and 32 RECIRC DRIVE 2B COOLANT FLOW LOW, RECIRC DRIVE 2B PROCESS ALARM, and RECIRC DRIVE 2B DRIVE ALARM
	ATC	Reports the 2-B-1 VFD Cooling Water Pump for the B Recirc Pump, has tripped.
	ATC	Reports Standby Recirc Drive Cooling Water Pump2-B-2, failed to auto start.
	ATC	RECIRC DRVIE 2B COOLANT FLOW LOW **STARTS** RECIRC DRIVE cooling water pump **and** **DISPATCHES** personnel to the RECIRC DRIVE, to check the operation of the Recirc Drive cooling water system.
	SRO	Concurs with start of Standby VFD Pump.
	BOP	RECIRC DRIVE 2B DRIVE ALARM A. **REFER TO** ICS Group Display "GD @VFDBDA" and determine cause of alarm. B. **IF** a problem with the cooling water system is indicated, **THEN VERIFY** proper operation of cooling water system. C. **IF** the problem is conductivity in the cooling water system, **THEN VERIFY** demineralizer is in service. D. **IF** a problem with power supplies is indicated, **THEN VERIFY** all the low voltage supply breakers are CLOSED/ON. E. For all other alarms, or any problems encountered **CONTACT** system engineering.
	Crew	Verifies Standby pump started by pulling up ICS displays.
	BOP	Dispatches personnel to VFD.
	DRIVER	Wait 4 minutes after dispatched, **THEN** report tripped VFD Pump is hot to touch, internal bkr closed, 480 volt bkr tripped (480 V SD BD 2A-5D).
	DRIVER	Upon Lead examiner direction F7 for Loss of Feedwater Heating

Simulator Event Guide:

Event 5 Component: Loss of Feedwater Heating and 2-FCV-5-21, HP HEATER 2B2 EXTR ISOL VLV Fail to isolate

	DRIVER	When directed by NRC insert F7 for Loss of Feedwater Heating and 2-FCV-5-21, HP HEATER 2B2 EXTR ISOL VLV Fail to isolate.
	ATC/BOP	Announces "BYPASS VALVE TO CONDENSER NOT CLOSED" and refers to 2-ARP-9-6A, window 18. A. **CHECK** heater high or low level or moisture separator high or low level alarm window illuminated on Panel 2-9-6 or 2-9-7 to identify which bypass valve is opening. B. **CHECK** ICS to determine which bypass valve is open. C. **DISPATCH** personnel to check which valve's light is extinguished on junction box.
	DRIVER	Acknowledge dispatch, wait 1-2 minutes and report 2-LCV-6-22B light is out on junction box 34-21.
	ATC/BOP	Announces "HEATER B2 LEVEL HIGH" and refers to 2-ARP-9-6A window 9. A. **CHECK** the following indications: • Condensate flow recorder 2-29, Panel 2-9-6. Rising flow is a possible indication of a tube leak. • Heater B2 shell pressure, 2-PI-5-22 and drain cooler B5 flow, 2-FI-6-34, Panel 2-9-6. High or rising shell pressure or drain cooler flow is possible indication of a tube leak. B. **CHECK** drain valve 2-FCV-6-95 open. C. **CHECK** level on ICS screen, FEEDWATER HEATER LEVEL (FWHL). • **IF** the 2B2 heater indicates HIGH (Yellow), **THEN** **VERIFY** proper operation of the Drain and Dump Valves. • **DISPATCH** personnel to local Panel 2-LPNL-925-562C to VERIFY and MANUALLY control the level. D. **IF** a valid HIGH HIGH level is received, **THEN** **GO TO** 2-AOI-6-1A or 2-AOI-6-1C.
	ATC/BOP	Checks condensate flow recorder, Heater B2 shell pressure and Drain Cooler B5 flow for indications of a tube leak Checks drain valve 2-FCV-6-95 open Checks 2B2 Heater level on ICS and dispatches personnel to verify and manually control level
	DRIVER	Acknowledge order to verify and manually control level on B2 Heater. Wait 6 minutes and report unable to take manual control of B2 Heater.

Simulator Event Guide:

Event 5 Component: Loss of Feedwater Heating and 2-FCV-5-21, HP HEATER 2B2 EXTR ISOL VLV Fail to isolate

	ATC/BOP	Announces B1 and B2 High Pressure Heater Extraction Isolation
	SRO	Directs crew to enter 2-AOI-6-1A or 2-AOI-6-1C
	ATC/BOP	**2-AOI-6-1A High Pressure Feedwater Heater String/Extraction Steam Isolation** **4.1 Immediate Actions** [1] **REDUCE** Core Thermal Power to ≥ 5% below initial power level to maintain thermal margin. **4.2 Subsequent Actions** [1] **REFER** TO 2-OI-6 for turbine/heater load restrictions. [2] **REQUEST** Reactor Engineer EVALUATE and ADJUST thermal limits, as required. [3] **ADJUST** reactor power and flow as directed by Reactor Engineer/Unit Supervisor to stay within required thermal and feedwater temperature limits. **REFER TO** 2-GOI-100-12 or 2-GOI-100-12A for the power reduction. [4] **ISOLATE** heater drain flow from the feedwater heater string that isolated by closing the appropriate FEEDWATER HEATER B-2 DRAIN TO HTR B-3, 2-FCV-6-95. [5] **IF** a tube leak is indicated, **THEN** **PERFORM** manual actions of Attachment 1 for affected heaters. [6] **VERIFY** automatic actions occur. **REFER TO** Attachment 1. [7] **MONITOR** TURB THRUST BEARING TEMPERATURE, 2-TR-47-23, for rises in metal temperature and possible active/passive plate reversal. [8] **DETERMINE** cause which required heater isolation and **PERFORM** necessary corrective action.

Simulator Event Guide:

Event 5 Component: Loss of Feedwater Heating and 2-FCV-5-21, HP HEATER 2B2 EXTR ISOL VLV Fail to isolate

	ATC/BOP	**2-AOI-6-1A High Pressure Feedwater Heater String/Extraction Steam Isolation (continued)** **4.2 Subsequent Actions (continued)** [9] **WHEN** the condition which required heater isolation is no longer required, **THEN** **RESTORE** affected heater. **REFER TO 2**-OI-6.
	ATC BOP	Lower Reactor Power greater than 5% below initial power level using Recirc Pump flow adjustments Refers to 2-OI-6 for turbine/heater load restrictions Contacts Reactor Engineer to evaluate and adjust Thermal Limits, if needed Isolates heater drain flow B2 Heater Drain to B3 Heater by shutting 2-FCV-6-95
	SRO	Directs isolating FW to B HP heater string based on indications of tube leak by performing manual actions of Attachment 1 and verifying automatic actions occur **2-AOI-6-1A Attachment 1** B1 or B2 — The following valves must be manually closed: 2-FCV-3-31, HP HTR 2B2 FW INLET ISOL VALVE 2-FCV-3-76, HP HTR 2B1 FW OUTLET ISOL VALVE The following valves AUTO Isolate 2-FCV-5-9, HP HEATER 2B1 EXTR ISOL VLV 2-FCV-5-21, HP HEATER 2B2 EXTR ISOL VLV 2-FCV-6-74, MOISTURE SEP LC RES B1 ISOL VLV 2-FCV-6-172, MOISTURE SEP LC RES B2 ISOL VLV Directs power reduction to 920 MWe (79%) power (Power Reduction with RCP flow or Control Rods) per 2-OI-6, Illustration 1 **2-OI-6 Illustration 1** **HEATERS OUT (Tube and Shell Side) **** One HP string — 920 MWe (79%) One LP string — 920 MWe (79%) One HP and LP string — 920 MWe (79%) Enters 2-GOI-100-12, Power Maneuvering Notifies Rx Eng. And ODS of Feedwater Heater isolation and power reduction

Simulator Event Guide:

Event 5 Component: Loss of Feedwater Heating and 2-FCV-5-21, HP HEATER 2B2 EXTR ISOL VLV Fail to isolate

	BOP	**2-AOI-6-1A Attachment 1** Closes the following Feedwater Valves Manually 2-FCV-3-31, HP HTR 2B2 FW INLET ISOL VALVE 2-FCV-3-76, HP HTR 2B1 FW OUTLET ISOL VALVE Verifies the following valves close automatically 2-FCV-5-9, HP HEATER 2B1 EXTR ISOL VLV 2-FCV-5-21, HP HEATER 2B2 EXTR ISOL VLV 2-FCV-6-74, MOISTURE SEP LC RES B1 ISOL VLV 2-FCV-6-172, MOISTURE SEP LC RES B2 ISOL VLV Takes action to manually shut 2-FCV-5-21 upon determining the valve did not automatically close and reports to SRO Recognizes HTR level lowers as a result of isolating the Condensate side of 2B HP HTR string (i.e. tube leak) and reports to crew
	DRIVER	After HS for 2-FCV-5-21 taken to closed, verify **Trigger 5** goes active. As Reactor Engineer , when contacted direct crew to follow the guidance of urgent load reduction and 2-OI-6
	ATC	Lower Reactor Power to <920 MWe/<79% power by lowering recirc flow.
	SRO	Direct ATC to insert the first group of control rods on the Emergency Shove Sheet per Reactor Engineer recommendation.
	ATC	Inserts the first group of rods on the Emergency Shove Sheet using a peer check as directed by Rx Engineer & Unit Supervisor

Simulator Event Guide:

Event 6: Feedwater Pump 3A Governor Drifts Up

	DRIVER	When NRC directs, insert imf fw30a check current setting of fw30a and then ramp to 100 over 20 minutes for Feedwater Pump Governor Failure. When operator takes the RFPT Governor to manual the malfunction is automatically deleted, therefore, **IF** the operator pulls the Governor control knob back out, the malfunction must be manually reinserted and deleted when the operator returns the Governor control knob back down to force the operator to control level manually.
	ATC	Report Rising Reactor Water Level and RFPT is not responding.
	SRO	Direct manual control of operating RFPT and Enter 2-AOI-3-1.
		4.2 Subsequent Actions [1] **VERIFY** applicable automatic actions. **6.0 HIGH REACTOR WATER LEVEL** [2] **IF** Feedwater Control System has failed, **THEN PERFORM** the following: [2.1] **PLACE** individual RFPT Speed Control Raise/Lower switches in MANUAL GOVERNOR (depressed position with amber light illuminated). [2.2] **ADJUST** RFP Discharge flows with RFPT Speed Control Raise/Lower switches as necessary to maintain level. [6] **IF** level continues to rise, **THEN TRIP** a RFP, as necessary. [8] **IF** RFPs are in manual control, **THEN LOWER** speed of operating RFPs. [9] **EXPECT** a possible Reactor power rise due to a rise in moderation. [10] **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.
	ATC	Take MANUAL GOVERNOR control of RFPT and maintain Reactor Water Level Manually in the Normal Level Band. Operator may attempt to control RFPT with PDS. PDS will not respond.
	DRIVER	If a scram is inserted or at NRC direction initiate F9 for LOCA and make Earthquake calls

Simulator Event Guide:

Event 7 Major: Earthquake

Driver	**Driver**	Report confirmed earthquake Unit 1 is handling 0-AOI-100-5, Earthquake
	ATC/BOP	Reports rising Drywell pressure
	SRO	Establishes Drywell Pressure to insert a Reactor Scram
	ATC	Insert Manual SCRAM when directed
	SRO	Enters 2-AOI-100-1, EOI-1 and EOI-2 on High Drywell Pressure
	ATC	2-AOI-100-1 [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** (Otherwise N/A) [3] REFUEL MODE ONE ROD PERMISSIVE light check: [3.1] **PLACE** REACTOR MODE SWITCH, 2-HS-99-5A-S1, in REFUEL. [3.2] **CHECK** REFUEL MODE ONE ROD PERMISSIVE light, 2-XI-85-46, illuminates. [3.3] **IF** REFUEL MODE ONE ROD PERMISSIVE light, 2-XI-85-46, is not illuminated, **THEN CHECK** all control rod positions at Full-In Overtravel, or Full-In. (Otherwise N/A) [4] **PLACE** REACTOR MODE SWITCH, 2-HS-99-5A-S1, in SHUTDOWN position.
Driver	**Driver**	Ensure **trigger 1** goes active on MODESWITCH

Simulator Event Guide:

Event 7 Major: Earthquake – Feedwater Line Break

Driver	Driver	Report confirmed earthquake Unit 1 is handling 0-AOI-100-5, Earthquake
	ATC	Determines Feedwater Leak on the A Feedwater Line due to Feedwater Line A Flow high and Feedwater line B flow lowering to 0 and Reactor Feed Pump Flows Increasing with a Lowering Reactor Water Level.
	SRO	Directs Reactor Feed Pumps to be tripped, Reactor Feed Pump Discharge Valves shut, and Condensate Booster Pumps then Condensate Pumps secured. (Isolate and stop leak) Also directs HPCI locked out due to Feedwater Line Break on the A line.
	ATC	Trips Reactor Feed Pumps and shuts Reactor Feed Pump Discharge Valves. Secures Condensate Booster Pumps then Condensate Pumps.
	BOP	Trips HPCI if running and places HPCI Aux Oil Pump in PTL when HPCI speed lowers to 0 rpm.
	SRO	**Enters EOI-1 on Low Reactor Water Level and High Drywell Pressure** **RC/Q** Monitor and Control Reactor Power. Directs Exit of EOI-1 RC/Q Leg, after ATC reports All Rods In on Scram Report. **RC/P** Monitor and Control RPV Pressure. Answers **NO** to: Is any MSRV cycling? Directs BOP to maintain RPV Pressure 500 -1000 psig using Appendix 11A.. **RC/L** Monitor and Control RPV Water Level. Verify as Required: • PCIS Isolations (Groups 1, 2 and 3) • ECCS • RCIC Directs level band of +2 to +51 inches, with Appendix 5C, 5B and/or 7B.

Simulator Event Guide:

Event 7 Major: Earthquake – Feedwater Line Break

	ATC/BOP	Pressure Control IAW Appendix11A, RPV Pressure Control SRVs
		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. 2-PCV-1-179 MN STM LINE A RELIEF VALVE
		b. 2-PCV-1-180 MN STM LINE D RELIEF VALVE.
		c. 2-PCV-1-4 MN STM LINE A RELIEF VALVE
		d. 2-PCV-1-31 MN STM LINE C RELIEF VALVE
		e. 2-PCV-1-23 MN STM LINE B RELIEF VALVE
		f. 2-PCV-1-42 MN STM LINE D RELIEF VALVE
		g. 2-PCV-1-30 MN STM LINE C RELIEF VALVE
		h. 2-PCV-1-19 MN STM LINE B RELIEF VALVE.
		i. 2-PCV-1-5 MN STM LINE A RELIEF VALVE.
		j. 2-PCV-1-41 MN STM LINE D RELIEF VALVE
		k. 2-PCV-1-22 MN STM LINE B RELIEF VALVE
		l. 2-PCV-1-18 MN STM LINE B RELIEF VALVE
		m. 2-PCV-1-34 MN STM LINE C RELIEF VALVE

Simulator Event Guide:

Event 8 Major: Loss of all injection Steam Cooling

NOTE	NOTE	When RCIC is started, a break will occur on the RCIC Steam Line prior to FCV 71-8.
	ATC/BOP	Reports alarm RCIC STEAM LINE LEAK DETECTION TEMP HIGH and rising temperatures in RCIC
	SRO	Directs RCIC Isolation verified
	ATC/BOP	Verifies RCIC automatically isolates.
		Attempt to align SLC per Appendix 7B. Recognize and report trip of both SLC Pumps.
		Report trip of CRD Pump 2A and inability to align CRD Pump 1B due to 2-85-8A will not open.
	CREW	Recognizes loss of all High Pressure Injection sources
	ATC/BOP	Report loss of 480 V RMOV Bd 2A / RMOV Bd 2E / RMOV Bd 2D
	CREW	Recognizes loss of all Injection sources
CT#3	SRO	**EOI-1 (cont)** Answers **NO** to: Can water level be Restored and Maintained above (+) 2 inches? Maintain RPV Water Level above (-) 162 inches. Directs ADS inhibited when RPV Water Level drops below -120 inches. Augments RPV Water Level Control with SLC, per Appendix 7B. Answers **NO** to: Can RPV Water Level be maintained above (-) 162 inches? Exits RC/L and enters C-1, "Alternate Level Control".
CT#3	ATC/BOP	Inhibits ADS

Simulator Event Guide:

Event 8 Major: Loss of all injection Steam Cooling

	SRO	**Enters C-1, Alternate Level Control** Verifies ADS Inhibited Directs lineup of Injection Systems Irrespective of Pump NPSH and Vortex limits (LPCI and CS) per Appendix 6B and 6D Answers **NO** to can 2 or more CNDS, LPCI or CS Injection Subsystems be aligned with pumps running When RPV Water Level drops to -162 inches, Then continues Answers **NO** to is any CNDS, LPCI or CS Injection Subsystem aligned with at least one pump running Before RPV Water Level drops to -180 inches continue Answers **NO** to are pumps running that can restore and maintain RPV Water Level above -180 inches after Emergency Depressurization When RPV Water Level drops to -180 inches continue Answers **NO** to is any CNDS Injection Source aligned with at least one pump running Steam Cooling is Required
Driver	Driver	Once steam cooling is entered insert F10 (dmf ed12a). Then close normal feeder breaker to RMOV Bd 2A insert F11 (mrf ed09 norm). Notify crew that RMOV Bd 2A is restored. Then insert F12 (mrf rp02 reset) to reset RPS B.
NOTE	NOTE	Restoration of RMOV Bd 2A makes Core Spray Loop I available.
CT#1	SRO	**C-1, Alternate Level Control** (Cont.) If any Injection Source aligned with at least one pump running and Reactor Level is < -180 inches continue Emergency Depressurization is required Enters C-2

Simulator Event Guide:

Event 8 Major: Loss of all injection Steam Cooling

CT#1	SRO	**C-1, Alternate Level Control** (Cont.) If RPV Water Level drops to -200 inches continue Emergency Depressurization is required Enters C-2 Directs maximizing RPV Injection from all available sources irrespective of pump NPSH and Vortex Limits
CT#1		**Enters C-2, Emergency RPV Depressurization** Answers **Yes** to will the Reactor remain subcritical without Boron under all conditions Answers **Yes** to is Drywell Pressure above 2.4 psig Does not prevent Injection from any Core Spray or LPCI pumps because they are all needed to assure adequate core cooling Answers **Yes** to is Suppression Pool Level above 5.5 feet Directs opening of all ADS Valves Answers **NO** to can 6 ADS Valves be opened Open additional MSRVs as necessary to establish 6 MSRVs Open Answers **YES** to are at least 4 MSRVs Open
CT#1	BOP/ATC	Open 5 ADS Valves and one additional SRV due to Inoperable ADS SRV
CT#2	BOP/ATC	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 TAF.

Simulator Event Guide:

Event 8 Major: Loss of all injection Steam Cooling

	BOP/ATC	**Appendix 6D, Loop I Core Spray** 1. **VERIFY OPEN** the following valves: • 2-FCV-75-2, CORE SPRAY PUMP 2A SUPPR POOL SUCT VLV • 2-FCV-75-11, CORE SPRAY PUMP 2C SUPPR POOL SUCT VLV • 2-FCV-75-23, CORE SPRAY SYS I OUTBD INJECT VALVE. 2. **VERIFY CLOSED** 2-FCV-75-22, CORE SPRAY SYS I TEST VALVE. 3. **VERIFY** CS Pump 2A and/or 2C running. 4. WHEN ... RPV pressure is below 450 psig, THEN ... **THROTTLE** 2-FCV-75-25, CORE SPRAY SYS I INBD INJECT VALVE, as necessary to control injection at or below 4000 gpm per pump.
	SRO	**C-1, Alternate Level Control** (Cont.) Answers **Yes** to can RPV Water Level be restored and maintained above -180 inches Exits C-1 and enters EOI-1, RPV Control at step RC/L-1
	SRO	**Enters EOI-2 on High Drywell Pressure** **DW/T** Monitor and control Drywell temperature below 160F using available Drywell cooling Answers **No** to can Drywell Temperature be maintained below 160F Operate all available drywell cooling Before Drywell Temperature rises to 200F enter EOI-1 and Scram Reactor (this will already be complete at this time) Before Drywell Temperature rises to 280F continue Answers **Yes** to is Suppression Pool Level below 18 Feet Answers **Yes** to are Drywell Temperatures and Pressures within the safe area of curve 5 Directs Shutdown of Recirc Pumps and Drywell Blowers (should leave Drywell Blowers running due to being unable to spray because adequate core cooling is not assured)

Simulator Event Guide:

Event 8 Major: Loss of all injection Steam Cooling

	SRO	**Enters EOI-2 on High Drywell Pressure (cont)** **PC/P** Monitor and control Primary Containment pressure below 2.4 psig using the Vent System (Appendix 12) as necessary Direct Appendix 12
	ATC/BOP	Vent Containment IAW Appendix 12
		1. VERIFY at least one SGTS train in service. 2. VERIFY CLOSED the following valves (Panel 2-9-3 or Panel 2-9-54): 2-FCV-64-31, DRYWELL INBOARD ISOLATION VLV, 2-FCV-64-29, DRYWELL VENT INBD ISOL VALVE, 2-FCV-64-34, SUPPR CHBR INBOARD ISOLATION VLV, 2-FCV-64-32, SUPPR CHBR VENT INBD ISOL VALVE.
		Steps 3, 4, 5 and 6 are If / Then steps that do not apply
		7. **CONTINUE** in this procedure at: Step 8 to vent the Suppression Chamber through 2-FCV-84-19, **OR** Step 9 to vent the Suppression Chamber through 2-FCV-84-20.
		8. VENT the Suppression Chamber using 2-FIC-84-19, PATH B VENT FLOW CONT, as follows: a. PLACE keylock switch 2-HS-84-35, DW/SUPPR CHBR VENT ISOL BYP SELECT, to SUPPR-CHBR position (Panel 2-9-54). b. VERIFY OPEN 2-FCV-64-32, SUPPR CHBR VENT INBD ISOL VALVE (Panel 2-9-54). c. PLACE 2-FIC-84-19, PATH B VENT FLOW CONT, in AUTO with setpoint at 100 scfm (Panel 2-9-55). d. PLACE keylock switch 2-HS-84-19, 2-FCV-84-19 CONTROL, in OPEN (Panel 2-9-55). e. VERIFY 2-FIC-84-19, PATH B VENT FLOW CONT, is indicating approximately 100 scfm. f. CONTINUE in this procedure at step 12.

Simulator Event Guide:

Event 8 Major: Loss of all injection Steam Cooling

	BOP	Vents Primary Containment IAW Appendix 12
		9. VENT the Suppression Chamber using 2-FIC-84-20, PATH A VENT FLOW CONT, as follows: a. VERIFY OPEN 2-FCV-64-141, DRYWELL DP COMP BYPASS VALVE (Panel 2-9-3). b. PLACE keylock switch 2-HS-84-36, SUPPR CHBR/DW VENT ISOL BYP SELECT, to SUPPR-CHBR position (Panel 2-9-54). c. VERIFY OPEN 2-FCV-64-34, SUPPR CHBR INBOARD ISOLATION VLV (Panel 2-9-54). d. VERIFY 2-FIC-84-20, PATH A VENT FLOW CONT, in AUTO with setpoint at 100 scfm (Panel 2-9-55). e. PLACE keylock switch 2-HS-84-20, 2-FCV-84-20 ISOLATION BYPASS, in BYPASS (Panel 2-9-55). f. VERIFY 2-FIC-84-20, PATH A VENT FLOW CONT, is indicating approximately 100 scfm. g. CONTINUE in this procedure at step 12.
		12. ADJUST 2-FIC-84-19, PATH B VENT FLOW CONT, or 2-FIC-84-20, PATH A VENT FLOW CONT, as applicable, to maintain ALL of the following: Stable flow as indicated on controller, AND 2-PA-84-21, VENT PRESS TO SGT HIGH, alarm light extinguished, AND Release rates as determined below: iii. IF Venting for ANY other reason than items i or ii above, THEN MAINTAIN release rates below Stack release rate of 1.4 x 107 µCi/s AND 0-SI-4.8.B.1.a.1 release fraction of 1.
	DRIVER	Acknowledge Notification

Simulator Event Guide:

Event 8 Major: Loss of all injection Steam Cooling

	SRO	**Enters EOI-2 on High Drywell Pressure (cont)** **PC/P** Monitor and control Primary Containment pressure below 2.4 psig using the Vent System (Appendix 12) as necessary Direct Appendix 12 Answers **No** to can Primary Containment Pressure be maintained below 2.4 psig Before Suppression Chamber Pressure rises to 12 psig Initiate Suppression Chamber Sprays using only those pumps not required for Adequate Core Cooling Directs Drywell Spray
	ATC/BOP	Initiate Suppression Chamber Sprays per Appendix 17C
		1. BEFORE Suppression Chamber pressure drops below 0 psig, **CONTINUE** in this procedure at Step 6. 2. IF ..... Adequate core cooling is assured **OR** Directed to spray the Suppression Chamber irrespective of adequate core cooling, THEN ... **BYPASS** LPCI injection valve open interlock as necessary: • **PLACE** 2-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS**. • **PLACE** 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.**

Simulator Event Guide:

Event 8 Major: Loss of all injection Steam Cooling

	ATC/BOP	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-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE. c. **MOMENTARILY PLACE** 2-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT, switch in SELECT. d. IF.....2-FCV-74-53(67), RHR SYS I(II) INBD INJECT VALVE, is OPEN, THEN...**VERIFY CLOSED** 2-FCV-74-52(66), RHR SYS I(II) OUTBD INJECT VALVE. e. **VERIFY OPERATING** the desired RHR System I(II) pump(s) for Suppression Chamber Spray. f. **VERIFY OPEN** 2-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV. g. **OPEN** 2-FCV-74-58(72), RHR SYS I(II) SUPPR CHBR SPRAY VALVE. h. IF.....RHR System I(II) is operating ONLY in Suppression Chamber Spray mode, THEN...**CONTINUE** in this procedure at Step 5.k. i. **VERIFY CLOSED** 2-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.
	ATC/BOP	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-23-34, RHR HX 2A RHRSW OUTLET VLV • 2-FCV-23-46, RHR HX 2B RHRSW OUTLET VLV • 2-FCV-23-40, RHR HX 2C RHRSW OUTLET VLV • 2-FCV-23-52, RHR HX 2D RHRSW OUTLET VLV. n. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers.
	SRO	The Emergency classification is 1.1-G1

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

Core Spray Loop 2 is out of service and tagged out, Technical Specifications have been addressed

Operations/Maintenance for the Shift:

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

Once completed raise reactor power to 100% with Recirculation.

Units 1 and 3 are at 100% power.

Unusual Conditions/Problem Areas:

None

cility: **Browns Ferry NPP** Scenario No.: **NRC - 8** Op-Test No.: **1108**

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

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 3% power. 3-GOI-100-1A Section 5.4 Step 63.3

Turnover: Warm RFPT B IAW 3-OI-3 Section 5.6 step 20. Continue to pull rods for Mode Change.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Warm RFPT B 3-OI-3 5.6 Step 20
2		R-ATC R-SRO	Raise power with Control Rods, Group 34 18-43 at 08
3	RD06	C-ATC TS-SRO	Control Rod stuck 26-27, after drive water pressure raised rod drifts out ATC will insert control rod
4	OG05a	I-BOP TS-SRO	Hydrogen Water Chemistry Malfunction
5	RP01A	C-ALL TS-SRO	Loss of RPS A
6	FW15C	C-ATC C-SRO	RFPT C Trip
7	ED01	M-ALL	Loss of Offsite Power, LOCA, ATWS
8		C	Shutdown Boards B, C and D fail to energize
9	DG03a	C	DG A fails to tie to SD BD

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

Critical Tasks – Two

CT#1- With a loss of all Off Site Power and NO Diesel Generators powering their respective Shutdown Boards ties Diesel Generator A to 4 KV SD BD A.

1. Safety Significance:
   Provides Power for Control Rod Insertion and ECCS Systems

2. Cues:
   Procedural compliance
   4 KV Shutdown Board Energized

3. Measured by:
   Observation – RO closes in DG Supply Breaker to 4 KV SD BD A
   AND
   Observation – 4 KV SD BD A indicates energized

4. Feedback:
   Power to 4 KV SD BD A
   Power to 4 KV RMOV BD A

CT#2 -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.

EVENTS

1. BOP Operator warms RFPT B IAW 3-OI-3 Feedwater System, section 5.6 step 20

2. ATC Continues Power ascension for Mode Change

3. Control Rod 26-27 will not withdraw with normal drive water pressure from position 8, The ATC will take action IAW 3-OI-85 for control difficult to withdraw. When drive water pressure is increased rod 26-27 will withdraw and continue out. SRO enters AOI for rod drift out. The ATC will insert control rod 26-27, when drive in is released the control rod will drift out, the ATC will have to maintain drive in until the control rod is scrammed. The SRO will declare the Control Rod Inoperable Technical Specification 3.1.3 condition C.

4. 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 and shutdown the Hydrogen Water Chemistry System. The SRO will evaluate TRM 3.7.2 and enter Condition A.

5. Loss of RPS A the SRO will direct entry into 3-AOI-99-1, 3-AOI-70-1 and 3-AOI-64-2D. The crew will restore RPS, PCIS, RBCCW and other systems IAW 3-OI-99. The SRO will evaluate TRM 3.4.1 and direct Chemistry to sample in order to satisfy TSR 3.4.1.1.

6. RFPT C Trips, ATC increases the speed of RFPT B to maintain level in the normal level band. SRO will enter 3-AOI-3-1.

7. The crew will respond to a LOOP, LOCA and ATWS; the SRO will direct entry to 0-AOI-57-1A, EOI-1, EOI-C-5, and EOI-2. The crew will discover that HPCI has failed to operate. RCIC is available for level control. SRVs for pressure control. RHR Pump A is available to spray the Drywell. Crew will call for LOOP action and for RPS to be reset.

8. Shutdown Boards B, C and D fail to energize

9. DG A fails to tie to Shutdown board A, an operator manually closes in DG output breaker to energize SD BD A.

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

All Control Rods are inserted

Reactor Level is maintained

Drywell has been Sprayed

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 8

8	Total Malfunctions Inserted: List (4-8)
4	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)
0	EOI Contingencies used: List (0-3)
75	Validation Time (minutes)
2	Crew Critical Tasks: (2-5)
YES	Technical Specifications Exercised (Yes/No)

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Warm RFPT B			
RO U-003-NO-23	259001A4.02	3.9	3.7
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-7 SRO S-085-AB-7	201002A2.02	3.2	3.3
Hydrogen Water Chemistry Malfunction			
RO U-066-AL-10 SRO S-066-AB-1	271000A1.13	3.2	3.7
Loss of RPS A			
RO U-099-AB-1 SRO S-099-AB-1	212000A2.02	3.7	3.9
RFPT C Trip			
RO U-003-AB-1 SRO S-003-AB-1	259001A2.01	3.7	3.7
LOOP			
RO U-57A-AB-1 RO U-082-AL-7 SRO S-57A-AB-1 SRO S-000-EM-1 SRO T-000-EM-18 SRO S-000-AD-27	295003AA1.03	4.4	4.4

Procedures Used/Referenced:

Procedure Number	Procedure Title	Procedure Revision
3-OI-3	Reactor Feedwater System	Rev 82
3-GOI-100-12	Power Maneuvering	Rev 35
3-OI-85	Control Rod Drive System	Rev 70
3-ARP-9-5B, W10	REACTOR PROT 120V PWR SYS ABNORMAL	Rev 17
3-AOI-99-1	Loss of Power to One RPS Bus	Rev 16
3-OI-99	Reactor Protection System	Rev 47
3-ARP-9-6C, W29	RFPT TRIPPED	Rev 12
3-ARP-9-6C, W15	RFPT C ABNORMAL	Rev 12
3-AOI-57-1A	Loss of Offsite Power (161 and 500 KV)/Station Blackout	Rev 79
3-ARP-9-5A	Control Rod Drift	Rev 41
3-AOI-85-6	Rod Drift Out	Rev 9
TS 3.1.3	Control Rod Operability	Amd 212
TRM 3.4.1	Coolant Chemistry	Rev 21
TRM 3.7.2	Airborne Effluents	Rev 0
3-AOI-66-1	Off Gas H2 High	Rev 6
3-ARP-9-53	Panel 9-53	Rev 24
3-AOI-3-1	Loss of Reactor Feedwater or Reactor Water Level	Rev 9
3-AOI-64-2D	Group 6 Ventilation System Isolation	Rev 16
3-EOI-3-C-5	Level/Power Control	Rev 9
3-EOI-1	RPV Control	Rev 8
3-AOI-100-1	Reactor Scram	Rev 53
3-EOI-App-2	Defeating ARI Logic Trips	Rev 4
3-EOI-App-1F	Manual Scram	Rev 2
3-EOI-App-11A	Alternate RPV Pressure Control MSRVs	Rev 2

Procedures Used/Referenced:

Procedure Number	Procedure Title	Procedure Revision
3-EOI-App-1D	Insert Control Rods using Reactor Manual Control System	Rev 2
3-EOI-2	Primary Containment Control	Rev 8
3-EOI-App-17A	RHR System Operation Suppression Pool Cooling	Rev 5
3-EOI-App-17B	RHR System Operation Drywell Sprays	Rev 5
3-EOI-App-17C	RHR System Operation Suppression Chamber Sprays	Rev 6
3-EOI-App-12	Primary Containment Venting	Rev 4
3-EOI-App-5C	Injection System Lineup RCIC	Rev 3
EPIP-1	Emergency Classification	Rev 46

#stuck rod 26-27
imf rd06r2627
imf rd04r2627 (e3 0)

#hwc malfunction
imf og05a (e5 0) 85
ior xa5553a[10] (e5 0) alarm_on
trg 16 nrc20110440
trg 16 = mmf og05a 100 360 99

#rps A trip
imf rp01a (e10 0)
mrf rp04 (e11 0) A
irf rp03 (e11 0) reset
irf rp09 (e11 0) reset

#FWP trip
imf fw15c (e15 0)

#LOOP LOCA ATWS/major
bat atws95
mrf ed27a (e19 0) close
mrf ed10 (e24 0) alt
trg 21 = bat atws-1
trg 22 = bat app01f
trg 23 = bat app02
trg 25 = bat sdv
imf th22 (e20 0) 100
imf th21 (e20 0) 0.1
imf ed01 (e20 0)
imf dg03a (e20 0)
imf ed15c (e20 0)
imf dg06b (e20 0)
imf ed15d (e20 0)
imf hp07 (e20 0)
trg 26 = bat eecw
trg 27 = bat eecw-1
trg 28 = bat ca
trg 29 = bat rpsreset

Scenario 8

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 203
Simulator Setup	**Load Batch**	NRC 1108-8
Simulator Setup		Verify file loaded

Simulator Event Guide:

Event 1 Normal: Warm RFPT B 3-OI-3 5.6 Step 20

	SRO	Directs BOP to continue warming RFPT B per 3-OI-3 Section 5.6, step 20
	BOP	Continues warming RFPT B per 3-OI-3 Section 5.6, starting at step 20
		5.6 Warming the Second and Third RFP/RFPT (continued)
		[20] **VERIFY** RFPT Speed Control in MANUAL GOVERNOR.
		[20.1] **ADJUST** RFPT 3B SPEED CONT RAISE/LOWER switch, 3-HS-46-9A, as necessary until RFPT speed is approximately 1000 rpm, as indicated on RFPT SPEED.
		[21] **PLACE** RFPT 3B TURNING GEAR MOTOR, 3-HS-3-127A, in AUTO.
		[22] **DEPRESS** RFPT 3B TRIP, 3-HS-3-151A.
		[22.1] **VERIFY** HP and LP Stop Valves close.
		[23] **VERIFY** Turning Gear automatically engages or RFP rolling on minimum flow.
		NOTE Turning Gear Motor will lockout if Turning Gear does NOT engage within five seconds of reaching zero speed. Lockout can be reset by placing control switch to OFF and pulling out (at OFF).
		[24] **DEPRESS** RFPT 3B TRIP RESET, 3-HS-150A.
		[24.1] **VERIFY** the following: • Blue light extinguishes. • HP and LP Stop Valves open.
		CAUTION DO **NOT** RAISE RFP discharge pressure to greater than Reactor Pressure to prevent injection to the vessel. **NOTE** Normal operating range for RFP lube oil to bearings is 110°F to 120°F. Illustration 7 has additional instruction for controlling Raw Cooling Water through RFP lube oil cooler.

Simulator Event Guide:

Event 1 Normal: Warm RFPT B 3-OI-3 5.6 Step 20 (continued)

	BOP	[25] **PLACE** RFPT 3B START/LOCAL ENABLE, 3-HS-46-138A, in START.
		[25.1] **OBSERVE** RFPT accelerates to approximately 600 rpm on RFPT 3B SPEED, 3-SI-46-9A (Panel 3-9-6)
		[26] **IF** the lube oil to bearings is **NOT** at least 110°F, **THEN PERFORM** the following: [26.1] **RAISE** RFPT speed to 1100 rpm using RFPT 3A(3B)(3C) SPEED CONT RAISE/LOWER switch, 3-HS-46-9A. • **MAINTAIN** this speed until lube oil to the bearings reaches 110°F. [26.2] **WHEN** oil to the bearings reaches 110°F, **THEN REDUCE** RFPT speed using RFPT 3B SPEED CONT RAISE/LOWER switch, 3-HS-46-9A, until RFP 3A(3B)(3C) DISCH PRESS, 3-PI-3-9A, is less than Reactor Pressure.

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 34 18-43 at 08

	SRO	Direct Power increase using Control Rods per 3-GOI-100-1A , Section 5.4 **5.4 Withdrawal of Control Rods while in Mode 2** [67] **CONTINUE** to withdraw control rods to raise Reactor power to approximately 8%. (REFER TO 3-OI-85 and 3-SR-3.1.3.5(A))
	ATC	Raise Power with Control Rods per 3-OI-85, Section 6.6 Group 34 = 18-43, 42-43, 42-19, 18-19 from 08 to 12 Group 35 = 26-35, 34-35, 34-27, 26-27 from 08 to 12 Group 36 = 02-35, 26-59, 34-59, 58-35, 58-27, 34-03, 26-03, 02-27 from 00 to 12
		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** [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]. [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.

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 34 18-43 at 08

	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. [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, 3-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 the full core Display, digital readout and background light remain illuminated. • CONTROL ROD OVERTRAVEL annunciator, 3-XA-55-5A, Window 14, does not alarm. [6.3] **CHECK** the control rod settles into Position 48 and the ROD SETTLE light extinguishes. [6.4] **IF** Control Rod Coupling Integrity Check fails, **THEN REFER TO** 3-AOI-85-2.

Simulator Event Guide:

Event 2 Reactivity: Raise power with Control Rods, Group 34 18-43 at 08

	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 3 Component: Control Rod stuck, 26-27

	DRIVER	Verify malfunction (imf rd06r2627) to stick control rod 26-27 at 08 indicates TRUE
	ATC	Reports Control Rod 26-47 failed to withdraw from position 08.
	SRO	Direct 3-OI-85 Section 8.15
		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 **CAUTION** [NER/C] Never pull control rods except in a deliberate, carefully controlled manner, while closely monitoring the Reactor's response. [INPO SOER-96-001] [3] [NRC/C] **IF** RWM is enforcing, **THEN** **VERIFY** RWM is operable and LATCHED in to the correct ROD GROUP. [NRC-IR 84-02] **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.

Simulator Event Guide:

Event 3 Component: Control Rod stuck, 26-27

	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** CRD DRIVE WTR HDR DP, 3-PDI-85-17A, to 300 psid, using CRD DRIVE WATER PRESS CONTROL VLV, 3-HS-85-23A. [7.2] **ATTEMPT** to withdraw the control rod using CRD CONTROL SWITCH, 3-HS-85-48. [7.3] **IF** the control rod successfully notches out, **THEN** **LOWER** 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, and **PROCEED** to Section 6.6.
		CAUTION To prevent a drive from double notching in a high rod worth region and to reduce exposure of drive seals and directional control valves to excessive pressures, the CRD DRIVE WTR HDR DP should be returned to between 250 psid and 270 psid as soon as possible.
		[7.4] **IF** the control rod failed to notch out, **THEN** **RAISE** CRD DRIVE WTR HDR DP, 3-PDI-85-17A, to 350 psid, using CRD DRIVE WATER PRESS CONTROL VLV, 3-HS-85-23A.
		[7.5] **ATTEMPT** to withdraw the control rod using CRD CONTROL SWITCH, 3-HS-85-48.
		[7.6] **LOWER** 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.

Simulator Event Guide:

Event 3 Component: Control Rod stuck, 26-27 drifts

Driver	Driver	After drive water pressure is raised, and Operator withdraws Control Rod 26-27 **INSERT** trigger 3 for Control Rod Drift.
	ATC	Reports CONTROL ROD DRIFT alarm and Control Rod 26-27 is drifting out
	SRO	Directs ATC to respond per ARP and enters 3-AOI-85-6
	ATC	**3-ARP-9-5A window 28 CONTROL ROD DRIFT** A. **DETERMINES** which rod is drifting from Full Core Display. B. **IF** no control rod motion is observed, **THEN** **RESETS** rod drift as follows: 1. **PLACE** ROD DRIFT ALARM TEST switch, 3-HS-85-3A-S7, in RESET and **RELEASE**. 2. **RESET** the annunciator. C. **IF** rod drifting in, **THEN** **REFER TO** 3-AOI-85-5 and 3-AOI-85-7. D. **IF** rod drifting out, **THEN** **REFER TO** 3-AOI-85-6 and 3-AOI-85-7. E. **REFER TO** Tech Spec Section 3.1.3 and 3.10.8.
	ATC	Responds per 3-AOI-85-6 Monitors Full Core Display for a second Control Rod Drift, per Immediate Actions of 3-AOI-85-6.
	ATC	**3-AOI-85-6 Control Rod Drift** **4.1 Immediate Actions** [1] **IF** multiple control rod drifts are identified, **THEN** **MANUALLY SCRAM** the reactor and enter 3-AOI-100-1.

Simulator Event Guide:

Event 3 Component: Control Rod stuck, 26-27 drifts

	ATC	**3-AOI-85-6 Control Rod Drift (continued)** **4.2 Subsequent Actions** [1] **IF** a Control Rod is moving from its intended position without operator actions, **THEN SELECT** the drifting control rod and **INSERT** to the FULL IN position. [2] **IF** control rod drive does NOT respond to INSERT signal, **THEN** [3] **NOTIFY** the Reactor Engineer to Evaluate Core Thermal Limits and Preconditioning Limits for the current Control Rod pattern. [4] **IF** another Control Rod Drift occurs before Reactor Engineering completes the evaluation, **THEN** **MANUALLY SCRAM** Reactor and enter 3-AOI-100-1. [5] **IF** the control rod will not latch into position "00" and continues to demonstrate occurrences of inadvertent withdrawal, **THEN** [6] **IF** the control rod is latched into position "00", **THEN** **REMOVE** associated HCU from service per 3-OI-85. [7] **EVALUATE** Tech Spec 3.1.3. [8] **INITIATE** Service Request/Work Order.
	ATC	**3-AOI-85-6 Control Rod Drift (continued)** **4.2 Subsequent Actions(continued)** [9] **NOTIFY** Reactor Engineer to perform the following for current condition: • **EVALUATE** condition of core to assure no resultant fuel damage has occurred. • **EVALUATION** of impact on thermal limits and PCIOMOR restraints. (N/A if scram was initiated.) • **DETERMINE** if other control rods need to be repositioned in order to safely restore core symmetry to prevent local fuel damage. (N/A if scram was initiated.) [10] **NOTIFY** System Engineering to **PERFORM** 0-TI-20, Control Rod Drive System Testing and Troubleshooting to determine problem with faulty control rod.

Simulator Event Guide:

Event 3 Component: Control Rod stuck, 26-27 drifts

<table>
<tr><td></td><td></td><td>[13] NOTIFY Reactor Engineer to EVALUATE impact on preconditioning envelope, prior to returning to normal power operation.</td></tr>
<tr><td></td><td>ATC</td><td>Selects Control Rod 26-27 and inserts to position 00.
When Drive In is released control rod will start to drift out again, maintains drive in for control rod 26-27 until Operator dispatched to scram rod with SRI switch.</td></tr>
<tr><td>Driver</td><td>Driver</td><td>When requested to scram control rod 26-27 insert IRF RD10r2627 SCRAM, once scrammed delete control rod drift on 26-27 and to return SRI to Normal insert MRF RD10r2627 NORM.
As Reactor Engineer, inform that Core Thermal Limits and Preconditioning Limits for the current Control Rod pattern will be evaluated.</td></tr>
<tr><td></td><td>SRO</td><td>Evaluates Tech Spec 3.1.3, Condition C.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.3 Control Rod OPERABILITY

LCO 3.1.3 Each control rod shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS
----------NOTE----------
Separate Condition entry is allowed for each control rod.

<table>
<tr><td>C. One or more control rods inoperable for reasons other than Condition A or B.</td><td>C.1

AND

C.2</td><td>----------NOTE----------
RWM may be bypassed as allowed by LCO 3.3.2.1, if required, to allow insertion of inoperable control rod and continued operation.

Fully insert inoperable control rod.

Disarm the associated CRD.</td><td>

3 hours

4 hours</td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Simulator Event Guide:

Event 3 Component: Control Rod stuck, 26-27 drifts

Driver	Driver	The SRO will direct the associated HCU removed from service. Acknowledge order to remove HCU from service, verify what steps in 3-OI-85 will be used to isolate the HCU. Wait 20 minutes, then **INSERT** malfunction **rd08** to bring in accumulator low pressure alarm and report HCU removed from service.
		Notifies Reactor Engineer to perform the following for current condition: • Evaluation of condition of core to assure no resultant fuel damage has occurred. • Evaluation of impact on thermal limits and PCIOMOR restraints. • Determination if other control rods need to be repositioned in order to safely restore core symmetry to prevent local fuel damage. Notifies System Engineering to perform 0-TI-20, Control Rod Drive System Testing and Troubleshooting to determine problem with faulty control rod. Enters 3-GOI-100-12, Power Maneuvering, for the power change that occurred. Directs associated HCU removed from service, IAW 3-OI-85.
iver	Driver	Acknowledge all positions informed in step 2 of Subsequent Actions. **IF** contacted as Work Control, inform that you will get working on a Work Order/Service Request. **IF** contacted as Reactor Engineer, inform that you will evaluate all conditions listed above.

Simulator Event Guide:

Event 4 Instrument: Hydrogen Water Chemistry Malfunction

	Driver	When directed by NRC, insert malfunction OG05a to cause a Hydrogen Water Chemistry Malfunction.
	BOP	Respond to Off Gas Panel Alarms 9-53-10, 3, and 13
		53-10, H2 Water Chemistry Abnormal A. Checks H2 concentration on H2 analyzer on 3-9-53. B. Dispatches personnel.
		53-3 and 13, High Offgas % H2 Train A and B A. **CHECK** H2 concentration on OFF-GAS HYDROGEN ANALYZER, at 3-H2R-66-96 (CH2), on Panel 3-9-53 to verify H2 concentration.. B. **IF** alarm is valid, **THEN REFER TO** 3-AOI-66-1.
	SRO	Announces entry into 3-AOI-66-1, "Off Gas H2 High".
	Driver	When dispatched to the Panel in ONE minute report, "H2 injection rates above (high) setpoint cannot adjust." If requested to Shutdown H2 water chemistry locally inform control room you cannot access the switch.
	BOP	3-AOI-66-1, "Off Gas H2 High" [2] **IF** HWC System injection is in service, **THEN PERFORM** the following (otherwise N/A): [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. 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 NOTIFY** the Unit Supervisor and **INITIATE** a HWC System shutdown using either: • 3-HS-4-40A H2 WATER CHEMISTRY CONTROL [Panel 3-9-53] **or** • 3-HS-4-40B H2 WATER CHEMISTRY CONTROL [Panel 3-9-5] **or** • 3-HS-4-39 HWC SHUTDOWN SWITCH [3-LPNL-925-0588].
	BOP	Shutdown HWC System using either 3-HS-4-40A at panel 9-53 or 3-HS-4-40B at panel 9-5
	SRO	[4] **IF** hydrogen concentration is ≥ 4%, **THEN REFER TO** TRM 3.7.2
NRC	NRC	Once HWC is Shutdown, H2 Concentration will begin to lower slowly

Simulator Event Guide:

Event 4 Instrument: Hydrogen Water Chemistry Malfunction

	SRO	3-AOI-66-1, "Off Gas H2 High"
	SRO	**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).
NRC	NRC	No indication of Fuel Failure Exists, step 5 should be NA.
	BOP	Report H2 Concentration lowering slowly.
		CAUTION When hydrogen concentration is suspected of being greater than 4% (by volume), Off-Gas System valves (other than non-spark producing SJAE inlet valves 3-FCV-066-0011 and 3-FCV-066-0015) are **NOT** allowed to be operated until the unit is shutdown and hydrogen concentration is confirmed to be < 4% (by volume).

Simulator Event Guide:

Event 4 Instrument: Hydrogen Water Chemistry Malfunction

<table>
<tr><td></td><td>SRO</td><td>[7] WHEN any of the following conditions exist, THEN INITIATE actions to reduce hydrogen concentration within 48 hours:
• Hydrogen Analyzer on Panel 3-9-53 indicates ≥4% hydrogen
• Chemistry Lab grab samples indicate ≥4% hydrogen</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>SRO</td><td>REFER TO TRM 3.7.2</td></tr>
<tr><td></td><td></td><td>TR 3.7 PLANT SYSTEMS
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
NOTE
TRM LCO 3.0.3 is not applicable.
ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. With the concentration of hydrogen >4% by volume.</td><td>A.1 Restore the concentration to within the limit.</td><td>48 hours</td></tr>
</table></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Simulator Event Guide:

Event 5 Component : Loss of RPS A

DRIVER	DRIVER	When directed by the NRC, insert malfunction imf rp01a Trigger 10 to cause a loss of RPS A
	ATC	Recognizes a loss of RPS A
	ATC	REACTOR PROT 120V PWR SYS ABNORMAL 2-XA-55-5B, Window 10
		Operator Action: A. **REFER TO** 1-AOI-99-1.
	SRO	Directs entry into 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.
		NOTE The blanks to the side of steps contained in Section 4.0 Operator Actions are intended for place keeping only. Initials are **NOT** required. If necessary, place keeping marks may be made directly in the Control Room copy of this instruction. **CONTACT** Management Services for a replacement copy when time permits.
		4.2 Subsequent Actions **NOTES** 1) If power cannot be restored promptly to a de-energized RPS Bus, plant operation may continue until repairs are made provided all plant operational limits are met. 2) With Reactor Building Ventilation isolated, Main Steam Line Tunnel Area temperature can reach PCIS Group 1 isolation trip setpoint in less than 10 minutes unless the Main Steam Tunnel Booster Fan is in service. 3) With Drywell Control Air isolated, MSIV accumulator air can bleed down and cause MSIV's to close.

Simulator Event Guide:

Event 5 Component : Loss of RPS A

	Crew	[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.
	Driver	After dispatched to RPS MG report trip of MG Set cause unknown at this time When requested to restore RPS A using alternate insert trigger 11
		[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.

Simulator Event Guide:

Event 5 Component : Loss of RPS A

	Crew	Restoration of systems to normal per 3-OI-99
		8.3 Restoration to Normal Following RPS Bus Power Loss **NOTES** 1) This section provides instructions for resetting the various system isolations and reopening affected valves to allow those systems to be restored to normal operation in accordance with their respective operating instructions. 2) The following steps are performed at Panel 3-9-5 unless otherwise noted. 3) When RPS Bus power is lost to some scram discharge volume level switches, their RTD heater is de-energized. Following the restoration of power, a time delay, dependent on how long the level switch was de-energized, prevents resetting the half scram signal. This may take up to 37 seconds after RPS power is restored. Precaution 3.0M can be referred to for more information on these level switches.
	ATC	[1] **OBTAIN** Unit Supervisor/SRO's permission to restore to normal. [2] **MOMENTARILY PLACE** SCRAM RESET, 3-HS-99-5A/S5, as follows: A. RESET FIRST B. RESET SECOND C. NORMAL
	ATC	[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. D. Points SOE033 and SOE035 on ICS computer or on the First Out Printer reads "NOT TRIP" for RPS "A". E. Points SOE034 and SOE036 on ICS computer or on the First Out Printer reads "NOT TRIP" for RPS "B".

Simulator Event Guide:

Event 5 Component : Loss of RPS A

	BOP	[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.
	BOP	[4.2] **CHECK** the following red lights ILLUMINATED: • MSIV GROUP A1, 3-IL-64-A1 • MSIV GROUP B1, 3-IL-64-B1
	BOP	[4.3] **MOMENTARILY PLACE** PCIS DIV II RESET, 3-HS-64-16A-S33, to left and right RESET positions.
	BOP	[4.4] **CHECK** the following red lights ILLUMINATED: ▪ MSIV GROUP A2, 3-IL-64-A2 ▪ MSIV GROUP B2, 3-IL-64-B2
		NOTE Steps 8.3[5] through 8.3[21] can be performed in any order.
	BOP	[5] **CHECK** the green lights are ILLUMINATED on all 5 of the QLVPS located at bottom of Panel 9-14.
	BOP	[6] **RESTORE** Reactor and Refuel Zone Ventilation to normal operation. REFER TO 3-AOI-64-2D, Group 6 Ventilation System Isolation.
		[7] **RESTORE** Standby Gas Treatment System to standby readiness. REFER TO 0-OI-65.

Simulator Event Guide:

Event 5 Component : Loss of RPS A

	BOP	3-AOI-64-2D Group 6 Ventilation System Isolation
		[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. • 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 • 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

Simulator Event Guide:

Event 5 Component : Loss of RPS A

	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.
	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.
	BOP	[12] At Panel 3-9-2, **RESTORE** Radiation Monitoring System as follows: [12.1] **DEPRESS** RESET pushbutton. [12.2] **VERIFY OPEN** the associated valve. [12.3] **RELEASE** pushbutton. • 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)

Simulator Event Guide:

Event 6 Component : Trip of RFPT C

	DRIVER	When directed by NRC, insert malfunction (imf fw15c (e15 0) to trip the RFPT C.
	ATC	Recognizes Trip of RFPT C and reports to SRO.
	ATC	Verifies Feedwater is recovering RPV Water Level in Automatic.
	ATC	Responds to the following alarms: RFPT TRIPPED (3-XA-55-6C, Window 29) RFPT C ABNORMAL (3-XA-55-6C, Window 15)
	ATC	RFPT TRIPPED (3-XA-55-6C, Window 29): **Operator Action:** 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.
	ATC	RFPT C ABNORMAL (3-XA-55-6C, Window 15) **Operator Action:** A. **CHECK** other RFP alarms on Panel 3-9-6 to determine problem area. B. **REFER TO** appropriate alarm response procedure. C. **IF** no other annunciator on Panel 3-9-6 is in alarm, **THEN PERFORM** an alarm summary on alarm types.

Simulator Event Guide:

Event 6 Component : Trip of RFPT C

	SRO	Enters 3-AOI-3-1, Loss Of Reactor Feedwater or Reactor Water Level High/Low
		3-AOI-3-1, Loss Of Reactor Feedwater or Reactor Water Level High/Low
	ATC	**CAUTION** [NRC/C] Operations outside of the allowable regions shown on the Recirculation System Operating Map could result in thermal-hydraulic power oscillations and subsequent fuel damage. **REFER TO** 3-GOI-100-12A for required actions and monitoring required during a power reduction. [NCO 940245001]
		[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. [3] **IF** any EOI entry condition is met, **THEN ENTER** the appropriate EOI(s). [10] **IF** RFPs are in manual control, **THEN RAISE** speed of operating RFPs.
	ATC	Takes manual control of RFPT B and restores water level.
Driver	Driver	When directed by the NRC Insert Trigger 20 for loss of all offsite power and trigger 25 on the scram
Driver	Driver	If an Automatic Scram occurs or the crew scrams the reactor insert trigger 20 and 25

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	ATC	Report Reactor Scram and places Mode Switch to Shutdown Scram Report: • Rods out • MSIVs closed • Reactor Level lowering and no Feedwater Available • Reactor Pressure increasing • Initiated One Channel of ARI
	BOP	Report loss of all offsite power
	SRO	Directs entry into 0-AOI-57-1A
CT#2	SRO	**Enters EOI-1 on Low Reactor Water Level and High Reactor Pressure** **RC/Q** Monitor and Control Reactor Power Verify the Mode Switch is on Shutdown Initiate second channel of ARI Verify Recirc Pump Runback. (Pump speed 480rpm or less) Answers **NO** to: Is Reactor Power above 5% or Unknown? Directs ATC to perform: • Appendix 2, Defeat ARI Logic Trips • Appendix 1F, Defeat RPSA Logic Trips • Appendix 1D, Drive Control Rods
	ATC	Recognizes CRD 3A Pump is not available due to power loss. Starts 3B CRD pump. He will have to coordinate this step if RHR 3A pump is already running on 4KV S/D Board EA (3EA diesel supplying).
	BOP/ATC	Dispatch personnel to perform Appendix 2 and outside portions of Appendix 1F. Dispatch personnel to close, 3-FCV-85-586. (While awaiting completion of Appendix 1F.) Drive Rods per Appendix 1D, while waiting for completion of Appendix 1F.
Driver	Driver	When directed to perform Appendix 2 and outside portions of Appendix 1F wait 3 minutes. Insert **triggers 22 (bat app01f) and 23 (bat app02)** then report completion.

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	DRIVER	When scram is reset insert **trigger 21 (bat atws-1)**
CT#2	ATC	**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. 7. **CONTINUE** to perform Steps 1 through 6 UNTIL ANY of the following exists: • ALL control rods are fully inserted, **OR** • NO inward movement of control rods is observed, **OR** • SRO directs otherwise.
	DRIVER	If directed to close 3-FCV-85-586, wait 3 minutes, then insert **mrf rd06 close** and report completion. If/When directed to re-open 3-FCV-85-586, wait 3 minutes, then insert **mrf rd06 open** and report completion.

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

CT#2	ATC	**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. 6. WHEN NO further control rod movement is possible or desired, THEN **DISPATCH** personnel to **VERIFY OPEN** 3-SHV-085-0586, CHARGING WATER SOV (RB NE, El 565 ft).
		RC/P Monitor and Control RPV Pressure. Answers **YES** to: Is any MSRV cycling? Directs BOP to maintain RPV Pressure 800-1000 psig using SRVs Appendix 11A
	BOP	Maintains RPV Pressure as directed with SRV's

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	SRO	**RC/L** Monitor and Control RPV Water Level. Verify as Required: • PCIS Isolations (Groups 1, 2 and 3) • ECCS • RCIC Answers **YES** to: Can water level be Restored and Maintained above (+) 2 inches? Direct level control with RCIC IAW 3-EOI Appendix-5C with a level band of +2 to 51 inches
	BOP	Control Reactor Water Level with RCIC IAW 3-EOI Appendix-5C 3. **VERIFY RESET** and **OPEN** 3-FCV-71-9, RCIC TURB TRIP/THROT VLV. 4. **VERIFY** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller in AUTO with setpoint at 620 gpm. 5. **OPEN** the following valves: • 3-FCV-71-39, RCIC PUMP INJECTION VALVE • 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE • 3-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV. 6. **PLACE** 3-HS-71-31A, RCIC VACUUM PUMP, handswitch in START. 7. **OPEN** 3-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV, to start RCIC Turbine. 8. **CHECK** proper RCIC operation by observing the following: a. RCIC Turbine speed accelerates above 2100 rpm. b. RCIC flow to RPV stabilizes and is controlled automatically at 620 gpm. c. 3-FCV-71-40, RCIC TESTABLE CHECK VLV, opens by observing 3-ZI-71-40A, DISC POSITION, red light illuminated. d. 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE, closes as flow rises above 120 gpm. 9. IF BOTH of the following exist: • RCIC Initiation signal is NOT present, **AND** • RCIC flow is below 60 gpm, THEN **VERIFY OPEN** 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE. 10. **ADJUST** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller as necessary to control injection.

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	SRO	Enters 0-AOI-57-1A, Loss of Offsite Power (161 and 500 KV)/Station Blackout
	BOP	0-AOI-57-1A, Loss of Offsite Power (161 and 500 KV)/Station Blackout **4.1 Immediate Actions** [1] **VERIFY** Diesel Generators have started and tied to respective 4kV Shutdown Boards, **THEN DISPATCH** personnel to Diesel Generators.
CT#1	BOP	Recognizes 3EA Diesel Generator started but the breaker failure auto close and manually closes the breaker to energize the 4KV shutdown board 3EA.
	BOP	Recognized the failure of 3EB, 3EC, and 3ED diesels to start. Manually starts 3EC and 3ED. 3EB does not start.
	BOP	[2] **VERIFY** two EECW Pumps (not using the same EECW strainer) are in service supplying Diesel Generators.
	BOP	[4] **PERFORM** the following to ensure at least one train of Diesel Generator Room Fans are energized: • **VERIFY** 480V DSL Aux Board 3EA or 3EB energized.
	NRC	DG 3EA is the only DG that will pick up its respective Shutdown Board

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

CT#1	BOP	**4.2 Subsequent Actions** [1] **IF** ANY EOI entry condition is met, **THEN** **REFER** to the appropriate EOI(s). (Otherwise N/A) [2] **VERIFY** automatic actions and **PERFORM** any that failed to occur.
CT#1	BOP	Recognizes 3EA Diesel Generator started but the breaker failure auto close and manually closes the breaker to energize the 4KV shutdown board 3EA.
		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) 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	[3] **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.
	DRIVER	When requested to restore EECW in the above step, insert **trigger 26 (bat eecw) and then trigger 27 bat eecw-1**

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

<table>
<tr><td></td><td>BOP</td><td>[4] START Control Air Compressors G,A, and D as required and MONITOR system pressure. Refer to 0-AOI-32-1.

[4.1] IF an air compressor trips on high temperature, THEN (Otherwise N/A)

NOTIFY Unit Supervisor for instructions.

[5] REFER to 1(2)(3)-AOI-32-2, Loss of Control Air, as necessary</td></tr>
<tr><td></td><td>DRIVER</td><td>When requested to restore air compressors in the above step, insert <u>"TRIGGER 28 (BAT CA)"</u></td></tr>
<tr><td></td><td>SRO</td><td>Dispatch personnel to energize available Boards

Table 2
<table><tr><th>Board</th><th>Normal Power Supply</th><th>Alternate Power Supply</th></tr><tr><td>480V SD BD 3A</td><td>4KV SD BD 3EA</td><td>4KV SD BD 3EB</td></tr><tr><td>480V SD BD 3B
480V RMOV BD 3A</td><td>4KV SD BD 3EC
480V SD BD 3A</td><td>4KV SD BD 3EB
480V SD BD 3B</td></tr><tr><td>480V RMOV BD 3B</td><td>480V SD BD 3B</td><td>480V SD BD 3A</td></tr><tr><td>480V RMOV BD 3C</td><td>480V SD BD 3B</td><td>480V SD BD 3A</td></tr><tr><td>480V RMOV BD 3D</td><td>MG Feed from 480V SD BD 3A</td><td>MG Feed from 480V SD BD 3B</td></tr><tr><td>480V RMOV BD 3E</td><td>MG Feed from 480V SD BD 3B</td><td>MG Feed from 480V SD BD 3A</td></tr><tr><td>480V Diesel Aux BD 3EA</td><td>480V SD BD 3A</td><td>480V SD BD 3B</td></tr><tr><td>480V Diesel Aux BD 3EB</td><td>480V SD BD 3B</td><td>480V SD BD 3A</td></tr></table></td></tr>
<tr><td></td><td>Crew</td><td>Energizes</td></tr>
<tr><td></td><td>DRIVER</td><td>When requested to rack in Alternate Supply Breakers for 480V Boards, wait 2 minutes and Insert triggers 19 and 24. Inform Control Room that 480 V RMOV Board 3B is energized and that they can energize 480 V RMOV Board 3C</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>Crew</td><td>Energizes 480 V RMOV BD 3A and 3C, 480 V SD BD 3A and 480 V Diesel Aux BD 3EA</td></tr>
<tr><td></td><td></td><td>[6] PLACE RPS MG Sets A and B in service. Refer to 1(2,3)-OI-99.</td></tr>
<tr><td></td><td>DRIVER</td><td>When requested to restore RPS in the above step, wait 2 minutes and insert trigger 29 (bat rpsreset)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	SRO	**Executes all legs of EOI-2 concurrently** **EOI-2 DW/T** Monitor and control Drywell Temperature below 160°F, using available Drywell Cooling. Answers **NO** to: Can Drywell Temperature be maintained below 160°F? **PC/P** Monitor and control Primary Containment pressure below 2.4 psig using the Vent System (Appendix 12) as necessary Direct Appendix 12 Answers **No** to can Primary Containment Pressure be maintained below 2.4 psig Before Suppression Chamber Pressure rises to 12 psig Initiate Suppression Chamber Sprays using only those pumps not required for Adequate Core Cooling Directs Suppression Chamber Sprays
	SRO	**EOI-2 PC/H** Monitor and control Drywell and Suppression Chamber: • Hydrogen at or below 2.4% **AND** • Oxygen at or below 3.3% Using the Nitrogen Makeup System (APPX 14A). **EOI-2 SP/T** Monitor and control Suppression Pool temperature below 95°F, using available Suppression Pool Cooling (APPX 17A) as necessary.
	SRO	**EOI-2 SP/L** Monitor and control Suppression Pool Level between -1 inch and -6 inches. Can Suppression pool level be maintained above -6 inches YES Can Suppression pool level be maintained below -1 inch YES

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	ATC/BOP	Vent Containment IAW Appendix 12
		1. VERIFY at least one SGTS train in service. 2. VERIFY CLOSED the following valves (Panel 2-9-3 or Panel 2-9-54): 2-FCV-64-31, DRYWELL INBOARD ISOLATION VLV, 2-FCV-64-29, DRYWELL VENT INBD ISOL VALVE, 2-FCV-64-34, SUPPR CHBR INBOARD ISOLATION VLV, 2-FCV-64-32, SUPPR CHBR VENT INBD ISOL VALVE.
		Steps 3, 4, 5 and 6 are If / Then steps that do not apply
		7. **CONTINUE** in this procedure at: Step 8 to vent the Suppression Chamber through 2-FCV-84-19, **OR** Step 9 to vent the Suppression Chamber through 2-FCV-84-20.
		8. VENT the Suppression Chamber using 2-FIC-84-19, PATH B VENT FLOW CONT, as follows: a. PLACE keylock switch 2-HS-84-35, DW/SUPPR CHBR VENT ISOL BYP SELECT, to SUPPR-CHBR position (Panel 2-9-54). b. VERIFY OPEN 2-FCV-64-32, SUPPR CHBR VENT INBD ISOL VALVE (Panel 2-9-54). c. PLACE 2-FIC-84-19, PATH B VENT FLOW CONT, in AUTO with setpoint at 100 scfm (Panel 2-9-55). d. PLACE keylock switch 2-HS-84-19, 2-FCV-84-19 CONTROL, in OPEN (Panel 2-9-55). e. VERIFY 2-FIC-84-19, PATH B VENT FLOW CONT, is indicating approximately 100 scfm. f. CONTINUE in this procedure at step 12.

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	BOP	Vents Primary Containment IAW Appendix 12
		9. VENT the Suppression Chamber using 2-FIC-84-20, PATH A VENT FLOW CONT, as follows: a. VERIFY OPEN 2-FCV-64-141, DRYWELL DP COMP BYPASS VALVE (Panel 2-9-3). b. PLACE keylock switch 2-HS-84-36, SUPPR CHBR/DW VENT ISOL BYP SELECT, to SUPPR-CHBR position (Panel 2-9-54). c. VERIFY OPEN 2-FCV-64-34, SUPPR CHBR INBOARD ISOLATION VLV (Panel 2-9-54). d. VERIFY 2-FIC-84-20, PATH A VENT FLOW CONT, in AUTO with setpoint at 100 scfm (Panel 2-9-55). e. PLACE keylock switch 2-HS-84-20, 2-FCV-84-20 ISOLATION BYPASS, in BYPASS (Panel 2-9-55). f. VERIFY 2-FIC-84-20, PATH A VENT FLOW CONT, is indicating approximately 100 scfm. g. CONTINUE in this procedure at step 12.
		12. ADJUST 2-FIC-84-19, PATH B VENT FLOW CONT, or 2-FIC-84-20, PATH A VENT FLOW CONT, as applicable, to maintain ALL of the following: Stable flow as indicated on controller, AND 2-PA-84-21, VENT PRESS TO SGT HIGH, alarm light extinguished, AND Release rates as determined below: iii. IF Venting for ANY other reason than items i or ii above, THEN MAINTAIN release rates below Stack release rate of 1.4 x 107 µCi/s AND 0-SI-4.8.B.1.a.1 release fraction of 1.
	DRIVER	Acknowledge Notification

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	ATC/BOP	Initiate Suppression Chamber Sprays per Appendix 17C
		1. BEFORE Suppression Chamber pressure drops below 0 psig, **CONTINUE** in this procedure at Step 6. 2. IF Adequate core cooling is assured **OR** Directed to spray the Suppression Chamber irrespective of adequate core cooling, THEN **BYPASS** LPCI injection valve open interlock as necessary: • **PLACE** 2-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS**. • **PLACE** 2-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.**
	ATC/BOP	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-74-122(130), RHR SYS I(II) LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE. c. **MOMENTARILY PLACE** 2-XS-74-121(129), RHR SYS I(II) CTMT SPRAY/CLG VLV SELECT, switch in SELECT. d. IF.....2-FCV-74-53(67), RHR SYS I(II) INBD INJECT VALVE, is OPEN, THEN...**VERIFY CLOSED** 2-FCV-74-52(66), RHR SYS I(II) OUTBD INJECT VALVE. e. **VERIFY OPERATING** the desired RHR System I(II) pump(s) for Suppression Chamber Spray. f. **VERIFY OPEN** 2-FCV-74-57(71), RHR SYS I(II) SUPPR CHBR/POOL ISOL VLV. g. **OPEN** 2-FCV-74-58(72), RHR SYS I(II) SUPPR CHBR SPRAY VALVE. h. IF.....RHR System I(II) is operating ONLY in Suppression Chamber Spray mode, THEN...**CONTINUE** in this procedure at Step 5.k. i. **VERIFY CLOSED** 2-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.

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	ATC/BOP	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-23-34, RHR HX 2A RHRSW OUTLET VLV • 2-FCV-23-46, RHR HX 2B RHRSW OUTLET VLV • 2-FCV-23-40, RHR HX 2C RHRSW OUTLET VLV • 2-FCV-23-52, RHR HX 2D RHRSW OUTLET VLV. n. **NOTIFY** Chemistry that RHRSW is aligned to in-service RHR Heat Exchangers.
	SRO	When Suppression Chamber Pressure exceeds 12 psig, determines that Drywell Sprays are required. Directs **Loop II** of RHR to be placed in Drywell Sprays per EOI Appendix 17B.
	ATC/BOP	**Drywell Sprays per appendix 17B** 1. IF.....Adequate core cooling is assured **OR** Directed to spray the Drywell irrespective of adequate core cooling, THEN..... **BYPASS** LPCI injection valve open interlock as necessary: • **PLACE** 1-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in **BYPASS**. • **PLACE** 1-HS-74-155B, LPCI SYS II OUTBD INJ VLV BYPASS SEL in **BYPASS.**
		2. **VERIFY** Recirc Pumps and Drywell Blowers shutdown.
		3. IF ..... Directed by SRO to spray the Drywell using RHR System I(II), THEN.....**CONTINUE** in this procedure at Step 6 using RHR Loop I(II).

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

	ATC/BOP	6. **INITIATE** Drywell Sprays using RHR Loop I as follows: a. BEFORE drywell pressure drops below 0 psig, **CONTINUE** in this procedure at Step 9. a. **VERIFY** at least one RHRSW pump supplying each EECW header.
		c. IF EITHER of the following exists: • LPCI Initiation signal is NOT present, **OR** • Directed by SRO, THEN **PLACE** keylock switch 1-XS-74-122(130), RHR SYS I LPCI 2/3 CORE HEIGHT OVRD, in MANUAL OVERRIDE.
		d. **MOMENTARILY PLACE** 1-XS-74-121, RHR SYS I CTMT SPRAY/CLG VLV SELECT, switch in SELECT.
		e. IF1-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE, is OPEN, THEN **VERIFY CLOSED** 1-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE.
		f. **VERIFY OPERATING** the desired System I(II) RHR pump(s) for Drywell Spray.
		g. **OPEN** the following valves: 1-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV 1-FCV-74-61, RHR SYS I DW SPRAY INBD VLV.
		h. **VERIFY CLOSED** 1-FCV-074-0007, RHR SYSTEM I MIN FLOW VALVE.
		j. **MONITOR** RHR Pump NPSH using Attachment 2.
		k. **VERIFY** RHRSW pump supplying desired RHR Heat Exchanger.
		l. **THROTTLE** the following in-service RHRSW outlet valves to obtain between 1,350 and 4,500 gpm RHRSW flow: • 1-FCV-23-34, RHR HX 1A RHRSW OUTLET VLV

Simulator Event Guide:

Event 7 Major: Loss of Offsite Power, LOCA, ATWS

		9. 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: • 1-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV • 1-FCV-74-61, RHR SYS I DW SPRAY INBD VLV b. IF RHR pumps are running THEN **VERIFY OPEN** 1-FCV-74-7, RHR SYS I MIN FLOW VALVE.
	SRO	REP Classification is an Alert. EAL 2.1-A

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

All Control Rods are inserted

Reactor Level is maintained

Drywell or Suppression Chamber has been Sprayed

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

3% power. 3-GOI-100-1A Section 5.4 Step 63.3

Operations/Maintenance for the Shift:

Warm RFPT B IAW 3-OI-3 Section 5.6 step 20. Continue to pull rods for Mode Change.

Units 1 and 2 are 100% Power

Unusual Conditions/Problem Areas:

None

Facility: **Browns Ferry NPP** Scenario No.: **NRC - 10** Op-Test No.: **1108**

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

_____ **ATC:**_____

_____ **BOP:**_____

Initial Conditions: 95% power. DG 3A is OOS

Turnover: Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 3-OI-30B and raise power to 100% with Recirc Flow

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP N-SRO	Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 3-OI-30B
2		R-ATC R-SRO	Raise Power to 100% with flow
3	CU04	C-ATC TS-SRO	RWCU Leak with failure to Auto isolate
4	EG13a	C-BOP C-SRO	Bus Duct Cooling Fan Trip with failure of standby fan to auto start
5	TH03a	C-ATC R-ATC TS-SRO	RR Pump A Trip with power oscillations
6	TH30a / d	C-BOP TS-SRO	Level 2 instrument failures (58A and 58D) cause HPCI and RCIC to Auto initiate
7	HP08	M-ALL	HPCI Steam Leak without Isolation
8	TC02	C	No bypass valves with ATWS
9	ED12a	C	Loss of 480V RMOV BD 3A

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

Critical Tasks - Three

CT#1-With reactor at power and with a primary system discharging into the secondary containment, manually scram the reactor before any area exceeds the maximum safe operating level.

1. Safety Significance:
   Scram reduces to decay heat energy that the RPV may be discharging into the secondary containment.

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

3. Measured by:
   Observation - With a primary system discharging into secondary containment, a reactor scram is initiated before a maximum safe condition is reached.
   OR
   Observation - With a primary system discharging into secondary containment, US transitions to EOP-1 and RO initiates scram upon report that a maximum safe condition has been reached.

4. Feedback:
   Control rod positions
   Reactor power decrease

CT#2-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.

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

CT#3-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.

4. Feedback:
   Valve position indication

EVENTS

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

2. ATC raises power to 100%

3. The ATC will respond to RWCU alarms indicating a leak and RWCU will fail to isolate. The ATC will isolate RWCU and take actions IAW 2-AOI-64-2A. The SRO will evaluate Technical Specification 3.6.1.3 Condition A is required. The SRO will evaluate TRM 3.4.1 and direct Chemistry to sample in order to satisfy TSR 3.4.1.1.

4. BOP will respond to Bus Duct Cooling 3A Fan trip and take action IAW with ARPs, start standby Bus Duct Cooling Fan 3B.

5. Reactor Recirculation 3A Pump will trip, ATC will respond IAW 3-AOI-68-1A. The ATC will close 3A RR Pump Discharge Valve. Small power oscillations will develop. The ATC will insert control rods to dampen oscillations and exit region 2. The SRO will evaluate Technical Specification 3.4.1 Condition A is required.

6. Level transmitter 58A and 58D will fail to less than -45 inches. This failure will result in a HPCI and RCIC auto initiation. The BOP Operator will respond IAW ARPs. BOP Operator will verify that level is in normal band and secure HPCI and RCIC. The SRO will evaluate Technical Specification 3.3.4.2 Condition A and B, 3.3.5.1 Condition A, B and F, 3.3.5.2 Condition A and B, and 3.8.1 Condition D and J.

7. After the HPCI initiation a steam leak will develop in the HPCI Room, HPCI will fail to automatically and manually isolate. When attempting to manually isolate HPCI steam valve 73-2 the 3A 480V RMOV Board will be lost due to an electrical fault.

8. The crew will enter EOI-3 and scram the Reactor. A small ATWS will occur on the scram; power, level and pressure will be controlled IAW EOI-1. When the second MAX safe temperature is reached the crew will Emergency Depressurize.

9. Turbine Bypass Valves will not be available on the scram with an ATWS of 20 rods.

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

All but 6 Control Rods are inserted

Emergency Depressurization complete

Reactor Level is restored and maintained.

SCENARIO REVIEW CHECKLIST

SCENARIO NUMBER: 10

8 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)

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

1 EOI Contingencies used: List (0-3)

75 Validation Time (minutes)

3 Crew Critical Tasks: (2-5)

YES Technical Specifications Exercised (Yes/No)

Scenario Tasks

TASK NUMBER	K/A	RO	SRO
Alternate Reactor and Refuel Zone Fans			
RO U-30A-NO-2	288000A4.01	3.1	2.9
Raise Power with Recirc Flow			
RO U-068-NO-17 SRO S-000-NO-138	2.1.23	4.3	4.4
RWCU Leak with Failure to Auto Isolate			
RO U-069-AL-10 SRO S-000-EM-12	223002A2.03	3.0	3.3
Bus Duct Cooling Fan Trip			
RO U-047-AL-13	245000A2.05	3.6	3.8
Reactor Recirculation Pump Trip			
RO U-068-AB-1 SRO S-068-AB-1	202001A2.03	3.6	3.7
Level 2 Instrument Failures			
RO U-073-NO-5 RO U-071-NO-5 SRO S-000-AD-27	216000A3.01	3.4	3.4
HPCI Steam Leak			
RO U-073-AL-06 SRO S-000-AB-03 SRO S-000-EM-12 SRO S-000-EM-15	295032EA2.03	3.8	4.0

Procedures Used/Referenced:

Procedure Number	Procedure Title	Procedure Revision
3-OI-30A	Refuel Zone Ventilation System	Rev 26
3-OI-30B	Reactor Zone Ventilation System	Rev 20
3-GOI-100-12	Power Maneuvering	Rev 35
3-OI-68	Reactor Recirculation System	Rev 80
3-ARP-9-3D, W17	RWCU Leak Detection Temperature High	Rev 28
3-AOI-64-2A	Group 3 RWCU Isolation	Rev 9
TS 3.6.1.3	Primary Containment Isolation Valves	Amd 212
TRM 3.4.1	Coolant Chemistry	Rev 21
3-EOI-3	Secondary Containment Control	Rev 10
3-ARP-9-7A, W31	Generator Bus Duct Fan Failure	Rev 22
3-AOI-68-1A	Recirc Pump Trip/Core Flow Decrease OPRMs Operable	Rev 6
3-ARP-9-3F, W29	Reactor Water Level Low Low HPCI/RCIC Initiation	Rev 28
TS 3.3.4.2	Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) Instrumentation	Amd 213
TS 3.3.5.1	Emergency Core Cooling System (ECCS) Instrumentation	Amd 213
TS 3.3.5.2	Reactor Core Isolation Cooling (RCIC) System Instrumentation	Amd 213
TS 3.8.1	AC Sources - Operating	Amd 244
TS 3.5.1	ECCS - Operating	Amd 244
TS 3.5.3	RCIC System	Amd 244
3-ARP-9-3F, W10	HPCI Leak Detection Temperature High	Rev 28
3-EOI-1	RPV Control	Rev 8
3-AOI-100-1	Reactor Scram	Rev 53
3-EOI-App-3A	SLC Injection	Rev 1
3-EOI-3-C-5	Level/Power Control	Rev 9

Procedures Used/Referenced:

Procedure Number	Procedure Title	Procedure Revision
3-EOI-App-4	Prevention of Injection	Rev 4
3-EOI-3-C-2	Emergency RPV Depressurization	Rev 8
3-EOI-App-6A	Injection Subsystems Lineup Condensate	Rev 2
3-EOI-App-6C	Injection Subsystems Lineup RHR System II LPCI Mode	Rev 3
3-EOI-App-2	Defeating ARI Logic Trips	Rev 4
3-EOI-App-1F	Manual Scram	Rev 2
3-EOI-App-1D	Insert Control Rods using Reactor Manual Control System	Rev 2
3-EOI-2	Primary Containment Control	Rev 8
3-EOI-App-17A	RHR System Operation Suppression Pool Cooling	Rev 5
EPIP-1	Emergency Classification	Rev 46
EPIP-4	Site Area Emergency	Rev 32

Simulator Instructor – IC205

#3A DG tagged out
ior ypobkr1838 fail_ccoil
mrf dg01a open
ior zlo3hs2113ea9a[1] off

#RWCU seal leak no auto iso
imf cu06
imf cu04 (e1 0) 100 300 50

#bus duct cooling fan trip
imf eg13a (e5 0)

#Recirc pump A trip, with pwr oscillations
imf th03a (e10 0)
imf cr02a (e10 30) 10 120
imf cr02b (e10 30) 10 120

#RCIC/HPCI Initiate due to failed Instr
imf th30a (e15 0) 40
imf th30d (e15 0) 35 60 84

#ATWS/major HPCI Leak (have to manually modify fp02 to close)
mrf fp02 (e20 0) close
imf hp09
imf hp08 (e20 0) 8 700 4
trg 21 nrc2011732
trg 21 = imf ed12a
ior ypovfcv733 (e20 0) fail_now
bat nrcstick20
imf tc02 (e20 0) 0
trg 26 = bat app01f
trg 27 = bat app02
trg 28 = bat app08ae
trg 29 = bat nrcunstick14

Scenario 10

		DESCRIPTION/ACTION
Simulator Setup	manual	Reset to IC 205
Simulator Setup	**Load Batch**	bat nrc1108-10
Simulator Setup	manual	Clearance DG 3A
Simulator Setup		Verify file loaded
Simulator Setup		

RCP required (95% - 100% with flow) and RCP for Urgent Load Reduction
Provide marked up copy of 3-GOI-100-12

Simulator Event Guide:

Event 1 Normal: Alternate Refuel and Reactor Zone Fans

	SRO	Direct alternating Refuel and Reactor Zone Supply and Exhaust Fans IAW 3-OI-30A, section 6.1 and 3-OI-30B, section 6.1
	BOP	Alternates Refuel Zone Supply and Exhaust Fans IAW 3-OI-30A, sections 6.1
		6.1 Alternating Refueling Zone Supply and Exhaust Fans [1] **NOTIFY** Unit 1 and Unit 2 Operators that the Refuel Zone fans are being alternated. [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. [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. [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

Simulator Event Guide:

Event 1 Normal: Alternate Refuel and Reactor Zone Fans

		6.1 Alternating Refueling Zone Supply and Exhaust Fans (contd) **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.
	Driver	When contacted as RBAUO, wait 6 minutes and report Supply Fan Filter Differential Pressure indicates .25 inches H2O and the Refueling Zone Static Pressure on Panel 25-220 indicates -0.30 inches
	BOP	Alternates Reactor Zone Supply and Exhaust Fans IAW 3-OI-30B, sections 6.1
		6.1 Alternating Reactor Zone Supply and Exhaust Fans [5] **PLACE** REACTOR ZONE FANS AND DAMPERS Switch, 3-HS-64-11A, in OFF [6] [II/C] **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

Simulator Event Guide:

Event 1 Normal: Alternate Refuel and Reactor Zone Fans

		6.1 Alternating Reactor Zone Supply and Exhaust Fans (contd) [7] **PLACE** REACTOR ZONE FANS AND DAMPERS Switch, 3-HS-64-11A, in SLOW A (SLOW B) to start alternate fans. [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.
	Driver	When contacted as RBAUO, wait 2 minutes and report Reactor Zone Pressure Differential indicates -0.30 inches

Simulator Event Guide:

Event 2 Reactivity: Raise Power to 100% 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
		[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, insert trigger 1 for RWCU Leak with failure to Auto isolate

Simulator Event Guide:

Event 3 Component: RWCU leak with failure to auto isolate

	ATC	Report alarm RWCU LEAK DETECTION TEMP HIGH (3-9-3D Window 17) A. **IF** this alarm is received in conjunction with RWCU ISOL LOGIC CHANNEL A TEMP HIGH [3-XA-55-5B, window 32] and RWCU ISOL LOGIC CHANNEL B TEMP HIGH [3-XA-55-5B, window 33], **THEN EXIT** this procedure and **GO TO** 3-ARP-9-5B. Otherwise, **CONTINUE** in this procedure.
		Report alarms RWCU ISOL LOGIC CHANNEL A TEMP HIGH, RWCU ISOL LOGIC CHANNEL B TEMP HIGH
		A. **VERIFY** alarm by checking: 1. ATUs on Panel 3-9-83 and 3-9-85. 3. Area temperature indications on LEAK DETECTION SYSTEM TEMPERATURE, 3-TI-69-29, on Panel 3-9-21.
		B. **IF** leak is suspected, **THEN MANUALLY ISOLATE** RWCU or if RWCU automatically isolates, **REFER TO** 3-AOI-64-2A. C. **IF** TIS-69-835A(C) indicates greater than 131°F, **THEN ENTER** 3-EOI-3.
	ATC	Reports RWCU Valve 69-1 failed to isolate
CT #3		Closes 69-1 to stop RWCU Leak
CT #3	SRO	Directs Penetration Isolated or concurs with the closure of 69-1
	SRO	Enter EOI-3 and 3-AOI-64-2A
	ATC	**4.1 Immediate Actions** [1] **VERIFY** automatic actions occur. [2] **PERFORM** any automatic actions which failed to occur.
	Driver	Acknowledge Notifications, when dispatched to ATUs report high temperatures in RWCU HX room and temperature lowering.

Simulator Event Guide:

Event 3 Component: RWCU leak with failure to auto isolate

	BOP	**4.2 Subsequent Actions** [5] **CHECK** the following monitors for a rise in activity: • AREA RADIATION, 3-RR-90-1, Points 9, 13, and 14 (Panel 3-9-2) • AIR PARTICULATE MONITOR CONSOLE, 3-MON-90-50, 3-RM-90-55 and 57 (Panel 3-9-2) • RB, TB, and Refuel Zone Exhaust Rad on CHEMISTRY CAM, MONITOR CONTROLLER, 0-MON-90-361 (Panel 1-9-2) [6] **IF** it has been determined that leakage is the cause of the isolation, **THEN NOTIFY** RADCON of RWCU status. [7] **NOTIFY** Chemistry that RWCU has been removed from service for the following evaluations: • The need to begin sampling Reactor Water • The need to remove the Durability Monitor from service [8] **IF** the isolation cannot be reset, **THEN** [9] **EVALUATE** Technical Requirements Manual Section 3.4.1, Coolant Chemistry, for limiting conditions for operation.
	SRO	Evaluate Technical Specification 3.6.1.3 and determine Condition A required and TRM 3.4.1. Notifies Chemistry that continuous monitoring is no longer available and to commence sampling per TRM Surveillance 3.4.1.1
		Enters EOI-3 on High Secondary Containment Temperature. **Secondary Containment Temperature** Monitor and Control Secondary Containment Temperature. Operate available ventilation, per Appendix 8F. Answers **YES** to: Is Any Area Temp Above Max Normal? Isolate all systems that are discharging into the area Verifies RWCU Isolated **Secondary Containment Radiation** Monitor and Control Secondary Containment Radiation Levels. Answers **NO** to: Is Any Area Radiation Level above Max Normal? **Secondary Containment Level** Monitor and Control Secondary Containment Water Levels. Answers **NO** to: Is Any Floor Drain Sump Above 66 inches? AND Answers **NO** to: Is Any Area Water Level Above 2 inches?
	Driver	When directed by NRC, insert trigger 5 for Bus Duct Cooling Fan Trip

Simulator Event Guide:

Event 4 Component: Bus Duct Cooling Fan Trip with failure of standby fan to auto start

	BOP	Responds to alarm "GEN BUS DUCT FAN FAILURE" 7A-31
		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(B) using 3-HS-262-1A(2A), 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 scram, **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.
	BOP	Start Standby Bus Duct Cooling Fan B and dispatches personnel
	SRO	Concurs with start or directs start of Bus Duct Cooling Fan B
	BOP	Dispatch personnel to breaker and bus duct cooling fans
	Driver	Breaker for bus duct cooling fan A is tripped, no abnormal indications apparent, if asked to reset breaker, breaker trips again, no problems noted at fans
	Driver	When directed by NRC, insert trigger 10 for RR pump A trip

Simulator Event Guide:

Event 5 Component: RR Pump A Trip with power oscillations

	ATC	Respond to numerous alarm and Report Trip of RR Pump A
	SRO	Enter 3-AOI-68-1A Recirc Pump Trip/Core Flow Decrease OPRMs Operable
	ATC	[1] **IF** both Recirc Pumps are tripped in modes 1 or 2, **THEN** (Otherwise N/A), [2] **IF** a single Recirc Pump tripped, **THEN CLOSE** tripped Recirc Pump discharge valve.
		Closes 3A Recirc Pump Discharge Valve
	ATC	[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. Report in Region 2 of Power to Flow Map
	SRO	Directs Load Line reduction to <95%
	ATC	Insert Rods per Emergency shove sheets until <95% Load Line
	Driver	When First Control rod is inserted delete Power Oscillations cr02a and cr02b
	Driver	When directed by NRC, insert trigger 15 for Level 2 instrument failures (58A and 58D) cause HPCI and RCIC to Auto initiate

Simulator Event Guide:

Event 6 Instrument: Level 2 instrument failures (58A and 58D) cause HPCI and RCIC to Auto initiate

	BOP	Report alarm 3F-29 RX WTR LVL LOW LOW HPCI/RCIC INIT
	ATC/BOP	A. **CHECK** RPV water level using multiple indications.
		Report indicated water level on B instrument is less than -45 inches but other indicators are normal.
	ATC/BOP	Trip RCIC and HPCI
	Crew	Determine that Level instruments 58A and 58D have failed
	Driver	If dispatched to investigate failures, report 58A is due to a problem with the slave trip unit LS-3-58A and still investigating the cause of the 58D instrument problem but it appears to be in the transmitter LT-3-58D.
	SRO	Technical Specification 3.3.4.2 Condition A, B and C Required Action A Completion Time 14 days Required Action B Completion Time 72 hours Required Action C Completion Time 1 hour 3.3.5.1 Condition A, B, and F Required Action A Completion Time Immediately Required Action B.1 Completion Time 1 hour Required Action B.2 Completion Time 1 hour Required Action B.3 Completion Time 24 hours Required Action F.1 Completion Time 1 hour Required Action F.2 Completion Time 96 hours and 8 days 3.3.5.2 Condition A and B Required Action A Completion Time Immediately Required Action B.1 Completion Time 1 hour Required Action B.2 Completion Time 24 hours 3.8.1 Condition D and J Required Action D.1 Completion Time 7 Days Required Action J.1 Completion Time Enter 3.0.3 Immediately 3.5.1 Condition C and G Required Action C.1 Completion Time Immediately Required Action C.2 Completion Time 14 Days Required Action G.1 Completion Time 12 Hours 3.5.3 Condition A and B Required Action A.1 Completion Time Immediately Required Action A.2 Completion Time 14 Days Required Action B.1 Completion Time 12 Hours
	Diver	When directed by NRC, insert trigger 20 for HPCI steam leak without isolation, **Manually modify fp02 to Close**

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	Crew	Recognize rising HPCI Room Temperatures and Radiation Levels. HPCI LEAK DETECTION TEMP HIGH A. **CHECK** HPCI temperature switches on LEAK DETECTION SYSTEM TEMPERATURE, 3-TI-69-29 on Panel 3-9-21. B. **IF** high temperature is confirmed, **THEN ENTER** 3-EOI-3 Flowchart. C. **CHECK** following on Panel 3-9-11 and **NOTIFY** RADCON if rising radiation levels are observed: 1. HPCI ROOM EL 519 RX BLDG radiation indicator, 3-RI-90-24A. 2. RHR WEST ROOM EL 519 RX BLDG radiation indicator, 3-RI-90-25A.
	ATC/BOP	**VERIFIES** HPCI STEAM LINE INBD ISOL VLV, 3-FCV-73-2 **AND** HPCI STEAM LINE OUTBD ISOL VLV, 3-FCV-73-3 **CLOSE.**
		Attempts to isolate HPCI Steam Supply Valves.
		Reports HPCI fails to isolate.
	ATC/BOP	During attempts to isolate HPCI Steam Supply Valves, report a loss of 3A RMOV Board. (Loop 1RHR and Loop 1 Core Spray unavailable.)
	Crew	Contacts personnel to investigate loss of 3A RMOV Board.
	Crew	Dispatches personnel to transfer RPS A to alternate.
	Driver	When requested, wait 4 minutes and place RPS A on alternate, irf rp04 **and** rp03.
	Crew	PA announcement to evacuate the HPCI quad or Reactor Building

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	SRO	Enters EOI-3 on Secondary Containment (Area Radiation or Temperature).
	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, per Appendix 8F. Defeat isolation interlocks if necessary, Appendix 8E.
		If ventilation isolated and below 72 mr/hr, directs Operator to perform Appendix 8F.
	Driver	If requested, wait 3 minutes and report Appendix 8E complete, **enter** bat app08e
CT #1	SRO	**Enters** EOI-1 RPV Control **and** directs Reactor Scram **before** any temperature exceeds MAX Safe.
CT #2	SRO	Stops at Stop sign When temperatures in two or more areas are above Max Safe, Then Emergency Depressurization is required.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

CT #1	SRO	**Enters** EOI-1 RPV Control **and** directs Reactor Scram **before** any temperature exceeds MAX Safe.
CT #2	SRO	Stops at Stop sign When temperatures in two or more areas are above Max Safe, Then Emergency Depressurization is required.
	SRO	EOI-3 Secondary Containment (Temperature)
		Monitor and Control Secondary Containment Temperature.
		Is Any Area Temp 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? - YES
		Proceeds to the STOP sign Before any area temp rises to Max Safe (table 5) Continue:
	Crew	Monitors for Max Safe Temperatures, reports when two areas are above MAX Safe (HPCI Room greater than 270°F and RHR System II Pump Room greater than 215°F)
	SRO	EOI-3 Secondary Containment (Level)
		Monitor and Control Secondary Containment Water Levels.
		Is Any Floor Drain Sump Above 66 inches?– NO Is Any Area Water Level Above 2 inches? - NO

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	SRO	EOI-3 Secondary Containment (Radiation)
		Monitor and Control Secondary Containment Radiation Levels.
		Is Any Area Radiation Level 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? - YES
		Proceeds to the STOP sign Before any area radiation rises to Max Safe (table 4) Continue

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

CT #1	SRO	**Enters** EOI-1 RPV Control **and** directs Reactor Scram **before** any temperature exceeds MAX Safe based on EOI-3 step SC/T-6.
CT #1	ATC	Inserts Reactor Scram, Initiates One Channel of ARI and reports "rods out"
	SRO	**Enters EOI-1 from EOI-3 step SC/T-6** Verify Reactor Scram **EOI-1 RC/P** Monitor and Control RPV pressure Exits RC/P and enters C-2, Emergency RPV Depressurization, based on Override step RC/P-4. **EOI-1 RC/L** Monitor and Control RPV Water Level Verify as Required: • PCIS Isolations (Groups 1,2 and 3) • ECCS • RCIC Exits RC/L and enters C-5, Level/Power Control, based on override RC/L-3 **EOI-1 RC/Q** Monitor and Control Reactor Power • Crew may determine Reactor Subcritical and exit RC/Q, as long as NO Boron has been injected, at any point during execution. If this is done Crew would enter AOI-100-1, Reactor Scram, based on override RC/Q-2. **(The following steps will be executed through AOI-100-1 if RC/Q exited)** • Verify Reactor Mode Switch is in Shutdown • Initiate second channel of ARI • Verify Recirc Pump Runback (Pump speed 480rpm or less) • Answers **No** to is Reactor Power above 5% or Unknown **(The Following steps N/A if RC/Q exited)** • Before Suppression Pool Temperature rises to 110F, determines Boron Injection is Required. • Initiates SLC per Appendix 3A

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	SRO	**EOI-1 RC/Q (cont)** Inhibit ADS Verify RWCU System Isolation Answers **Yes** to is SLC injecting into the RPV Stops at step RC/Q-18 until SLC has injected into the RPV to a tank level of 43%, then exits RC/Q and enters AOI-100-1 Trips the SLC pump when SLC tank level drops to 0%
	ATC	Initiates Second Channel of ARI and reports "no rod movement." Verifies Recirc Pump at 480 rpm or less. Reports Reactor Power less than 5% during Scram Report **Should** insert IRM's to determine if Reactor is subcritical
	BOP/ATC	Verify and Report PCIS Isolations, ECCS and RCIC If directed, Initiate SLC per Appendix 3A, Inhibit ADS, and Verify RWCU System Isolation (These steps N/A if RC/Q exited and AOI-100-1 entered)

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	BOP/ATC	**Appendix 3A** 1. **UNLOCK** and **PLACE** 3-HS-63-6A, SLC PUMP 3A/3B, control switch in START PUMP 3A or START PUMP 3B position. 2. **CHECK** SLC System for 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 on Panel 3-9-5 (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 on Panel 3-9-5, • SLC INJECTION FLOW TO REACTOR Annunciator in alarm on Panel 3-9-5 (3-XA-55-5B, Window 14). 3. IF Proper system operation CANNOT be verified, THEN **RETURN** to Step 1 and **START** other SLC pump. 4. **VERIFY** RWCU isolation by observing the following: • RWCU Pumps 3A and 3B tripped • 3-FCV-69-1, RWCU INBD SUCT ISOLATION VALVE closed • 3-FCV-69-2, RWCU OUTBD SUCT ISOLATION VALVE closed. • 3-FCV-69-12, RWCU RETURN ISOLATION VALVE closed. 5. **VERIFY** ADS inhibited. 6. **MONITOR** reactor power for downward trend. 7. **MONITOR** 3-LI-63-1A, SLC STORAGE TANK LEVEL, and **CHECK** that level is dropping approximately 1% per minute.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	SRO	**Enters C-5 from EOI-1 step RC/L-3** Override Step C5-1, states that **IF** Emergency Depressurization is required, **THEN** continue at step C5-19, however, if the SRO has not determined that ED is required at this time then he will continue at step C5-2 (below) Inhibit ADS Answers **Yes** to is any Main Steam Line Open Bypass the following Isolation Interlocks: • MSIV Low Low Low RPV Water Level (APPX (8A) • RB Ventilation Low RPV Water Level (APPX 8E) Crosstie CAD to DW Control Air, if necessary (APPX 8G) **(Step N/A)**
	Driver	When requested for appendix 8A and 8E wait 4 minutes and insert trigger 28 for bat app08ae and report complete
	SRO	Answers **No** to is Reactor Power Above 5% or Unknown Establishes Reactor Water Level Band between -180 and +51 inches utilizing available injection sources listed on step C5-15. Upon determination that Emergency Depressurization is required continues at step C5-19 and enters C-2 by direction of EOI-3 step SC/T-9 and from EOI-1 step RC/P-4 and directs Crew to Stop and Prevent all Injection Sources to the RPV Except from RCIC, CRD and SLC per step C5-20, in accordance with Appendix 4.
	BOP/ATC	Inhibits ADS (if not already done per Appendix 3A) If directed, dispatches personnel to perform Appendices 8A and 8E. Maintains Reactor Water Level until directed to Stop and Prevent per Appendix 4. When directed performs Appendix 4 to Stop and Prevent all Injection Sources to the RPV Except from RCIC, CRD and SLC

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	BOP/ATC	**Appendix 4** 1. **PREVENT** injection from HPCI by performing the following: a. IF HPCI Turbine is NOT at zero speed, THEN **PRESS** and **HOLD** 3-HS-73-18A, HPCI TURBINE TRIP push-button. **b.** WHEN HPCI Turbine is at zero speed, THEN **PLACE** 3-HS-73-47A, HPCI AUXILIARY OIL PUMP control switch in PULL TO LOCK and **RELEASE** 3-HS-73-18A, HPCI TURBINE TRIP push-button. 3. **PREVENT** injection from CORE SPRAY following an initiation signal by **PLACING** ALL Core Spray pump control switches in STOP. 4. PREVENT injection from LPCI SYSTEM I by performing the following: NOTE Injection may be prevented by performing EITHER step 4.a or step 4.b. a. Following automatic pump start, PLACE RHR SYSTEM I pump control switches in STOP. OR b. BEFORE RPV pressure drops below 450 psig, 1) PLACE 3-HS-74-155A, LPCI SYS I OUTBD INJ VLV BYPASS SEL in BYPASS. AND 2) VERIFY CLOSED 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE. 5. PREVENT injection from LPCI SYSTEM II by performing the following: NOTE Injection may be prevented by performing EITHER step 5.a or step 5.b. a. Following automatic pump start, PLACE RHR SYSTEM II pump control switches in STOP. **OR**

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	BOP/ATC	**Appendix 4 (continued)** 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. b. **LOWER** RFPT 3A(3B)(3C) speed to minimum setting (approximately 600 rpm) using ANY of the following methods on Panel 3-9-5: • Using 3-LIC-46-5, REACTOR WATER LEVEL CONTROL, in MANUAL AND individual 3-SIC-46-8(9)(10), RFPT 3A(3B)(3C) SPEED CONTROL in AUTO, **OR** • Using individual 3-SIC-46-8(9)(10), RFPT 3A(3B)(3C) SPEED CONTROL in MANUAL, **OR** • Using individual 3-HS-46-8A(9A)(10A), RFPT 3A(3B)(3C) SPEED CONT RAISE/LOWER switch in MANUAL GOVERNOR. 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 d. **TRIP** RFPTs as necessary to prevent injection by **DEPRESSING** the following push-buttons: • 3-HS-3-125A, RFPT 3A TRIP • 3-HS-3-151A, RFPT 3B TRIP • 3-HS-3-176A, RFPT 3C TRIP.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

CT #2	SRO	**Determines Emergency Depressurization is required and enters C-2** Answers **No** to will the reactor remain subcritical under all conditions. Waits until he receives the report that Appendix 4 is complete. Answers **Yes** to is Suppression Pool Level above 5.5 ft Directs All ADS Valves opened Answers **Yes** to can Six ADS Valves be opened **Stops** execution of C-2 until: • The Reactor will remain Subcritical without Boron under all conditions **OR** • SLC has injected into the RPV to a tank level of 43% **OR** • The Reactor is Subcritical and No Boron has been injected into the RPV **Stops** execution of execution of C-2 until Shutdown Cooling RPV Pressure Interlocks are clear **Maintain** RPV in Cold Shutdown per Appendix 17D
CT#2	BOP/ATC	Reports when Appendix 4 is complete Reports Suppression Pool Level in Feet when Directed Opens and Verifies Open ALL ADS Valves when directed
	SRO	**Upon commencement of Emergency Depressurization Continues in C-5 at step C5-21** Answers **Yes** to are at least 2 MSRV's open per C-2, Emergency RPV Depressurization **Stops** until RPV Pressure is below MARFP (190psig with 6 MSRV's open) **Then** continues Directs crew to **Start** and **Slowly** raise RPV Injection to Restore and Maintain RPV Water Level above -180 inches irrespective of pump NPSH limits and Suppression Pool level per Appendix 6A or per Appendix 6C

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	BOP/ATC	**Appendix 6A** 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 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). 10. **VERIFY** RFW flow to RPV.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	BOP/ATC	**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** 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. 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

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	BOP/ATC	**Starts** and **Slowly** raises RPV Injection to Restore and Maintain RPV Water Level above -180 inches irrespective of pump NPSH limits and Suppression Pool level per Appendix 6A or per Appendix 6C
	SRO	**EOI-1 RC/Q steps RC/Q-20 and RC/Q-21** Reset ARI Defeat ARI Logic Trips if necessary (APPX 2) (This step is N/A, however, crew may choose to perform this step) Insert Control Rods by performing Appendix 1F and 1D **Appendix 1F:** Scram Valves Opened but SDV is Full 1) Reset Scram Defeat RPS Logic Trips if necessary 2) Drain SDV 3) Recharge Accumulators 4) Initiate Reactor Scram **Appendix 1D:** Manual Control Rod Insertion Method 1) Drive Control Rods. Bypass RWM if necessary
	BOP/ATC	Dispatch personnel to perform Appendix 2(N/A) and outside portions of Appendix 1F. Dispatch personnel to close 3-FCV-85-586 (while awaiting completion of Appendix 1F) Drive Rods per Appendix 1D while waiting for completion of Appendix 1F

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	ATC	**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. 7. **CONTINUE** to perform Steps 1 through 6 UNTIL ANY of the following exists: • ALL control rods are fully inserted, **OR** • NO inward movement of control rods is observed, **OR** • SRO directs otherwise.
	Driver	When directed to perform Appendix 2 and outside portions of Appendix 1F wait 3 minutes. Insert Triggers 26, 27, and 29 then report completion. If directed to close 3-FCV-85-586 wait 3 minutes then insert **mrf rd06 close**. Then report completion. If/When directed to re-open 3-FCV-85-586 wait 3 minutes then insert **mrf rd06 open**. Then report completion.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	ATC	**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. 6. WHEN NO further control rod movement is possible or desired, THEN **DISPATCH** personnel to **VERIFY OPEN** 3-SHV-085-0586, CHARGING WATER SOV (RB NE, El 565 ft).
	ATC	Continue performance of Appendix 1F and 1D until all rods inserted **OR** Until EOI-1 RC/Q is exited due to Reactor determined to be Subcritical at which point continue to insert rods per 3-AOI-100-1 and 3-OI-85

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	SRO	**Executes all legs of EOI-2 concurrently** **EOI-2 DW/T** Monitor and control Drywell Temperature below 160F using available Drywell Cooling Answers **Yes** to can Drywell Temperature be maintained below 160F **EOI-2 PC/P** Monitor and control Primary Containment pressure below 2.4 psig using the vent system (APPX 12) as necessary Answers **Yes** to can Primary Containment pressure be maintained below 2.4 psig **EOI-2 PC/H** Monitor and control Drywell and Suppression Chamber • Hydrogen at or below 2.4% AND • Oxygen at or below 3.3% Using the Nitrogen Makeup System (APPX 14A) **EOI-2 SP/T** Monitor and control Suppression Pool temperature below 95F using available Suppression Pool Cooling (APPX 17A) as necessary Answers **No** to can Suppression Pool temperature be maintained below 95F (This is assuming Emergency Depressurization is complete and Reactor Water Level has been restored, if Emergency Depressurization has not been conducted yet, the answer will be Yes. If Reactor Water Level has not been restored yet, after Emergency Depressurization, this is not a priority.) Directs Line up of all available Suppression Pool Cooling using only RHR pumps not required to assure adequate core cooling by continuous injection (APPX 17A) (After Emergency Depressurization complete and Reactor Water level restored)
	BOP	Performs Appendix 17A to place Suppression Pool cooling in service after Emergency Depressurization and restoration of Reactor Water level.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	BOP	**Appendix 17A** 1. **If** Adequate core cooling is assured, **OR** Directed to cool the Suppression Pool 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. 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.

Simulator Event Guide:

Event 7 Major: HPCI Steam Leak without Isolation

	BOP	**Appendix 17A (cont)** h. **VERIFY** desired RHR pump(s) for Suppression Pool Cooling are operating. 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.
	SRO	Emergency Plan Classification is 3.1-S.

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

All but six Control Rods are inserted

Emergency Depressurization complete

Reactor Level is restored and maintained

SHIFT TURNOVER SHEET

Equipment Out of Service/LCO's:

DG 3A is Out of Service

Operations/Maintenance for the Shift:

Alternate Refuel and Reactor Zone Fans IAW 3-OI-30A and 3-OI-30B and raise power to 100% with Recirc Flow.

Unit 1 and 2 are 100% Power

Unusual Conditions/Problem Areas:

None